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Adriana Lúcia Meireles[1,2,*]
https://orcid.org/0000-0002-1447-953X
Luciano Garcia Lourenção[1,2]
https://orcid.org/0000-0002-1240-4702
Luiz Antônio Alves de Menezes Júnior[1,2]
https://orcid.org/0000-0002-4497-5358
Hillary Nascimento Coletro[1,2]
https://orcid.org/0000-0002-9142-6079
Irene Carolina Sousa Justiniano[1,2]
https://orcid.org/0000-0002-1635-3367
Samara Silva de Moura[1,2]
https://orcid.org/0000-0003-2485-5137
Amanda Popolino Diniz[1,2]
https://orcid.org/0000-0002-3300-0440
Thaís da Silva Sabião[1,2]
https://orcid.org/0000-0002-9309-1110
Ana Maria Sampaio Rocha[1,2]
https://orcid.org/0000-0003-0665-6548
Aline Priscila Batista[1,2]
https://orcid.org/0000-0001-8305-1011
Nara Nunes Lage[1,2]
https://orcid.org/0000-0003-0243-9378
Bárbara dos Santos Simões[1,2]
https://orcid.org/0000-0002-0432-8885
Carolina Ali Santos[1,2]
https://orcid.org/0000-0001-7237-5299
Raquel de Deus Mendonça[1,2]
https://orcid.org/0000-0001-7599-8715
Amanda Cristina de Souza Andrade[3]
https://orcid.org/0000-0002-3366-4423
Keila Furbino Barbosa[1]
https://orcid.org/0000-0001-9546-8893
Cássio Zumerle Masioli[1]
https://orcid.org/0000-0003-4871-0645
Júlia Cristina Cardoso Carraro[1,2]
https://orcid.org/0000-0003-0027-2690
Mariana Carvalho de Menezes[1,2]
https://orcid.org/0000-0002-3069-7959
Renata Cristina Rezende Macedo Nascimento[1,2]
https://orcid.org/0000-0001-7756-2157

Leonardo Roever[5]
https://orcid.org/0000-0002-7517-5548
Waleska Teixeira Caiaffa[4]
https://orcid.org/0000-0001-5043-4980
George Luiz Lins Machado-Coelho[1,2,*]
https://orcid.org/0000-0002-9806-9721

[1]Epidemiology Laboratory, Medical School, Federal University of Ouro Preto. Ouro Preto, Minas Gerais, Brazil.
[2]Post-graduate Program in Health and Nutrition, Nutrition School, Federal University of Ouro Preto. Ouro Preto, Minas Gerais, Brazil.
[3]Institute of Collective Health, Federal University of Mato Grosso. Cuiabá, Mato Grosso, Brazil
[4]Federal Universityof Minas Gerais. Belo Horizonte, Minas Gerais, Brazil.
[5]Federal University of Uberlândia, Uberlândia, Minas Gerais, Brazil.
[*]These authors jointly supervised this work: Adriana Lúcia Meireles, George Luiz Lins Machado-Coelho.

*** Corresponding author:**

George Luiz Lins Machado-Coelho
Federal University of Ouro Preto, Medical School
Laboratório de Epidemiologia, Escola de Medicina. Universidade Federal de Ouro Preto, Campus Universitário Morro do Cruzeiro. Bauxita. Ouro Preto, Minas Gerais, Brazil. Postal Code: 35400-000.
Phone: +55 (31) 3559-1001
E-mail: gmcoelho@ufop.edu.br

ABSTRACT

Background: A population study is an important tool that can be used to understand the actual epidemiological scenario of the Covid-19 in different territories, identify its magnitude, understand its transmission dynamics, and its demographic, geographical, and social distribution.

Objective: The aim of this study was to determine the prevalence and dynamics of SARS-CoV-2 infection in the population of two Brazilian cities during the pandemic first wave and subsequent socioeconomic and health effects.

Materials & methods: This paper described the methodological procedures adopted and the prevalence of the SARS-CoV-2 infection in the population. A household survey was conducted

between October and December 2020, in two historic cities of Brazil's mining region. Anti-SARS-CoV-2 antibody was detected using the Wondfo® rapid test. The face-to-face interview consisted of administration of a questionnaire containing registration data, sociodemographic and economic variables, living habits, general health condition, mental health, sleep habits, and eating and nutrition.

