Adherence to social isolation in the Covid-19 pandemic among primary school teachers in Minas Gerais, Brazil

Adesão ao isolamento social na pandemia de Covid-19 entre professores da educação básica de Minas Gerais, Brasil

Cássio de Almeida Lima[1], Celina Aparecida Gonçalves Lima[1], Ana Júlia Soares Oliveira[1], Priscylla Guimarães Silva[1], Wesley Miranda Lourenço de Freitas[1], Desirée Sant'Ana Haikal[1], Rosângela Ramos Veloso Silva[1], Marise Fagundes Silveira[1]

ABSTRACT This study aimed to estimate the prevalence of adherence to social isolation and to investigate associated factors during the Covid-19 pandemic among teachers in Minas Gerais, Brazil. This is a cross-sectional study carried out with a sample of 15,641 teachers. A digital form was applied for data collection. Descriptive analyses of the variables were conducted, which included adherence to social isolation, sociodemographic characteristics, occupational factors, and self-reported health conditions. The Poisson regression model with robust variance was used and Prevalence Ratios (PR) were estimated, with 95% confidence intervals. The prevalence of adherence to social isolation was estimated at 79.8%, and the associated factors were: female gender; 60 years old or older; living with a spouse; longer working hours; sleeping difficulty; feeling sad; and pathologies such as hypertension, diabetes mellitus, obesity, and respiratory diseases. There was a significant prevalence of adherence to social isolation measures among teachers, and that adherence is associated with sociodemographic characteristics, occupational factors, and health conditions of education professionals.

KEYWORDS School teachers. Social isolation. Coronavirus infections. Covid-19. Epidemiology.

RESUMO *Este estudo teve por objetivo estimar a prevalência da adesão ao isolamento social e verificar os fatores associados, durante a pandemia de Covid-19, entre professores de Minas Gerais, Brasil. Trata-se de um estudo transversal realizado com uma amostra de 15.641 docentes. Aplicou-se um formulário digital para a coleta dos dados. Foram conduzidas análises descritivas das variáveis, que incluíram adesão ao isolamento social, características sociodemográficas, fatores ocupacionais e condições de saúde autorrelatadas. Utilizou-se o modelo de regressão de Poisson com variância robusta e se estimaram Razões de Prevalências (RP) com intervalos de 95% de confiança. A prevalência de adesão ao isolamento social foi estimada em 79,8%, cujos fatores associados foram: sexo feminino; faixa etária igual ou superior a 60 anos; viver com o(a) cônjuge; maior carga horária de trabalho; dificuldades no sono; sentimento de tristeza; além de patologias como hipertensão arterial sistêmica, diabetes mellitus, obesidade e doenças respiratórias. Evidenciou-se expressiva prevalência de adesão às medidas de isolamento social entre os docentes, e que a adesão está associada a características sociodemográficas, fatores ocupacionais e condições de saúde dos profissionais da educação.*

PALAVRAS-CHAVE *Professores escolares. Isolamento social. Infecções por coronavírus. Covid-19. Epidemiologia.*

[1]Universidade Estadual de Montes Claros (Unimontes) – Montes Claros (MG), Brasil. *cassioenf2014@gmail.com*

Introduction

In December 2019, in the city of Wuhan, in China, a new variant of an already known virus, the coronavirus, called Sars-CoV-2, emerged. Because it is highly infectious, the virus quickly spread to other countries, and a public health emergency as declared by the World Health Organization (WHO). Due to the growth in the number of cases worldwide, the beginning of the Covid-19 pandemic was announced on March 11, 2020[1]. The lack of effective treatment for the disease has led the Brazilian Ministry of Health to adopt prevention and spread control in the community as its the main strategy[2].

