RBSO Revista Brasileira de Saúde Ocupacional
ISSN: 2317-6369 (online)
http://dx.doi.org/10.1590/2317-6369000016420

Dossier COVID-19 and Worker's Health/
Article

Eduardo de Paula Lima[a,b]
https://orcid.org/0000-0001-8957-8025

Alina Gomide Vasconcelos[a,b]
http://orcid.org/0000-0003-2406-1812

Luciane Rugani Teles Corrêa[a]
http://orcid.org/0000-0002-6008-2998

Andréia Geraldo Batista[a]
https://orcid.org/0000-0003-1826-7590

[a] Corpo de Bombeiros Militar de Minas Gerais (CBMMG), Assessoria de Assistência à Saúde. Belo Horizonte, MG, Brazil.

[b] Universidade Federal de Minas Gerais (UFMG), Faculdade de Filosofia e Ciências Humanas, Departamento de Psicologia. Belo Horizonte, MG, Brazil.

Corresponding author:
Eduardo de Paula Lima

Email address:
eduardo.lima@bombeiros.mg.gov.br

The authors inform that the work was not presented at any scientific event and was not based on a dissertation or thesis.

The authors declare that the work received no funding and that there is no conflict of interest.

Frontline losses: absenteeism among firefighters during the fight against the COVID-19 pandemic

Baixas na linha de frente: absenteísmo entre bombeiros durante o combate à pandemia da COVID-19

Abstract

Objectives: to describe absenteeism related to suspected (acute respiratory infection cases) and confirmed cases of COVID-19 and other diagnoses among firefighters in Minas Gerais, Brazil. *Methods*: we analyzed official records of sick leave due to health problems. The analysis was organized into: 1) graphs stratified by diagnostic group; 2) descriptive analyses of proportion of sick leave and percentage of working days lost due to acute respiratory infection; Chi-squared comparison of proportion of sick leave and percentage of working days lost due to acute respiratory infection, and other diagnoses, between 2019 and 2020. *Results*: the graphical analysis showed a regular sick leave pattern before the onset of the pandemic, a peak in sick leave due to acute respiratory infection after the onset of the pandemic, and a new sick leave pattern after the peak period. The proportion of sick leave and the percentage of working days lost due to acute respiratory infection increased by 312% and 580% in 2020, respectively. In contrast, the percentage of working days lost due to other diagnoses decreased by 16%. *Conclusion*: the change in the absenteeism profile among firefighters reflects formal employment contract, institutional policies and risk perception about COVID-19.

Keywords: *absenteeism; firefighters; Coronavirus infections; occupational health*

Resumo

Objetivos*: descrever o absenteísmo relacionado a casos suspeitos (com infecção respiratória aguda) e confirmados da COVID-19 e a outros diagnósticos entre bombeiros de Minas Gerais, Brasil.* Métodos*: foram analisados os registros oficiais sobre afastamento do trabalho por problemas de saúde (licença-saúde). A análise foi organizada em: 1) gráficos estratificados por grupo de diagnóstico; análises descritivas da proporção de licenças-saúde e do percentual de dias de trabalho perdidos por infecção respiratória aguda; 3) comparação (qui-quadrado) da proporção de licenças-saúde e do percentual de dias de trabalho perdidos por infecção respiratória aguda e por outros diagnósticos entre 2019 e 2020.* Resultados*: a análise gráfica mostrou um padrão regular de licenças-saúde antes do início da pandemia, um pico de licenças-saúde por infecção respiratória aguda após o início da pandemia e um novo padrão de licenças-saúde após o período de pico. A proporção de licenças-saúde e o percentual de dias de trabalho perdidos por infecção respiratória aguda aumentaram, respectivamente, 312% e 580% em 2020. Em contraste, o percentual de dias de trabalho perdidos por outros diagnósticos diminuiu 16%.* Conclusão*: a mudança no perfil de absenteísmo entre bombeiros reflete o vínculo formal de emprego, as políticas institucionais e a percepção de risco sobre a COVID-19.*

Palavras-chave: *absenteísmo; bombeiros; infecções por coronavírus; saúde do trabalhador.*

Received: June 10, 2020
Reviewed: July 9,2020
Approved:July10,2020

Introduction

In December 2019, an outbreak of unknown cause pneumonia was identified in the city of Wuhan, capital of Hubei province, China. The disease was attributed to a new type of coronavirus in humans (SARS-CoV-2) and called COVID-19. This health condition can be serious, requiring hospitalization and leading to death in some cases. Preliminary studies indicate that mortality rates are higher among older adults and patients with chronic diseases.[1] There are currently no effective options of drug therapy.[2] As a result, since the beginning of the pandemic, non-pharmacological measures have been recommended by the World Health Organization, especially social distancing.[3]

However, social distancing measures are not feasible for many workers during a pandemic. In some cases, precarious employment and lack of social security do not allow the temporary suspension of workers' activities without compromising their livelihood.[4,5] In others, it is because workers provide essential services to the population, such as those linked to the production and distribution chains of food and medication.[6] There are not only doctors and nurses in hospitals, but also ambulance and fire brigade staff in the streets, in pre-hospital care.[7]

Frontline workers are at a higher risk of infection and illness[8] that result in absenteeism in workplace environments. Staying away from work is a necessary mitigation strategy for serious cases, which can lead to disability, and for all workers with suspected and confirmed SARS-CoV-2 infection. Such precaution is due to the high rate of transmission of the virus from person to person.[1] Otherwise, infected workers could transmit the disease to their co-workers, the patients, or the community members,[7] and contribute to potentially severe economic and public health consequences.[9]