Results: We evaluated 1,762 residents, of which 764 (43.4%) were in Mariana and 998 (56.6%) in Ouro Preto. For both cities, 51.9% of the interviewees were female, with a predominance of the age range 35 to 59 years old (47.2%). The prevalence of the SARS-CoV-2 infection was 5.5% in all cities, 6.2% in Ouro Preto, and 4.7% in Mariana. The prevalence was similar between cities ($P>0.05$).

Conclusion: The study was effective in verifying the seroprevalence of infection by the virus and its findings will enable further analyses of the health conditions of the population related to social isolation and the risk of infection with SARS-CoV-2.

Keywords: Coronavirus Infections; Pandemics; Health Surveys; Epidemiology; COVID-19 Serological Testing.

INTRODUCTION

The rapid spread of the SARS-CoV-2 virus, the infectious agent causing COVID-19, led the declaration by the World Health Organization on January 30, 2020 that the disease was a global public health emergency. Worldwide, the speed of spread and the risk of collapse of health services have posed ongoing challenges for governments, including the new waves of the disease [1-3].

In Brazil, the federal government's neglect and mismanagement in articulation of actions to pandemic control has led many municipalities to make important epidemiological surveillance decisions, in isolation, to avoid the spread of the virus in their territories. In this context, the difficulties inherent in the diagnosis and notification process, scarcity of human resources in the health services and epidemiological surveillance sectors, and lack of diagnostic tests have made it extremely difficult to understand the actual situation with respect to the frequency of both the disease and the infection [4-7].

Other difficulties related specifically to the disease include: the greater probability that only people with severe symptoms seek health care services and undergo diagnostic tests, the high percentage of infected people with mild symptoms or who are asymptomatic, and the social determination of the disease itself [5-7]. These factors can interfere with the dynamics of transmission, giving rise to underreporting, and the masking of the actual COVID-19 data.

Therefore, it is extremely relevant to assess the viral circulation situation at the local level, especially in smaller cities, where resources are even more scarce.

Thus, a population study is an important tool that can be used to understand the actual epidemiological scenario of the disease in different territories, identify its magnitude, understand its transmission dynamics, and its demographic, geographical, and social distribution. It allows for the construction of valid indicators capable of describing the prevalence of the infection and predicting the risk of disease. Therefore, immunochromatographic tests for antibody detection represent an important tool for epidemiological surveillance services enabling the identification and interruption of the virus transmission chain, subsidizing the health surveillance actions that aim to increase monitoring and individual care, such as the adoption of prevention measures [8-10].

Therefore, a seroepidemiological survey that aimed to determine the prevalence and dynamics of SARS-CoV-2 infection in the population of two medium-sized Brazilian cities, in the Inconfidentes region, and the subsequent socioeconomic and health effects, was conducted. This paper describes the methodological procedures adopted and estimated the prevalence of SARS-CoV-2 infection in the population studied.

METHODS

Study design

In this population-based serological study, a household survey was conducted in two historic cities of Brazil's mining region, between October and December 2020, during the pandemic first wave. The survey was carried out in three stages, with intervals of 21 days, in which different census sectors were evaluated in each stage.

The study design followed the recommendations of the seroepidemiological investigation protocol for SARS-CoV-2 infection of the World Health Organization [11]. All the procedures adopted by this study, followed the Declaration of Helsinki and the Brazilian guidelines and standards for research involving humans.

Study location

Mariana and Ouro Preto are two neighboring, medium-sized cities located in the Serra do Espinhaço, a central-southern region of the Brazilian state of Minas Gerais (Figure 1), known as the Iron Quadrangle. This metallurgical area is considered to be the largest national producer of iron ore. Since these cities have historical, sociodemographic, and geographical characteristics that are different from other Brazilian municipalities, and further, since surveys

conducted in other regions of Brazil may not reflect the real prevalence of infection in the resident population, it is important to understand the dynamics of the epidemic locally.

Mariana was founded in 1696 and is considered to be the first village of Minas Gerais. It has a Human Development Index (HDI) of 0.742. The main economic activity is iron ore extraction, a strong generator of jobs, and public revenue [12,13].

Ouro Preto was founded in 1711 and in 1720, it was chosen as the capital of the new provincia of Minas Gerais [14]. It has a HDI of 0.741. The main economic activities of the municipality revolve around the mining and metallurgical industries, tourism, and services, especially those related to the Federal Institution of Higher Education which is based in the city. These generate high population mobility due to the flow of workers and students [12].