Since the beginning of the pandemic, public health authorities in Brazil have recommended the adoption of measures to prevent the spread of the virus, such as social distancing, isolation of confirmed cases of the disease, washing hands, and wearing masks[3]. However, the main strategy to reduce the number of Covid-19 cases and deaths was the total or partial closure of places that gathered a large number of people, such as schools, stores that provided non-essential services, borders, and the cancellation of public events[1]. These procedures proved to be effective in reducing the overload in Intensive Care Units (ICU) according to a study carried out in the city of São Paulo, which showed an estimated increase of approximately 130% in the capacity of these units during the first month of the pandemic if there were no adherence to these restriction measures[4].

Despite the importance of the control measures adopted, a large part of the population has undergone profound changes in their daily routine, mainly related to work. Education was deeply affected, and remote work began to be used through platforms to continue remote learning[5]. Teachers in public schools had to reorganize their schedule to continue teaching classes synchronously and asynchronously; and, thus, there was an increase in working hours, bringing important consequences to the health of these workers, such as anxiety, stress and depression [6].

Although it is one of the most effective measures to combat the spread of the pandemic, social distancing, or social isolation, can have direct and indirect social and health consequences. Social isolation has caused changes in the pattern of coexistence in work environments and in the family context, arousing feelings of loneliness, fear and anxiety, amid the fear caused by the high rate of viral transmission, the invisibility and morbidity and mortality of Covid-19. Thus, it is necessary to understand the society's health needs. Scientific evidence on the epidemiological impact of the Covid-19 pandemic on different population levels is necessary – such as basic education teachers – so that appropriate public policies can be formulated and implemented to manage the issue in each context[2,6].

This study, therefore, was aimed at estimating the prevalence of adherence to social isolation and at verifying the associated factors, during the Covid-19 pandemic, among public school teachers in the state of Minas Gerais (MG) - Brazil.

Material and methods

Data from the research entitled 'Condições de saúde e trabalho entre professores da rede estadual de ensino do estado de Minas Gerais na pandemia da Covid-19' (Health and work conditions among teachers at state public schools in the state of Minas Gerais in the Covid-19 pandemic) were used. This is an epidemiological, cross-sectional and analytical study carried out with primary school teachers at state public schools in the state of MG, Brazil. In 2020, this population consisted of about 90 thousand teachers distributed in 3,500 state schools.

Data collection

For data collection, a digital form (Google Forms) was made available to participants after prior authorization from the State

Department of Education of the State of Minas Gerais (SEE-MG) and partnership with it. The link to the form was sent to the institutional email of all primary teachers at state public schools, provided by the Regional Education Superintendencies of MG. SEE-MG recommended and encouraged the participation of the teachers in the research, and an invitation was published on its official homepage and social media. Data were collected between August 20 and September 11, 2020, with guaranteed anonymity of the participants, who took, on average, 25 minutes to answer the questionnaire. The inclusion criteria adopted were: working at least in one state school in MG and being an in-service teacher in 2020.

Prior to data collection, a pilot study was carried out with 20 teachers from 5 cities in the state to test and adjust the instrument for data collection.

Study variables

Adherence to social isolation during the pandemic was considered a dependent variable of the study. This variable was evaluated by the question 'During the new coronavirus pandemic, how would you classify your adherence to social isolation?', with the following response options: 1) 'I stayed strictly at home, leaving only for health care needs and/or shopping at supermarkets and pharmacy'; 2) 'I tried to be careful, stay away from people, not visit the elderly, but I kept working and going out'; 3) 'I didn't adhere to it, I lived a normal life'. Adherence to social isolation was considered when the teacher answered option 1. Options 2 and 3 were grouped and considered as non-adherence to social isolation. This procedure followed previous studies[7,8].