On the frontline against pandemics, the organizational policies influence the adherence of their workers to mitigation strategies. In the case of the H1N1 outbreak in 2009, the effectiveness of institutional communication about the measures[10] and the policies to sign staff off work due to health problems[11] were critical in explaining the propensity of symptomatic workers to stay away from work.[12] Furthermore, there are individual elements at play in risk perception and propensity to absenteeism: a sense of duty and commitment to colleagues are frequently experienced by frontline workers.[10]

In response to the COVID-19 pandemic, the Minas Gerais Fire Department (CBMMG) published a contingency plan, which includes a health protocol to regulate medical care and mandatory sick leave of suspected and confirmed cases of the disease among firefighters.[13] Complementarily, the institution adopted the remote work for some functions[14] and canceled on-site training and courses.[15] Compulsory wearing of face masks was established in the workplace.[16] Also, new personal protective equipment to answer calls and procedures to sanitize vehicles were established.[17] Altogether, added to job stability and the right to paid leave, guaranteed to public servants, it is possible that such measures increased the propensity of firefighters to stay away from work in case of illness due to COVID-19.

The aim of this study was to describe absenteeism related to suspected (with acute respiratory infection) and confirmed cases of COVID-19 and other diagnoses among firefighters in Minas Gerais. Also, the sick leave records from the first five months of 2020 were compared to the same period in 2019. The investigation hypothesis was that there was an increase in sick leave due to acute respiratory infection from March 2020, related not only to COVID-19 cases, but also to the formal employment contract, institutional policies, and occupational risk perception on the frontline against the pandemic.

Method

Background

CBMMG is a state institution linked to Civil Defense, Social Defense and Public Security, with its own healthcare system. This system consists of healthcare centers where professionals from different specialties linked to the institution offer healthcare services to firefighters and their family members (organic network). Besides, the system has service provision agreements with hospitals, clinics, laboratories and, other private establishments (associate network).[18]

Firefighters seen by an organic healthcare professional have their data recorded in a digital platform called Integrated Health Management System (SIGS). In the case of illness, the healthcare professional reports the diagnosis in SIGS and, if he believes the firefighter is unable to work, signs him off work entirely for a given period (sick leave).

If the sick leave is generated by an associate healthcare professional, a doctor of the organic network must approve and record it in SIGS. Either way, entering it in the system is always mandatory. At the end of the process, all the firefighters' health information is stored in a virtual database.

Definition and construction of variables

In March 2020, CBMMG published a guidance protocol for healthcare professionals of the organic network regarding procedures during the pandemic.[13] The document provided definitions of suspected and confirmed cases of COVID-19. Cases of acute respiratory infection were considered as suspected, i.e., cases related to codes J00 to J22 of the International Classification of Diseases (ICD-10).[19] Patients who tested positive for COVID-19 were considered confirmed cases (ICD-10: U07.1). In the present study, sick leave due to suspected and confirmed cases was linked to types of acute respiratory infection. Sick leave due to other clinical diagnoses was identified as caused by other health problems.

Description of absenteeism in the institution was based on the virtual database records (SIGS), available in Excel® file, containing the following information: name and registration number of all active firefighters, position and current unit, length of service at the institution (in years), previous sick leave (yes or no), date of sick leave, diagnosis attributed to sick leave according to the code described in ICD-10,[19] sick leave start and end dates.

Four variables were constructed. The first was the number of potentially worked days. This was calculated from the total number of days in a given period multiplied by the number of active firefighters in the institution. The second was the number of working days lost due to health problems, calculated by the sum of sick leave days.

The third was the percentage of working days lost due to health problems, calculated from the sum of sick leave days divided by the sum of potentially worked days. The fourth variable was the proportion of sick leave due to acute respiratory infection. The latter considered sick leave events, i.e., the number of times that firefighters were signed off work by a healthcare professional after an appointment, regardless of the number of days. The variables were based on the recommendation of Heising and collaborators for studies on absenteeism.[20,21]

Analysis

The first stage of analysis was the construction of bar graphs to view the profile of working days lost due to health problems, day by day, between January 1 and May 31 in the years 2019 and 2020. We organized the data into two strata: acute respiratory infection and other diagnoses. Then, we carried out a descriptive analysis (of absolute and relative data) for these variables. The analyses were organized by month for the first five months of 2019 and 2020. Finally, we used the chi-square test to compare the percentage of lost working days by diagnosis group and the proportion of sick leave due to acute respiratory infection between 2019 and 2020. Comparisons with p-value ≤ 0.05 were considered significant.

Ethical aspects

This investigation, including access to SIGS data, was authorized by the CBMMG Healthcare Advisory Office and General Command. The study is part of a larger project on firefighters' health approved by the Research Ethics Committee of the Federal University of Minas Gerais (UFMG) (CAAE: 15169813.1.0000.5149).

Results

CBMMG currently has 5,627 staff members in active service. Between January 1 and May 31, 2020, 22.5% (n = 1,268) firefighters were signed off work for at least one day due to health problems (all diagnoses). In the same period, 7.0% (n = 396) were signed off work due to conditions compatible with acute respiratory infection. Among them, 20 (0.36%) tested positive for COVID-19. The first case was diagnosed on March 17, 2020, and the last one on May 29, 2020.

Graphic description of sick leave due to acute respiratory infection in 2019 and 2020

Figure 1 presents working days lost due to acute respiratory infection and other diagnoses during the first five months of 2019. The data indicated a low occurrence of absences due to acute respiratory infection and low daily variation in the number of firefighters signed off work for this reason.