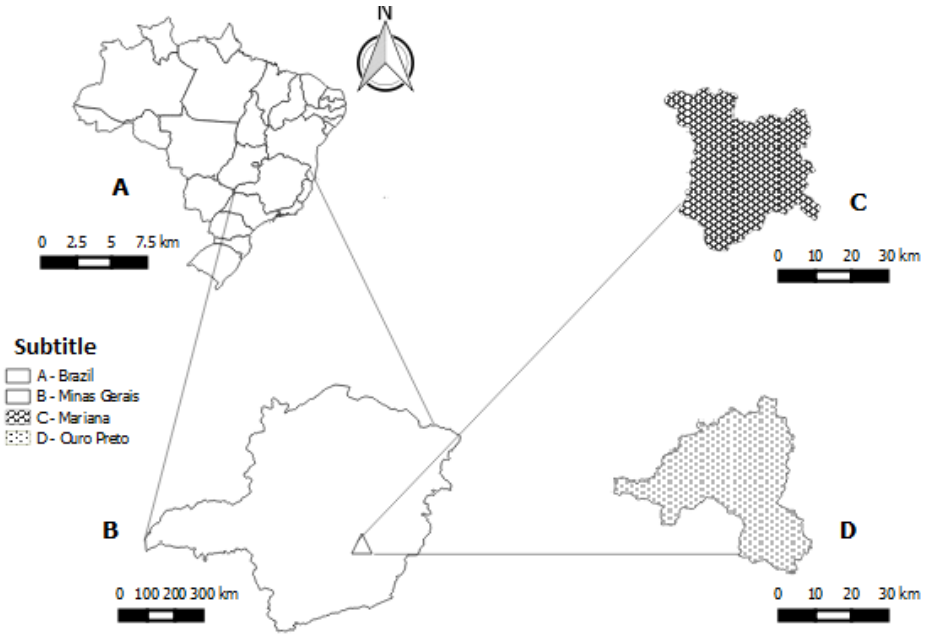


Figure 1 - Geographic location of the municipalities in the study.

Study population and sample

Residents in permanent households in the urban areas of the cities of Ouro Preto and Mariana, aged 18 years or older, were considered eligible for this study. According to data from the 2010 demographic census, there were 44,569 and 33,902 inhabitants, distributed in 17,753 and 14,078 households, in Ouro Preto and Mariana, respectively [12]. The protocols adopted and described below were identical for both the municipalities.

Sample size calculation

The sample size calculation was based on the population estimate for each city, taking into consideration a confidence level of 95%, a design effect equal to 1.5, and the parameters presented in Table 1, which also shows the sample distribution by stage of survey. Considering the losses resulting from refusals, absence of residents selected for the study, and the existence of closed households during the visit, a percentage of 20% of recomposition was added to the sample size in each city.

Table 1- Sample size calculation for the stages of the survey in the municipalities of Mariana and Ouro Preto, COVID-Inconfidentes.

Stage of the Survey	% estimated infection	Precision	Sample Ouro Preto	Sample Mariana	Sample Total
1	3%	3.0%	186	186	372
2	5%	3.5%	223	223	446
3	10%	4.0%	323	323	646

A three-stage conglomerate sampling design was adopted: census sector (selected for stages 1, 2, and 3 of survey, randomly and without replacement), households (selected from a systematic sampling process), and residents (one resident selected randomly, using the "Sorteador de Nomes®" applicative) [15].

Training the data collection team

The data collection team was composed of researchers, interviewers, and phlebotomists. The interviewers were recruited from the academic environment, with those interested being students who were enrolled regularly in undergraduate or graduate courses. The candidates underwent interviews in which their availability and interest were evaluated. After the selection, the students received a digital document, a video that explained the research objectives.

The interviewers were subdivided into teams coordinated by the six researchers. Each team received online training conducted by the coordinators/researchers, in which the project objectives and data collection methodology were addressed, and the interview questionnaire was disseminated. Subsequently, face-to-face training sessions for interviewers were conducted at the Medical School of the Federal University of Ouro Preto, on the use of the digital

questionnaire (Appendix 1) and how to approach the interviewees, ethical aspects, and biosafety during data collection.