The independent variables investigated in this study were distributed into three groups: sociodemographic characteristics, occupational factors and self-reported health conditions. In the group of sociodemographic characteristics, the following were addressed: age group (21 to 40 years old, 41 to 60 years old, over 60 years old); sex; family income (one to two minimum wages, three to five minimum wages and above five minimum wages); marital status (living or not with the spouse); education (master's/doctoral, specialization degrees, undergraduate degree); and number of children (none, one to two, three or more). Occupational factors were: type of contract with the school (state employee/effective and hired/designated); teaching experience (1 to 10 years, 11 to 20 years, more than 20 years); and weekly working hours (2 to 10 hours, 11 to 39 hours and 40 hours or more). Self-reported health conditions were: episodes of sadness during the pandemic (no, yes); sleeping difficulty during the pandemic (no, yes); episode of anxiety or depression during the pandemic (no, yes); systemic arterial hypertension (no, yes); diabetes mellitus (no, yes); obesity (no, yes); and respiratory diseases (no, yes).

Information regarding the location of the school was also collected: school region (urban or rural) and regional area (Centro, Mata, Norte, Sul and Vale do Aço).

Data analysis

The data obtained were transferred to the Statistical Package for the Social Sciences (SPSS) software, version 20.0 for Windows®, and analyzed. The variables were described by absolute and relative frequencies. Using the chi-square test, bivariate analyses were conducted to assess the association between the dependent and independent variables. The variables that presented a descriptive level <0.20 were selected for the multiple model. In the multiple analysis, the Poisson regression model was used, with robust variance[9,10]. At this stage, a significance level of 0.05 and the Deviance test were adopted to assess the model's goodness-of-fit[9,10]. The magnitude of the associations was estimated using the crude and adjusted Prevalence Ratios (PR), with their respective 95% confidence intervals.

Ethical considerations

This research was approved by the Research Ethics Committee of the State University of Montes Claros (Unimontes), with Opinion No. 4,200,389. All participants received a copy of the Free and Informed Consent Term and answered 'yes' to the question regarding their agreement to participate in the research.

Results

A total of 16,210 forms were received, of which 569 were excluded from the study (114 did not accept to participate in the study and 455 answered 'no' to the question 'Do you have a

position as a primary teacher at a state school in the state of Minas Gerais?'). After such exclusions, 15,641 forms were considered valid and were included in the study.

A total of 15,641 teachers from about 800 municipalities in Minas participated in the study, of which 13.3% worked in schools located in rural areas, more than half of the teachers were over 40 years old, and the female sex was predominant (81.9%) in the sample. *Table 1* shows the distributions of participants according to sociodemographic characteristics and occupational factors. About 90% of the teachers have reported feeling sad; and 58.1% have had sleeping difficulties during the pandemic. *Table 2* describes the distributions of the other health conditions of the teachers.

Table 1. Distribution of participants according to sociodemographic characteristics and occupational factors, prevalence of adherence to social isolation and crude prevalence ratio among primary teachers at state public schools in Minas Gerais, Brazil, 2020

Variables	n (%)	Adherence (%)	Gross PR (95% CI)
Sociodemographic characteristics			
Age			
21 to 40	6,447 (41.2)	78.4	1.00
41 to 60	8,793 (56.2)	80.6	1.03 (1.01-1.05)*
60 years old or older	401 (2.6)	84.8	1.08 (1.04-1.13)*
Sex			
Male	2,824 (18.1)	68.2	1.00
Female	12,817 (81.9)	82.4	1.21 (1.18-1.24)*
Family income			
1 to 2 minimum wages	3,969 (25.4)	78.8	1.00
3 to 5 minimum wages	9,301 (59.5)	80.2	1.02 (1.0-1.04)**
More than 5 minimum wages	2,371 (15.2)	80.1	1.02 (0.99-1.04)
Marital status			
Does not live with a spouse	5,188 (33.2)	78.3	1.00
Lives with a spouse	10,453 (66.8)	80.6	1.03 (1.01-1.05)*
Education			
Master's / doctorate	692 (4.4)	80.5	1.00
Specialization	11,115 (71.1)	80.3	1.0 (0.96-1.04)
Undergraduate degree	3,834 (24.5)	78.4	0.97 (0.94-1.01)**

Table 1. (cont.)