Figure 2 shows the number of working days lost due to acute respiratory infection and other diagnoses between January 1 and May 31, 2020.

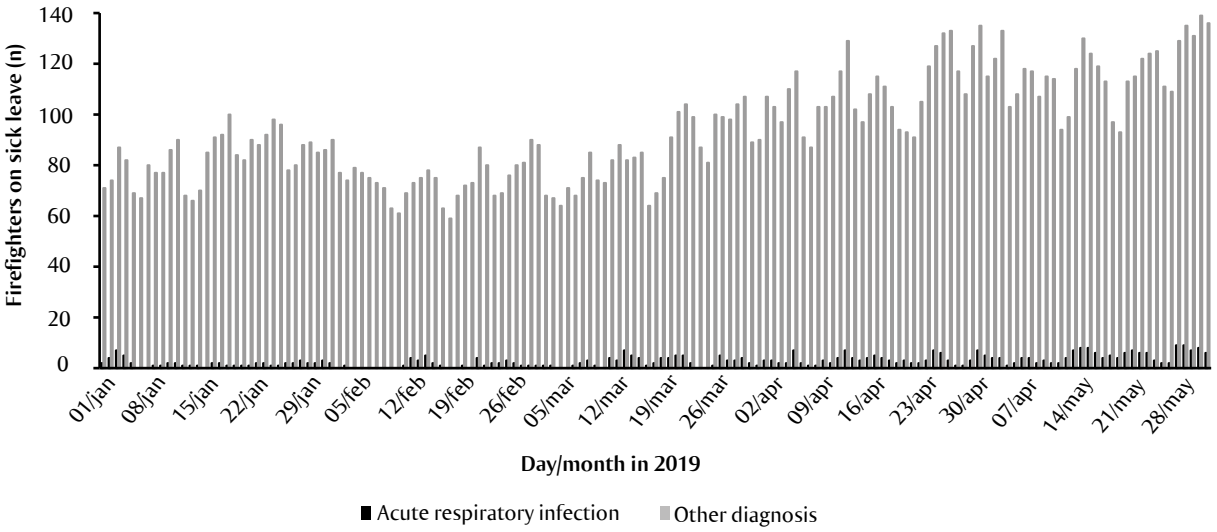

Figure 1 Number of firefighters on sick leave due to acute respiratory infection and other health problems between January 1 and May 31, 2019, in Minas Gerais, Brazil (N = 5,764)

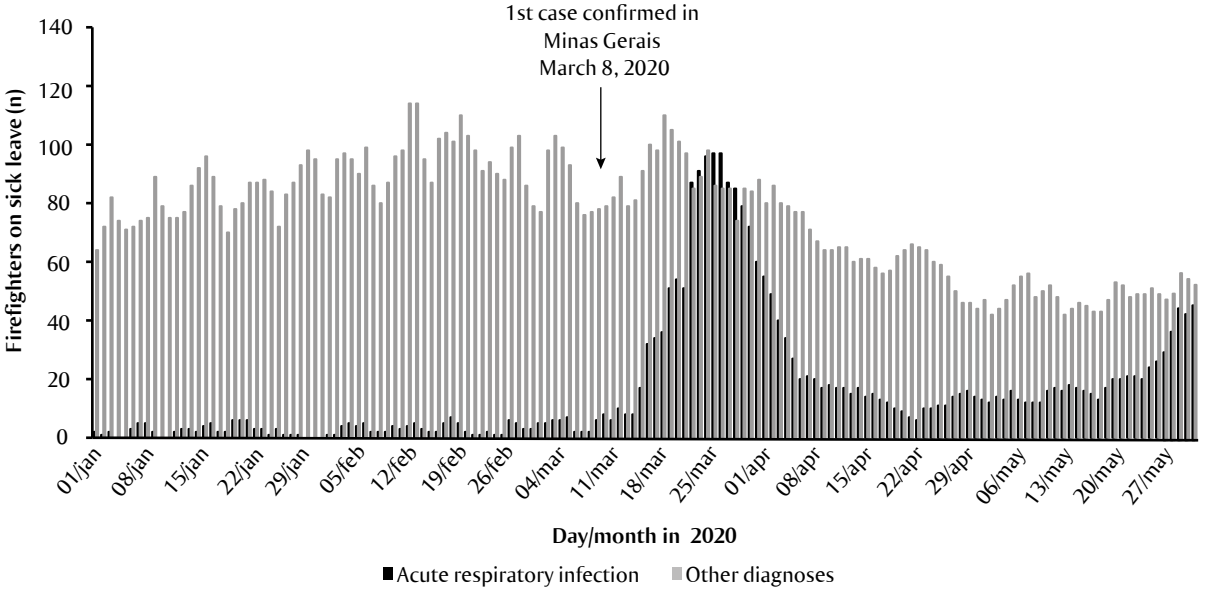

Figure 2 Number of firefighters on sick leave due to acute respiratory infection and other health problems between January 1 and May 31, 2020, in Minas Gerais, Brazil (N = 5,627)

The graphic analysis shows three distinct periods along 2020: 1) a regular sick leave pattern before the pandemic beginning (from January 1 to March 15); 2) a sick leave peak period after the pandemic manifestation (from March 16 to April 9); and 3) a new sick leave pattern after the pandemic peak (from April 10).

The first period is characterized by a regular sick leave pattern before the pandemic onset. A small variation could be observed in the raw data on working days lost due to acute respiratory infection. On average, three firefighters were signed off work per day during this period (0.05% of staff), and the day with the greatest number of suspensions was March 13 (10 firefighters; 0.18% of staff). The diagnosis accounted for, on average, 3.61% of total working days lost due to health problems.