During the face-to-face training, the research team and medical infectologist responsible for the team's biosafety were present. The health monitoring of the interviewers was conducted through periodic evaluation, prior to the beginning of each stage of the survey, using health questionnaires associated with the results of serological testing (immunochromatography reaction).

The phlebotomists also received digital documents and videos explaining the importance of their work and the research methodology. In a second session, these professionals were trained, in person, by a nurse who addressed the venipuncture technique for blood collection and biosafety measures.

The videos that explained the theme of the project were also disseminated to community health agents who were responsible for guiding the coordinators in the census sectors of the areas of greatest social vulnerability, which were randomly selected in the first stage of the survey in both cities. All the videos were created in a language accessible to the target audience and addressed the role of each professional in the data collection team.

Data Collection

The data collection process included listing and approaching households, recruiting participants, the collection of venous blood, and interviews. The activities were carried out during weekends (Friday, Saturday, and Sunday), aiming to enhance the participation of residents who worked during the week and increasing the representativeness of this population group.

In the week prior to the collection, the research team carried out the enrollment of households in pre-selected census sectors and developed plans to raise awareness in the population through the distribution of folders and posters in public places as well as the dissemination of the survey via local radio stations, social media (Instagram and Facebook), the University TV, WhatsApp groups, and religious celebrations.

An informative folder was attached in the door to randomly selected household, indicating that that household had been selected for the collection which would take place during the weekend. Taking into consideration the possibility of loss (refusal or closed household), an informative folder was attached to the neighbors on the left and right of the selected household (Appendix 2).

On the data collection days, the entire field team met at a support spot, where they donned personal protection equipment, received general instructions and were informed about the census sectors would be visited that day. The teams then moved to the census sectors where each interviewer approached the household and under the supervision of the researchers, selected the adult to be interviewed. In the case of a closed household, the absence of the resident selected or in the case of a refusal, the team would approach the neighbor to the right and, in the case of failure there, the household to the left of the one selected. If the refusal persisted, or if there were no residents in the house, the team moved on to the next house selected. There was no return to closed homes.

After the presentation of the research process and the participant's acceptance, they were asked to sign the informed consent form and the phlebotomist collected the venous blood with a venipuncture in the antecubital fossa region, the participant seated, and the arm supported on an appropriate support. For the blood collection, a 7.5 mL S-Monovette® (Sarstedt) serum gel tube was used to obtain the serum which was used for the COVID-19 rapid test and the other biochemical analyses. A 2.7 mL S-Monovette® (Sarstedt) collection tube containing sodium fluoride/EDTA was used to obtain whole blood for the molecular biology analyses.

At the end of the blood collection process, the interviewer commenced the face-to-face interview, which lasted between 30 to 45 minutes, varying according to the perception and dexterity of the interviewee in answering the questions. Data collection was conducted using the DataGoal® application that was installed on the tablets to capture the geographic coordinates (latitude and longitude) of the interviewee's home.

All the recommendations of the national protocols to fight the new coronavirus were adopted, with an emphasis on hand washing, the use of personal protection equipment (apron, cap, disposable surgical mask, and goggles), changing every shift, approaching the research participants preferably in the peridomestic area and, when this was not possible, in a large, ventilated room [16].

The interviewers kept a minimum distance of 1.5 m from the interviewees, and physical contact was restricted to only the moment of biological material collection.

Instruments and Data Collection

The face-to-face interview consisted of the administration of a questionnaire, in electronic format, that contained registration data, sociodemographic and economic variables, life habits, general health condition, mental health, sleep habits, and food and nutrition (Appendix 1), as follows:

Registration data: sex, individual taxpayer registry (CPF) number, filiation, date of birth, telephone number, and symptoms in the last 15 days.

Sociodemographic and economic variables: race/color, marital status, filiation, education, occupation, and family income prior to and during the pandemic.

Lifestyle: routine activities and behaviors, sun exposure, lifestyle, participation in religious celebrations prior to and during the pandemic

- ***Health conditions:*** Self-perception of health, presence of physical pain, use of medications/supplements, weight, height, and perception of COVID-19.

- ***Mental health:*** Assessment of anxiety and depression symptoms using the General Anxiety Disorder-7 (GAD-7) [17] and the Patient Health Questionnaire-9 (PHQ-9) [18] scales.

- ***Sleep habits:*** Sleep quality was measured using the Pittsburgh Sleep Quality Index (PSQI) scale [19].