Variables	n (%)	Adherence (%)	Gross PR (95% CI)
Number of children			
None	4,272 (27.3)	77.6	1.00
1 to 2	9,237 (59.1)	80.9	1.04 (1.02-1.06)*
3 or more	2,125 (13.6)	79.3	1.02 (0.99-1.05)**
Occupational Factors			
Type of contract with the school			
State employee/effective	8,440 (54.0)	80.1	1.00
Hired/designated	7,201 (46.0)	79.5	0.99 (0.98-1.01)
Teaching experience			
1 to 10 years	5,941 (38.0)	77.8	1.00
11 to 20 years	5,788 (37.0)	80.3	1.03 (1.01-1.05)*
21 years or more	3,911 (25.0)	82.1	1.06 (1.04-1.08)*
Working hours			
2 to 10 hours/week	1,351 (8.6)	70.3	1.00
11 to 39 hours/week	11,816 (75.6)	81.0	1.15 (1.11-1.19)*
40 or more hours/week	2,472 (15.8)	79.3	1.13 (1.08-1.17)*

Source: prepared by the authors, based on data from the research.

Gross RP: Gross Prevalence Ratio; 95% CI: 95% Confidence Interval; minimum wage = R$1,045.00. *p value<0.001. **p value<0.20.

Table 2. Distribution of participants according to health conditions, prevalence of adherence to social isolation and crude prevalence ratio among primary teachers at state public schools in Minas Gerais, Brazil, 2020

Variables	n (%)	Adherence (%)	Gross PR (95% CI)
Mental health conditions			
Episodes of sadness in the pandemic			
No	1,535 (9.8)	73.2	1.00
Yes	14,106 (90.2)	80.5	1.10 (1.07-1.14)*
Sleeping difficulty in the pandemic			
No	6,554 (41.9)	76.8	1.00
Yes	9,087 (58.1)	82.0	1.07 (1.05-1.09)*
Episodes of anxiety and depression in the pandemic			
No	11,597 (74.1)	79.6	1.00
Yes	4,044 (25.9)	80.5	1.01 (0.99-1.03)
Reported comorbidities			
Systemic arterial hypertension			
No	12,981 (83.0)	78.7	1.00
Yes	2,660 (17.0)	85.4	1.09 (1.07-1.11)*
Diabetes mellitus			
No	14.990 (95.8)	79.5	1.00
Yes	6.51 (4.2)	86.5	1.09 (1.05-1.12)*

Table 2. (cont.)

Variables	n (%)	Adherence (%)	Gross PR (95% CI)
Obesity			
No	14,343 (91.7)	79,2	1.00
Yes	1,298 (8.3)	86.8	1.10 (1.07-1.12)*
Respiratory diseases			
No	14.159 (90.5)	79.0	1.00
Yes	1,482 (9.5)	87.9	1.11 (1.09-1.14)*

Source: prepared by the authors, based on data from the research.

Gross PR: Gross Prevalence Ratio; 95% CI: 95% Confidence Interval. *p value<0.001.

The prevalence of adherence to social isolation in the general sample was equivalent to 79.8%. It was slightly higher among teachers who worked in schools in the urban area (*graph 1*). In the regional areas, the following results of adherence to this practice were detected: Centro (81.7%), Mata (81.4%), Norte (78.4%), Sul (77.5%), Triângulo (77 .4%), and Vale do Aço (81.7%).