The second period can be defined as sick leave peak period after the pandemic manifestation (from March 15 to April 9). The first confirmed

case of COVID-19 in Minas Gerais was reported on March 8, 2020.[22] One week later, the number of working days lost due to acute respiratory infection increased sharply at CBMMG. The upward trend started on March 15 (17 staff; 0.30% of the workforce) and peaked on March 26 and 27 (97 firefighters; 1.72% of staff). Then the number of signed off firefighters decreased on April 9 (20 firefighters; 0.36% of staff). The average number of firefighters signed off work during the peak period was 56 per day (1.00% of staff), i.e., 18.7 times higher than in the pre-pandemic pattern. Consequently, such suspensions accounted for 39.0% of total sick leave in the institution.

Finally, a new pattern was identified from April 10. The average number of firefighters signed off work per day was 17 (0.30% of staff), indicating an increase of about six times compared to the pre-pandemic period (January 1 to March 15). Absences due to acute respiratory infection accounted for, on average, 24.4% of the total after the peak period. In the period beginning on April 10, the sick leave numbers were not stable. On the contrary, a new growth trend was observed in working days lost due to acute respiratory infection.

Percentage comparison of working days lost due to acute respiratory infection between 2019 and 2020

The 2019 percentage of working days lost due to acute respiratory infection was compared to 2020. Differences were observed over the first five months. In January, no differences were found in total days lost due to acute respiratory infection between 2019 and 2020. In February, a significantly higher percentage of working days lost due to this infection was observed in 2020. In March, the difference between 2019 and 2020 increased and remained statistically significant throughout April and May. (**Table 1**). Compared to 2019, the percentage of working days lost due to acute respiratory infection increased by 580% in 2020.

Comparison of sick leave due to acute respiratory infection between 2019 and 2020

There were no differences between both years regarding the proportion of sick leave due to acute respiratory infection in January. From February, a significant difference in the proportion of sick leave was higher in 2020, with significant differences ($p \leq 0.05$) in February, March, April, and May (**Table 2**). The proportion of sick leave due to acute respiratory infection increased by 312% in 2020.

Percentage comparison of working days lost due to other health problems between 2019 and 2020

Figure 2 suggests that the percentage of working days lost due to other health problems decreased after the pandemic onset. No difference was found between 2020 and 2019 in January. In February and March, there was a greater percentage of working days lost due to other health problems when 2020 is compared to 2019 ($p < 0.05$).

In April and May, however, there was an inversion: a significantly lower percentage of working days lost due to other health problems was observed in 2020. Especially in May the percentage of working days lost due to other health problems was 2.4 times lower in 2020 than the same month in 2019 (0.84% vs. 2.00%, respectively) (**Table 3**). Altogether, the percentage of working days lost due to other diagnoses decreased by 16% in 2020.

Table 1 Descriptive analysis and bivariate comparison (chi-square) of the percentage of working days lost due to acute respiratory infection in 2019 and 2020 among firefighters in Minas Gerais, Brazil

Month	*2019**			*2020***			X^2	*p*
	Potentially worked days	*Days lost due to acute respiratory infection*		*Potentially worked days*	*Days lost due to acute respiratory infection*			
		n	*%*		*n*	*%*		
January	178,684	57	0.03	174,437	74	0.04	2.63	0.104
February	161,392	36	0.02	163,183	88	0.05	21.24	< 0.001
March	178,684	75	0.04	174,437	1150	0.66	972.91	< 0.001
April	172,920	100	0.06	168,810	600	0.36	370.08	< 0.001
May	178,684	150	0.08	174,437	603	0.35	284.17	< 0.001

* Population in 2019 = 5,764 firefighters.
** Population in 2020 = 5,627 firefighters.

Table 2 Descriptive analysis and bivariate comparison (chi-square) of sick leave due to acute respiratory infection in 2019 and 2020 among firefighters in Minas Gerais, Brazil

Month	2019*			2020**			X2	p
	Sick leave (total)	Sick leave due to acute respiratory infection (total)		Sick leave	Sick leave due to acute respiratory infection			
		n	%		n	%		
January	386	26	6.74	363	29	7.99	0.43	0.511
February	371	20	5.39	393	39	9.92	5.50	0.019
March	421	43	10.21	546	215	39.38	103.35	< 0.001
April	580	53	9.14	316	118	37.34	105.37	< 0.001
May	640	70	10.94	329	137	41.64	121.94	< 0.001

* Population in 2019 = 5,764 firefighters.
** Population in 2020 = 5,627 firefighters.

Table 3 Descriptive analysis and bivariate comparison (chi-square) of the percentage of working days lost due to other diagnoses in 2019 and 2020 among firefighters in Minas Gerais, Brazil

Month	2019*			2020**			X2	p
	Potentially worked days	Days lost due to other diagnoses		Potentially worked days	Days lost due to other diagnoses			
		n	%		n	%		
January	178,684	2,511	1.41	174,437	2,523	1.45	1.03	0.310
February	161,392	2,040	1.26	163,183	2,767	1.70	100.58	< 0.001
March	178,684	2,536	1.42	174,437	2,743	1.57	13.65	< 0.001
April	172,920	3,188	1.84	168,810	1,953	1.16	263.81	< 0.001
May	178,684	3,569	2.00	174,437	1,472	0.84	811.29	< 0.001

* Population in 2019 = 5,764 firefighters
** Population in 2020 = 5,627 firefighters

Discussion

The results corroborated the hypothesis that among firefighters absenteeism due to acute respiratory infection has grown since the pandemic onset. A graphic analysis indicated a distinct time-related pattern since the confirmation of the first COVID-19 case in Minas Gerais. The bivariate comparison between 2019 and 2020 showed a higher percentage of working days lost due to acute respiratory infection in 2020. In contrast, the percentage of working days lost due to other diagnoses decreased. The change in the absenteeism profile possiblly reflects the firefighters' illness, but also their formal employment contract, the institucional policies and the risk perception concerning the pandemic.