- ***Food and nutrition:*** Daily frequency of food consumption, perceived food prices, comfort food consumption, food accessibility, and availability of food at home, adapted from the research on Surveillance of Chronic Diseases by Telephone Inquiry - VIGITEL, from the Ministry of Health [20].

The questions about personal information were aimed at obtaining information for the registration and reporting of serological test results to the Ministry of Health, through the electronic system of epidemiological surveillance for notifications to the Unique Health System (e-SUS VE), to assist in the monitoring and analysis of the epidemiological situation of COVID-19 in the municipalities. The other questions assessed the living conditions of the population, allowing us to perform a situational analysis of the determinants of health.

Data collection was performed using offline devices and, at the end of the day, in a place with a stable internet connection, the devices were synchronized and the information that was collected, was sent to the storage cloud of the software used (DataGoal®). The devices were then loaded for use on the next collection day.

Laboratory Analysis - immunochromatography test for antibody detection

At the end of each shift (morning and afternoon), the blood samples were checked, packed in a thermal box, and transported to the Epidemiology Laboratory of the Medical School of the Federal University of Ouro Preto for processing and storage by the technical team. In the laboratory, the serum tubes were centrifuged at 2500 rpm for 15 min, and a yield of approximately 3 mL of serum per sample was obtained. Then, the serum was aliquoted in different polypropylene tubes and portioned as follows: one tube with a 50 μL aliquot for testing

COVID-19 and the rest in aliquots of approximately 500 µL to 1000 µL for use in the other biochemical analyses. These were stored in a freezer at -80ºC until required. The EDTA tube was stored in a -20 °C freezer for the subsequent extraction of the genetic material.

Serological screening for anti-SARS-CoV-2 antibodies was performed by trained professionals using immunochromatographic reaction-based tests. The diagnostic One Step COVID-2019 Test (Guangzhou Wondfo Biotech®, China) was used to determine IgM/IgG antibodies in whole blood, serum, or human plasma, qualitatively, without distinguishing the immunoglobulin type [21].

In this study, according to the manufacturer's instructions, 10 µL of serum and three drops of the buffer solution were added to the reaction well in the test device. The sample was absorbed by capillary action and mixed with the SARS-CoV-2 antigen-dye conjugate, which flowed through the pre-coated membrane. In cases where the level of SARS-CoV-2 antibodies in the sample was at or above the cut-off range (minimum detection limit of the test), antibodies that were bound to the antigen-dye conjugate, were captured by the human anti-IgG antibody and the anti-µ-chain antibody complex and immobilized in the test region of the device, producing a colored test band, indicating a positive result.

When the level of the SARS-CoV-2 antibody in the sample was zero or below the cut-off, there was no visible colored band formed in the test region of the device, indicating a negative result. As a control for the procedure, a colored line appeared in the control region, indicating that the test was working correctly. The minimum waiting time for the reading was 15 min, while the maximum time that was allowed was 20 min.

According to the manufacturer’s validation data, the sensitivity of the One Step COVID-2019 Test (Wondfo®) was 86.43% (95% CI: 82.58%–89.58%) and the specificity was 99.57% (95% CI: 97.92%–99.92%). It is important to note that the negative results did not exclude a SARS-CoV-2 infection, and the positive results cannot be used as absolute evidence of the presence of SARS-CoV-2. These results only indicate a previous exposure to the infectious agent [19].

Issuing and Delivery of Reports

After the serological testing for anti-SARS-CoV-2 antibodies, a report was issued and sent to each study participant. The reports served as information for the participants and teams of the COVID-19 Confrontation Committees in the municipalities.

The reports were issued by professionals from the laboratory team, using Microsoft Excel® spreadsheets, which contained information provided by the participant (full name, date

of birth, and contact phone number) and the results of the serological test (reactive or non-reactive). In addition, the reports contained information regarding the interpretation of the tests and the precautions to be taken, as well as the contacts of the Health Surveillance Departments of each city, so that the study participants could ask questions and receive guidance on the procedures to be adopted, especially those whose results were positive.

The reports were issued within seven days after collection of the data, in a pdf file, via WhatsApp messaging application. Participants who did not use the application, received the results by telephone and, for those who did not have a telephone, the report was delivered to the home.

Finally, the Microsoft Excel® spreadsheets with the participants' data and test results were forwarded to the Mariana and Ouro Preto Health Secretariats for case monitoring and management.