Graph 1. Prevalence of adherence to social isolation among primary teachers at state public schools, according to the school region. Minas Gerais, Brazil
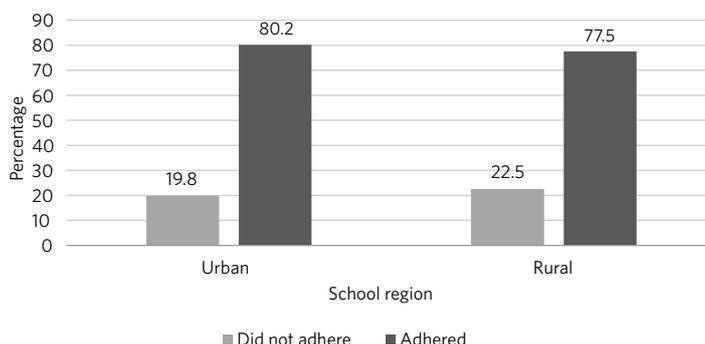
Source: prepared by the authors, based on data from the research.

The following variables were associated with adherence to social isolation in the bivariate analysis and were selected for the multiple model (p-value < 0.20): age group, sex, marital status, number of children, teaching experience in years, workload, episode of sadness, sleeping difficulties, systemic arterial hypertension, diabetes mellitus, obesity and respiratory diseases (*tables 1 and 2*).

Table 3 shows the results of the multiple analysis. Adherence to social isolation was more prevalent among participants over the age of 60, women, who lived with a spouse, who worked more than 10 hours/week, who felt sadness and had sleeping difficulty during the pandemic, who had comorbidities (systemic arterial hypertension, diabetes mellitus, obesity and respiratory diseases). The Deviance test showed that the model presented goodness-of-fit regarding the observed data (χ^2 =5511.0; p-value=0.353).

Table 3. Final model of factors associated with adherence to social isolation among primary teachers at state public schools, Minas Gerais, Brazil, 2020

Variables	Adjusted PR	95% CI
Age group		
21 to 40	1.00	
41 to 60	0.99	0.98-1.01
60 years old or older	1.08	1.03-1.13*
Sex		
Male	1.00	
Female	1.20	1.16-1.23*
Marital status		
Does not live with a spouse	1.00	
Lives with a spouse	1.02	1.00-1.04**
Working hours		
2 to 10 hours/week	1.00	
11 to 39 hours/week	1.13	1.10-1.17*
40 or more hours/week	1.12	1.07-1.16*
Episodes of sadness in the pandemic		
No	1.00	
Yes	1.04	1.00-1.07**
Sleeping difficulty in the pandemic		
No	1.00	
Yes	1.04	1.02-1.06*
Systemic arterial hypertension		
No	1.00	
Yes	1.06	1.04-1.08*
Diabetes mellitus		
No	1.00	
Yes	1.05	1.01-1.08**
Obesity		
No	1.00	
Yes	1.06	1.03-1.08*
Respiratory diseases		
No	1.00	
Yes	1.09	1.07-1.11*

Source: prepared by the authors, based on data from the research.

PR: Prevalence Ratio, 95% CI: 95% Confidence Interval; Deviance Test: $X2 = 5511.006$/p-value=0.353. *p value≤0.001. **p value <0.05.

Discussion

This study gathered epidemiological evidence on adherence to social isolation and associated factors among primary teachers at state public schools in the state of MG. There was an expressive prevalence of the outcome, its distribution in regional teaching areas, in addition to the association with the following factors: age group equal to or greater than 60

years old, female, living with a spouse, longer working hours, feeling sad, sleeping difficulties, systemic arterial hypertension, diabetes mellitus, obesity and respiratory diseases.

The definition of social isolation or distancing varies between studies and different epidemic moments, which makes it difficult to compare among countries and among groups or individuals within the same country[11]. Different results are identified in the international scenario. A telephone survey conducted in Hong Kong – China showed high prevalence of adults who avoided crowded places (from 61% in January to 85% in March 2020)[12]. In Japan, only 30% of the participants always avoided crowded places and 12.6% never avoided them[13]. In the United States (USA), an internet survey revealed that only 4% of the adults had left home in the previous three days[14].