At least three time-related sick leave patterns were identified between January and May 2020. Their characteristics translated the transition from normality to daily life marked by the need for social distancing and healthcare precautions. The pandemic onset led to an abrupt increase in sick leave numbers due to acute respiratory infection. However, only 7 COVID-19 cases had been recorded until April 10th, which indicates that few suspected cases received the diagnosis of the infectious. The question is: if the firefighters were not on sick leave due to COVID-19 diagnosis, what might explain the abrupt increase in the number of working days lost due to acute respiratory infection?

A caveat is in order here: there is acknowledged underreporting of COVID-19 cases in the state of Minas Gerais.[23] Therefore, one cannot rule out the possibility that sick leave due to acute respiratory infection among firefighters reflects cases of undiagnosed COVID-19, either because they were not tested or because the tests failed to identify the disease. This possibility is reinforced by the lack of diagnostic tests reported by the institution doctors, especially in the beginning of the pandemic. In such a setting, it is difficult to estimate the actual number of cases. However, even though underreporting is recognized and many firefighters stayed away from work without knowing if they had been infected. It is noticeable the increase in the number of workers who looked for a doctor and were signed off work due to symptoms of acute respiratory infection. This is the focus of the discussion.

A first hypothesis was that the increase in the daily number of firefighters signed off work due to

acute respiratory infection merely reflects the change in medical care practices. The protocol published by CBMMG recommended that all firefighters who fit the definition of COVID-19 suspected cases must be signed off work for 7 days and reassessed on the 7th day, with the possibility of extending the leave; it also recommended that confirmed cases be signed off for at least 14 days.[13] Such measures extended the terms adopted by the institution before the pandemic starting, when the recommendation for minimum sick leave due to acute respiratory infections varied from 3 (for example, in cases of flu or laryngitis) to 10 days (for example, in case of pneumonia), depending on the severity of the disease.[24] This hypothesis was discarded after comparison between sick leave in 2019 and 2020: sick leave due to acute respiratory infections grew in absolute numbers and percentages, with significant differences between the two years. Therefore, firefighters did indeed seek medical care more frequently when showing symptoms of acute respiratory infection.

The first hypothesis was rejected. A second one was that firefighters might have seeked more often for medical care due to their increased self perceived risk regarding the threat they were confronted with in their workplace.[25] People who previously would not consider the possibility of seeing a doctor due to fever, sore throat, or coughing changed their behavior. Doctors, in turn, following the new protocol to avoid contagion among workers in their Fire Units, signed off work everyone who reported acute respiratory symptoms. This hypothesis was also supported by the firefighters' formal employment contract. The influence of job security on higher absenteeism rates due to health problems is widely recognized.[26]

But what could explain the growth of sick leave days due to acute respiratory infection followed by a steep decrease in the number of working days lost between March 15 and April 9? Cases of the disease among the population have been growing steadily every day,[23] and, therefore, it seems unreasonable to consider they have decreased among firefighters. It is worth noting that, after the first case of the disease in Brazil, government agencies were unclear, or even contradictory about COVID-19.[27] The lack of centralized guidance during a pandemic tends to generate erratic behavior and undermine the population's adherence to mitigation measures.[28] The issuance of a medical care protocol by CBMMG helped redress this scenario, contributing to standardize individual and collective behavior, inform and, guide workers. Besides, the issuance of new guidelines reorganizing the workplace may also have contributed to stabilizing the firefighters' risk preception.

Self-perception of health risk is based on feelings and cognitions. Fear plays a key role and acts as a catalyst for the adoption of certain behaviors. In fearing the growth of COVID-19 cases in the country, a threat to their own health (and to the health of those close to them), people naturally strive to appease that unpleasant feeling.[29] However, their behavior will depend on their assessment of the situation. Individuals assess the severity of the threat facing them, the likelihood of that threat affecting them in particular (that is, their vulnerability), and, finally, the effectiveness of certain behaviors to mitigate the threat to which they are to exposed. This chain of feelings and cognitions helps to explain erratic behavior, as fear tends to generate inappropriate response when news of a threat are not accompanied by guidance: people may deny the pandemic, avoid talking or thinking about the current situation, focus on magical thoughts (belief in miraculous treatments, for example) or respond in a manner that is exaggerated or unsupported by scientific evidence or medical recommendation.[30]

In short, a plausible explanation for the peak of sick leave due to acute respiratory infection could be summarized as follows. In view of the uncertainty caused by the lack of information and guidance for the general population, there was a sudden increase in the firefighters' self-perceived risk of the disease and their evident occupational exposure to it. The medical guidance and the institutional attitude about the pandemic resulted in a decrease and stabilization of such perception. This explanation is compatible, for example, with the results obtained in a study carried out in Hong Kong showing the high degree of confidence of the population in healthcare professionals regarding behaviors to be adopted in the current situation.[31]

Further analysis suggested that, despite the decrease in sick leave recorded after April 10, risk perception remains higher than before the pandemic beginning. One may assume that this perception will remain high for some time, since no effective drug therapy for COVID-19 has been identified so far and the prospects for a vaccine are remote. Firefighters are likely to remain alert to the occurrence of typical symptoms of the disease because they fear either for their health or for the health of their co-workers, people rescued, and relatives. Therefore, a higher number of firefighters

absent from work due to acute respiratory infection is expected to be part of the new sick leave pattern.