Database consolidation and consistency and sample weight

At the end of the collection period, the database was consolidated by merging the three stages of the survey conducted in the two cities. A consistency analysis was then carried out to verify the consistency of the data, the presence of typing errors, or the absence of data. The sample weight of each selected unit (census tract, household, and individual) was calculated separately for each city, taking into consideration the inverse of the probability of selection, according to the sampling plan of the study and according to data from the 2010 demographic census. An adjustment was applied to compensate for the loss of interviews due to non-response and the weight of the household and the selected resident was calibrated, so that the population totals by sex and age group (18 to 29 years, 30 to 49 years, 50 to 59 years, and 60 years and older) were consistent with the 2019 population projections (DATASUS) [22].

Data Analysis

The relative frequencies of the sociodemographic variables were estimated for each stage of the survey (1, 2, and 3) and for all cities. The prevalence rate of seropositivity for SARS-Cov-2 and the confidence intervals (95% CI) were estimated for each stage of the survey, per city, and for both cities. Pearson's Chi-square test was used to compare the proportions of the sociodemographic variables and the prevalence of seropositivity for SARS-Cov-2 between each stage of the survey. The weighting factors were incorporated into the analyses using the svy command of the Stata® software, version 12.0. A significance level of 95% ($P \leq 0.05$) was adopted.

Role of the funding source

The funder of the study had no role in study design, data collection, data analysis, data interpretation, or writing of the report. The corresponding author had full access to all the data in the study and had final responsibility for the decision to submit for publication.

Ethics

The project was approved by the Research Ethics Committee (Certificate of Ethics Submission Nº. 32815620.0.1001.5149). All the procedures adopted by this study, followed the Declaration of Helsinki and the Brazilian guidelines and standards for research involving humans.

RESULTS

We approached 5,252 households, of which 2,523 (48.0%) were in the city of Mariana and 2,713 (52.0%) in the city of Ouro Preto. Of the total, 1,912 (36.4%) households were closed; in 1,079 (20.5%), the residents refused; in 267 (5.1%), the selected residents were absent; and in 1,762 (33.5%) the residents agreed to participate in the study, of which 764 (43.4%) were in Mariana and 998 (56.6%) in Ouro Preto, as described in Table 2.

Table 2 - Number of households approached, households closed, number of refusals, absent sorted dweller and number of households collected.

		Total households approached	Households Closed	Refusals	Absent Sorted Dweller	Households Collected
Mariana						
1º Stage	16 a 18/10	523 (100.0%)	183 (35.0%)	112 (21.4%)	47 (9.0%)	181 (34.6%)
2º Stage	06 a 08/11	988 (100.0%)	377 (38.2%)	204 (20.6%)	109 (11.0%)	298 (30.2%)
3º Stage	27 a 29/11	1012 (100.0%)	407 (40.2%)	244 (24.1%)	76 (7.5%)	285 (28.2%)
Ouro Preto						
1º Stage	30/10 a 01/11	885 (100.0%)	310 (35.0%)	181 (20.5%)	107 (12.1%)	287 (32.4%)
2º Stage	20 a 22/11	993 (100.0%)	369 (37.2%)	172 (17.3%)	98 (9.9%)	354 (35.6%)
3º Stage	11 a 13/12	851 (100.0%)	266 (31.3%)	166 (19.5%)	62 (7.3)	357 (41.9%)
Total		**5252** (100.0%)	**1912 (36.4%)**	**1079 (20.5%)**	**267 (5.1%)**	**1762 (33.5%)**