In Brazil, the prevalence detected was closer to what was found in this study. In a survey with primary teachers in the South region, only 6% reported not being practicing social distancing[5]. In the general population, the national literature presents the following findings on the prevalence of social isolation: 89.9% in a survey conducted in 24 states of the 5 regions of the country [2]; 91% among adults participating in the telephone survey called Surveillance of Risk and Protection Factors for Chronic Diseases by Telephone Survey (Vigilância de Fatores de Risco e Proteção para Doenças Crônicas por Inquérito Telefônico', Vigitel)[15]; in the study conducted in 9 cities in the state of Rio Grande do Sul, 65% of respondents adhered to social isolation[16]. In a national sample representative of the population at the age of 50 or over, a prevalence of 33% was observed (considering social isolation as not having left home in the previous seven days) or 94% when defining social isolation as not having left home or having gone out only to perform essential activities[11]. Also nationwide, in remote health surveys, 75% of the adults stayed at home and, of these, 15% strictly maintained social distancing[7]; 74.2% reported intense adherence to social restraint

measures[8]. In the state of Pernambuco, at the beginning of the pandemic, 32% of those surveyed were in total isolation, 57% in partial isolation and 11% were not isolated[17].

In view of these findings, it is worth mentioning that social distancing measures contribute to reducing the spread of Covid-19 infection, with a significant impact on reducing mortality[7], as observed in the international[18-20] and national literature[7,8,11]. However, in the national epidemiological and political scenario, the control of the Covid-19 epidemic takes place in a context of political disputes. Although the country has established general guidelines early to deal with the problem, it has been the target of conflicting narratives, with denial or reduction of its severity by the main authorities. The implementation of control and prevention measures is often insufficient. There is an environment of uncertainty that can affect the population's perception of the importance of adhering to prevention measures[11].

Such a situation may explain the slight variation in the prevalence of adherence to social isolation among the investigated educational areas, which also differed according to the urban or rural location of the school. Furthermore, the state of MG has a diversity of social, economic, and cultural characteristics, an extensive territorial dimension, and marked socioeconomic inequalities between its regions[21]. Regional studies are relevant because they elucidate the strengths and weaknesses of the regions, so that priority areas are defined, and public health interventions can be developed with greater effectiveness in the fight against the pandemic[21-23].

Regarding the factors associated with adherence to social isolation, similarly to the present study, other investigations also revealed greater adherence among elderly people[5,8,11,16] and women[7,8,16,24,25]. The older age group has probably increased social distancing. However, younger people tend to have greater social mobility and, therefore, high exposure to the Covid-19[5] virus, which increases transmission to the elderly[11]. In turn,

women have shown greater adherence to protective measures, making up a portion of the population with good acceptance of official recommendations related to healthcare[25].

Another factor associated with the assessed outcome was the weekly workload of 11 to 39 hours or 40 or more hours. Social isolation measures promoted the acceleration of changes in work routines through the computerization of processes and procedures, implying an increase in the provision of online services, especially in the field of education[4,5]. This had repercussions for the teachers who continued to work from home, in a process of transition from face-to-face teaching to a digital model of education, which is not a simple change easily absorbed by society[5]. In addition, the low remuneration of the category can be a factor that provides a greater workload, with the teacher accumulating positions and tasks. Teaching is a complex work that affects the health of the professional, as it is carried out in the midst of tensions and different responsibilities[26].

The impact of the current pandemic on mental health has been reported in the literature[2,5,7,17,27-29]. This is a reality that converges with what was observed in this study, in which episodes of sadness and sleeping difficulties were associated with social distancing, similarly to other studies[2,7]. When considering the sociable nature of individuals, isolation is an aspect that can trigger mental suffering[27]. With socioeconomic repercussions and restrictions on human mobility, mental health problems have increased significantly since the outbreak of the pandemic. This is because people tend to feel anxious and insecure in an environment of change and constant pressure[5,29], given the duration of social confinement, the fear of contamination, and the need for economic support[28].