The decrease in sick leave due to other diagnoses since April 2020 could be explained by more than one hypothesis. The first one is that the firefighters are less frequently seeking for healthcare services when affected by less severe symptoms not directly related to COVID-19. For example, sprains, minor cuts or burns, pulled muscles, among others, are being treated at home, without medical advice. At the same time, elective procedures in healthcare services have been restricted or canceled, reducing the number of regular surgeries, exams and appointments.[32] Altogether, the change in the behavioral pattern related to seeking medical care and the imposed restrictions would explain part of the decrease in sick leave due to other diagnoses. The second hypothesis, which complements the first, is that the firefighters are spending more time at home, restricting activities unrelated to work, such as exercising, and leisure.[33] As a result, they are less exposed to risk of injury from trauma and accidents during their time off.

The results suggest recommendations for pandemic management in Brazilian institutions with workers on the frontline against COVID-19. Due to the similarities with firefighters, doctors, nurses and ambulance staff can benefit from measures similar to those described in this article. First of all, it is recommended that the managers of such institutions provide disinfection products, materials, and personal protection equipment compatible with the type of risk inherent to each activity, with special attention to professionals providing hospital and pre-hospital care.[34] Standardized procedures for individual and environmental sanitization (materials, equipment, rooms, vehicles) and reorganization of common spaces, such as living quarters, administrative sectors, cafeterias, and snack bars, are also suggested. The adoption of new routines (such as teleworking, online meetings, shifts with reduced staff in administrative units) and restriction of other activities (suspension of face-to-face classes and courses, for example) are necessary and recommended alongside the mandatory wearing of face masks, distancing measures and hand hygiene during all day work. The institutions must adopt a distinct attitude in facing the pandemic, effectively communicate it to their employees and have the direct participation of healthcare professionals, especially doctors.[4,28] As for absenteeism policies, suspected and confirmed cases must be promptly signed off work. In other words, they must instruct and guide staff and reassure them that no penalties will be imposed.[11]

One aspect that should not be overlooked is health education.[4] Coming into work when ill should be discouraged, even if the employee feels well enough to work normally. Professionals on the frontline are known for minimizing their own risks in favor of the well-being of the population and their co-workers support. However, during a pandemic, such an attitude can be described as a "misplaced sense of duty."[12] Institutional programs should be developed to resignify values considered important by firefighters and other frontline professionals, such as strength, vigor, and selflessness,[35] contrasting them with the duty of not contributing to spread the disease.[28] Such initiatives should, for example, consider that these workers are in direct contact with vulnerable individuals (older adults, patients with chronic diseases), who need to avoid interaction with infected people as much as possible.[9]

Finally, institutions must be aware of changes in workers' habits during the pandemic. The decrease in physical activities due to social distancing and restrictions imposed by local governments (with the closure of gyms, parks, and clubs) may negatively impact on the health and work performance of professionals who need to be physically fit to undertake their jobs.[36] Providing open spaces in the workplace and training programs adapted to the current reality may be beneficial. Similarly, alternative health services for frontline workers can be offered such as online or telephone appointments should be encouraged, especially for those with chronic diseases. This should include psychological and psychiatric care,[8] since symptoms related to anxiety and depression tend to emerge during[37] and persist after periods of pandemic.[38]

This study was based on official absenteeism records and included the entire population of active workers of a public institution. The records of suspected and confirmed cases of COVID-19 were standardized through a protocol and entered into a computerized system. Despite its advantages, it is also necessary to highlight its limitations. The first was that despite the publication of the protocol, no training workshops were offered to the institution's physicians to ensure uniform records. Therefore, the criteria adopted by each professional could be heterogeneous. A second limitation is the absence

of self-reporting data that would make it possible to test the hypotheses. A complementary health survey is recommended addressing specific constructs such as risk perception, frequency of exercising, leisure activities, and search for healthcare services. The intention was to provide a following investigation integrated into the scope of the longitudinal study of which it is part.[39,40]

Conclusion

To conclude, it is noteworthy to stress that the variation in the sick leave pattern probably reflects formal employment conditions and institutional policies favorable to absenteeism due to acute respiratory infection. The increase in risk perception is positive and necessary during a pandemic in which non-pharmacological measures seem to be the only effective way to contain its progress. Consequently, institutions should reinforce such attitudes and behaviors through information campaigns and interventions in work environments and organization.

Authors' contributions

Lima EP and Vasconcelos AG contributed to all stages of the study: data survey, analysis and interpretation, drafting of the manuscript and final review. Corrêa LRT and Batista AG contributed to data interpretation, drafting of the manuscript and critical review. All authors approved the final version and take full responsibility for the study and published content.

References

1. Zhou F, Yu T, Du R, Fan G, Liu Y, Liu Z, et al. Clinical course and risk factors for mortality of adult inpatients with COVID-19 in Wuhan, China: a retrospective cohort study. Lancet. 2020;395(10229):1054-62. doi: 10.1016/S0140-6736(20)30566-3
2. Palmeira VA, Costa LB, Perez LG, Ribeiro VT, Lanza K, Silva ACS. Do we have enough evidence to use chloroquine/hydroxychloroquine as a public health panacea for COVID-19? Clinics. 2020;75:e1928. doi: 10.6061/clinics/2020/e1928
3. World Health Organization. Coronavirus disease (COVID-19) advice for the public: protect yourself and others from the spread of COVID-19 [Internet]. Genebra: WHO; 2020 [citado em 8 jun 2020]. Available from: https://www.who.int/emergencies/diseases/novel-coronavirus-2019/advice-for-public
4. Eastwood K, Durrheim D, Francis JL, d'Espaignet ET, Duncan S, Islam F, Speare R. Knowledge about pandemic influenza and compliance with containment measures among Australians. Bull World Health Organ. 2009;87(8):588-94. doi: 10.2471/blt.08.060772
5. Kumar S, Quinn SC, Kim KH, Daniel LH, Freimuth VS. The impact of workplace policies and other social factors on self-reported Influenza-like illness incidence during the 2009 H1N1 pandemic. Am J Public Health. 2012;102(1):134-40. doi: 10.2105/AJPH.2011.300307
6. Burdorf A, Porru F, Rugulies R. The COVID-19 (Coronavirus) pandemic: consequences for occupational health. Scand J Work Environ Health. 2020;46(3):229-30. doi: 10.5271/sjweh.3893
7. Baker MG, Peckham TK, Seixas NS. Estimating the burden of United States workers exposed to infection or disease: a key factor in containing risk of COVID-19 infection. PLoS ONE. 2020;15(4):e0232452. doi: 10.1371/journal.pone.0232452
8. Sim MR. The COVID-19 pandemic: major risks to healthcare and other workers on the front line. Occup Environ Med. 2020;77(5):281-2. doi: 10.1136/oemed-2020-106567
9. Edwards CH, Tomba GS, Kristiansen IS, White R, Blasio BF. Evaluating costs and health consequences of sick leave strategies against pandemic and seasonal influenza in Norway using a dynamic model. BMJ Open. 2019;9(4):e027832. doi: 10.1136/bmjopen-2018-027832
10. Chiu S, Black CL, Yue X, Greby SM, Laney AS, Campbell AP, de Perio MA. Working with influenza-like illness: presenteeism among US health care personnel during the 2014- 2015 influenza season. Am J Infect Control. 2017;45(11):1254-8. doi: 10.1016/j.ajic.2017.04.008
11. Edwards CH, Tomba GS, Blasio BF. Influenza in workplaces: transmission, workers' adherence to sick leave advice and European sick leave recommendations. Eur J Public Health. 2016;26(3):478-85. doi: 10.1093/eurpub/ckw031
12. Brown LH, Aitken P, Leggat PA, Speare R. Self-reported anticipated compliance with physician advice to stay home during pandemic (H1N1)

2009: results from the 2009 Queensland Social Survey. BMC Public Health. 2010;10:138. doi: 10.1186/1471-2458-10-138

13. Minas Gerais. Polícia Militar de Minas Gerais. Corpo de Bombeiros Militar de Minas Gerais. Nota Técnica nº 03/2020-PMMG/CBMMG: COVID-19 – orientações para os profissionais de saúde. Belo Horizonte: CBMMG; 2020.

14. Minas Gerais. Corpo de Bombeiros Militar de Minas Gerais. Memorando nº 1.127 – CBMMG/BM1. Dispõe sobre o regime especial de teletrabalho no âmbito do Corpo de Bombeiros Militar de Minas Gerais. Belo Horizonte: CBMMG; 2020.

15. Minas Gerais. Corpo de Bombeiros Militar de Minas Gerais. Ordem de Serviço nº 78/2020 – CBMMG/ABM. 1º ciclo adaptado de estudos à distância para os cursos do CFO2 BM 2020, CHO BM 2019/2020 e CFS BM 2020. Belo Horizonte: CBMMG; 2020.

16. Minas Gerais. Corpo de Bombeiros Militar de Minas Gerais. Nota Técnica nº 3 da Assessoria de Assistência à Saúde: uso de máscaras faciais. Belo Horizonte: CBMMG; 2020.

17. Minas Gerais. Corpo de Bombeiros Militar de Minas Gerais. Procedimento Operacional Padrão: limpeza e desinfecção de viatura contaminada por aerossóis. Belo Horizonte: CBMMG; 2020.

18. Minas Gerais. Polícia Militar de Minas Gerais. Corpo de Bombeiros Militar de Minas Gerais. Resolução Conjunta nº 151/2020-PMMG-CBMMG- IPSM: Aprova o Plano Diretor do Sistema de Saúde da Polícia Militar de Minas Gerais, do Corpo de Bombeiros Militar de Minas Gerais e do Instituto de Previdência dos Servidores Militares do Estado de Minas Gerais de 2020.Belo Horizonte: CBMMG; 20202.

19. Organização Mundial da Saúde. Classificação Estatística Internacional de Doenças e Problemas Relacionados à Saúde (CID-10). 10ª rev. São Paulo: Editora da Universidade de São Paulo; 1997.

20. Heising G. The measurements of sickness absence: a theoretical perspective. Nor Epidemiol. 2010;19(2):147-51. doi: 10.5324/nje.v19i2.584

21. Heising G, Alexanderson K, Allebeck P, Bjurulf P. How to measure sickness absence? Literature review and suggestion of five basic measures. Scand J Soc Med. 1998;26(2):133-44. doi: 10.1177/14034948980260020201

22. Minas Gerais. Secretaria de Estado de Saúde. Confirmação do primeiro caso de Coronavírus (Covid-19) em Minas Gerais [Internet]. Belo Horizonte: SES; 2020 [citado em 8 mar 2020]. Available from: https://www.saude.mg.gov.br/component/gmg/story/12233-confirmacao-do-primeiro-caso-de-coronavirus-covid-19-em-minas-gerais