In teaching, specifically in primary education, there are high demands that can make the teacher vulnerable to physical and mental health problems[26]. Thus, it is necessary to ensure that these professionals receive appropriate assistance, with strategies to promote mental health and psychosocial care in the short, medium, and long-term[7,26].

In the present study, there was an association of the outcome variable with systemic arterial hypertension, diabetes mellitus, obesity, and respiratory diseases. This is a finding consistent with the pandemic situation experienced, in which people with such pathologies fall into risk groups that must be extra cautious. It also reflects a global and national epidemiological reality, marked by a high occurrence of Chronic Non-Communicable Diseases (NCDs), which are the main cause of death worldwide[30].

Symptoms associated with coronavirus infection are reported to be more severe in older people and among those with preexisting chronic diseases[11]. There is a relationship of such diseases with higher rates of hospitalizations caused by Covid-19[11], ICU admissions[11,31], evolution to death[11], in addition to a worse prognosis of hospitalized patients and mortality[31-34]. Thus, it is necessary to prioritize health promotion strategies during and after the pandemic[7,31], especially giving special support to teachers with NCDs[26].

Finally, as the sample investigated here is an important population group, it is clear that the Covid-19 pandemic has implications for daily life. It is crucial that different government bodies and civil society entities ensure health care, safety, and resources necessary to reduce the speed of spread of the disease and mitigate its results in people's health[5,24,35,36]. Given the epidemiological circumstances of the country, clear and timely information should be provided, so that the community perceives the risks inherent to the epidemic and increases its adherence to social distancing[11,36].

This study has limitations and advantages. Information on social isolation was based on self-report and may be prone to memory bias or social desirability, in which the respondent may feel embarrassed to reveal low adherence to recommended practices, which may overestimate the prevalence of the event[16]. In a

cross-sectional design, it is difficult to examine social distancing patterns because of the rapid evolution of the pandemic, so inferences based on the results are restricted to the period in which the information was collected. The observed associations do not allow us to confirm a causal relationship. Thus, longitudinal investigations are suggested, which will allow us to assess how the factors studied behave throughout the evolution of the epidemic[11].

However, a robust sample was investigated, with participants residing in different municipalities located in all regions of a state. Online health surveys are promising; and, ethically, the method of data collection adopted is more plausible in the context of the pandemic, especially due to the possibility of obtaining information without the inherent risk of face-to-face interviews[7,11]. This type of survey has a low operational cost and allow tracking knowledge, behaviors, lifestyles, and perceptions in contexts of the rapid rise of infectious diseases[7].

Conclusions

In this study, a significant prevalence of adherence to social distancing was evidenced among public school teachers in the state of MG. The distribution of this adherence varied among the regional areas of basic education and was higher among teachers in the urban area. The outcome in the research was more prevalent among participants ate the age of 60 or over, female, living with a spouse, longer working hour per week, feeling sad, having sleeping difficulties, systemic arterial hypertension, diabetes mellitus, obesity, and respiratory diseases.

Collaborators

Lima CA (0000-0002-4261-8226)* and Lima CAG (0000-0003-3448-4974)* contributed to the analysis and interpretation of data, preparation of the article, and approval of the final version to be published. Oliveira AJS (0000-0001-6248-4053)*, Silva PG (0000-0001-9136-1140)* and Freitas WML (0000-0001-9764-4897)* contributed to the study conception and design, data collection, preparation of the article, and approval of the final version to be published. Haikal DS (0000-0002-0331-0747)* and Silva RRV (0000-0003-3329-8133)* contributed to the conception and design of the study, data analysis and interpretation, critical review of the article, and approval of the final version to be published. Silveira MF (0000-0002-8821-3160)* contributed to the conception and design of the study, guidance of all stages of the study, analysis and interpretation of data, critical review of the article, and approval of the final version to be published.

*Orcid (Open Researcher and Contributor ID).

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