23. Minas Gerais. Secretaria de Estado de Saúde. Secretaria analisa atual cenário da pandemia da Covid-19 em Minas Gerais [Internet]. Belo Horizonte: SES; 2020 [citado em 13 abr 2020]. Available from: https://www.saude.mg.gov.br/component/gmg/story/12471-secretaria-analisa-atual-cenario-da-pandemia-de-covid-19-em-minas-gerais

24. Minas Gerais. Polícia Militar de Minas Gerais. Corpo de Bombeiros Militar de Minas Gerais. Resolução Conjunta PMMG/CBMMG nº 4.789/2019. Acrescenta o § 15 ao Art. 32 e inclui os Anexos "Q" e "R" na Resolução Conjunta nº 4.278, de 10 de outubro de 2013 que dispõe sobre perícias, licenças e dispensas saúde, além de atividades correlatas desenvolvidas na Polícia Militar de Minas Gerais e no Corpo de Bombeiros Militar de Minas Gerais. Belo Horizonte: CBMMG; 2020.

25. Bish A, Michie S. Demographic and attitudinal determinants of protective behaviours during a pandemic: a review. Br J Health Psychol. 2010;15(4):797-824. doi: 10.1348/135910710X485826

26. Araia M, Thoursie OS. Incentives and selection in cyclical absenteeism. Labour Econ. 2005;12(2):269-80. doi: 10.1016/j.labeco.2003.11.009

27. Werneck GL, Carvalho MS. A pandemia de COVID-19 no Brasil: crônica de uma crise sanitária anunciada. Cad Saude Publica. 2020;36(5):e00068820. doi: 10.1590/0102-311X00068820

28. DiGiovanni C, Conley J, Chiu D, Zaborski J. Factors influencing compliance with quarantine in Toronto during the 2003 SARS outbreak. Biosecur Bioterror. 2004;2(4):265-72. Available from: https://doi.org/10.1089/bsp.2004.2.265

29. Pakpour AH, Griffiths MD, Lin CY. Assessing psychological response to the COVID-19: the fear of COVID-19 scale and the COVID stress scale. Int J Ment Health Addict. 2020;[4 p.]. doi: 10.1007/ s11469-020-00334-9

30. Norman P, Boer H, Seydel ER. Protection motivation theory. In: Conner M, Norman P, editores. Predicting health behaviour: research and practice with social cognition models. 2nd ed. Maidenhead: Open University Press; 2005. p. 81-126.

31. Kwok KO, Li KK, Chan HHH, Yi YY, Tang A, Wei1 WI, Wong YS. Community responses during the early phase of the COVID-19 epidemic 1 in Hong Kong: risk perception, information exposure and preventive measures. medRxiv [Internet]. 27 fev 2020 [citado em 8 jun 2020]:20028217. doi: 10.1101/2020.02.26.20028217

32. Conselho Federal de Medicina. Combate à COVID-19: CFM divulga orientações para o trabalho dos médicos durante o período de enfrentamento do coronavírus [Internet]. Brasília, DF: CFM; 2020 [citado em 8 jun 2020]. Available from: http://portal.cfm.org.br/index.php?option=com_content&view=article&id=28641:2020-03-20-22-16-32&catid=3

33. Li S, Wang Y, Xue J, Zhao N, Zhu T. The impact of COVID-19 epidemic declaration on psychological consequences: a study on active Weibo users.

Int J Environ Res Public Health. 2020;17(6):2032. doi: 10.3390/ijerph17062032

34. Jackson Filho JM, Assunção AA, Algranti E, Garcia EG, Saito CA, Maeno M. A saúde do trabalhador e o enfrentamento da COVID-19. Rev Bras Saude Ocup. 2020;45:e14. doi: 10.1590/2317-6369ed0000120

35. Toassi AJ. Heróis de fumaça: um estudo sobre os sentidos do trabalho para profissionais bombeiros [dissertação de mestrado]. Florianópolis: Universidade Federal de Santa Catarina; 2008.

36. Bhojani FA, Castillejo-Picco LA, Cathcart D, Emmett EA, Frangos S, Glencross PM, et al. Fitness- for-duty assessments of industrial firefighters: guidance for occupational medicine physicians. J Occup Environ Med. 2018;60(2):e82-9. doi: 10.1097/JOM.0000000000001256

37. Ho CS, Chee CY, Ho RC. Mental health strategies to combat the psychological impact of COVID-19 beyond paranoia and panic. Ann Acad Med Singapore [Internet]. 2020 [citado em 8 jun 2020];49(3):155-60. Available from: http://www.annals.edu.sg/pdf/49VolNo3Mar2020/V49N3p155.pdf

38. Brooks SK, Webster RK, Smith LE, Woodland L, Wessely S, Greenberg N, Rubin GJ. The psychological impact of quarantine and how to reduce it: rapid review of the evidence. Lancet. 2020;395(10227):912- 20. doi: 10.1016/S0140-6736(20)30460-8

39. Teoh KRH, Lima EP, Vasconcelos AG, Nascimento E, Cox T. Trauma and work factors as predictors of firefighters' psychiatric distress. Occup Med (Lond). 2019;69(8-9):598-603. doi: 10.1093/ occmed/kqz168

40. Lima EP, Vasconcelos AG, Camargos BH. Vigilância em saúde mental no Corpo de Bombeiros Militar de Minas Gerais (CBMMG). Rev Flammae [Internet]. 2020 [citado em 8 jun 2020];6(16):67-88. Available from: https://e0d7bd2c-8e8c-49d8-b8d1-a3128f6947c7.filesusr.com/ugd/08765e_37430ef160434426a231116edde6edb0.pdf