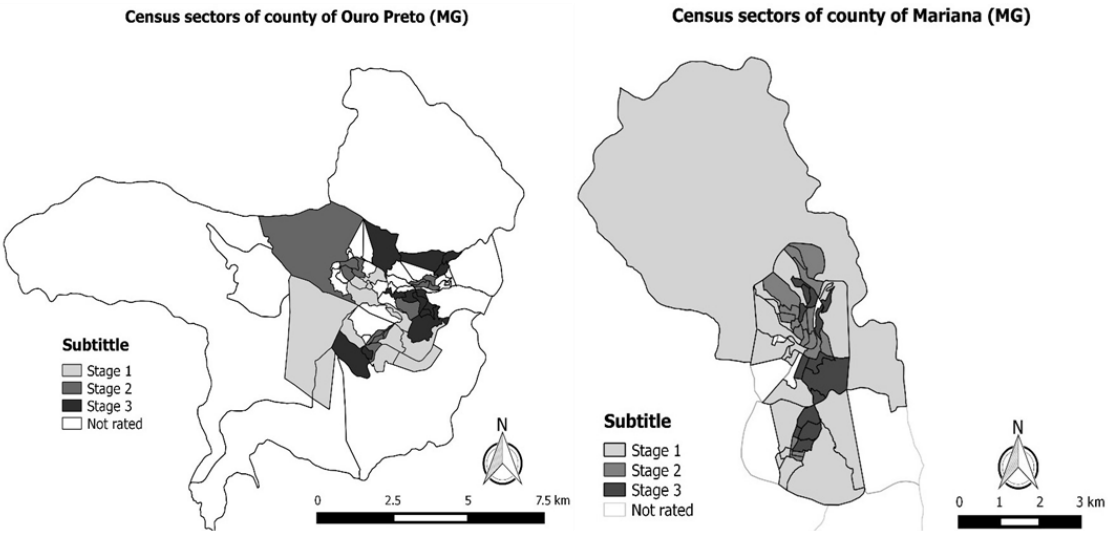
For both cities, 51.9% of the interviewees were female, with a predominance of the age range 35 to 59 years old (47.2%), 51.5% were married, 67.9% black or mulatto,71.5% with more than nine years of schooling and 61.2% with a family income higher than two minimum wages. No significant differences were observed in the distribution of the sociodemographic variables between each stage of the survey (Table 3).

Table 3 Sociodemographic characteristics of participants in the Covid-Inconfidentes Epidemiological Survey.

Variables	Total (n=1762)	1º Stage (n= 469)	2º Stage (n= 662)	3º Stage (n= 631)	p-value*
Age Group					
18 - 34 years	34.0 (30.5 – 37.6)	36.4 (29.3 – 44.1)	34.7 (30.3 – 39.2)	30.9 (25.4 – 36.9)	
35-59 years	47.2 (43.1 – 51.4)	44.8 (37.8 – 52.1)	46.5 (41.8 – 51.4)	50.3 (41.8 – 58.9)	0.748
≥ 60 years	18.8 (16.0 – 21.9)	18.8 (13.9 – 25.4)	18.8 (14.7 – 23.8)	18.8 (14.4 – 24.2)	
Marital status					
Single	36.1 (32.9 – 39.5)	32.0 (25.8 – 38.9)	37.0 (30.9 – 43.5)	39.3 (35.2 – 43.7)	
Married	51.5 (47.4 – 55.5)	53.5 (44.9 – 62.0)	49.2 (42.7 – 55.8)	51.7 (46.2 – 57.0)	0.214
Others[a]	12.4 (10.1 – 15.1)	14.5 (9.9 – 20.6)	13.8 (10.2 – 18.7)	9.0 (6.8 – 11.8)	
Cor					
White	26.1(22.1 – 30.7)	25.9 (19.2 – 33.9)	25.9 (18.3 – 35.1)	26.8 (20.7 – 33.8)	
Black	21.5 (17.7 – 25.8)	19.3 (13.3 – 27.6)	22.1 (15.2 – 31.0)	23.0 (18.0 – 28.9)	0.888
Brown	46.4 (37.3 – 50.1)	47.9 (38.7 – 57.3)	47.5 (39.2 – 56.0)	43.6 (37.3 – 50.1)	
Others	6.0 (4.8 – 9.0)	6.9 (4.3 – 10.8)	4.5 (2.8 – 7.1)	6.6 (4.8 – 9.0)	
Scholarity					
Notliterate	1.7 (0.8 – 3.5)	2.1 (0.6 – 6.8)	2.1 (0.6 – 6.9)	0.9 (.3 – 2.6)	
Upto 9 years	26.8 (23.2 – 30.6)	30.5 (24.2 – 37.6)	24.2 (19.7 – 29.3)	25.6 (18.8 – 33.8)	0.523
> 9 years	71.5 (67.5 – 75.2)	67.4 (59.9 – 74.0)	73.7 (68.0 – 78.7)	73.5 (65.2 – 80.4)	
Family Income					
≤ 2 MW	38.9 (34.1 – 43.8)	43.5 (33.5 – 54.1)	38.8 (33.3 – 44.7)	34.0 (26.4 – 42.6)	
> 2 a ≤ 4 MW	34.0 (30.4 – 37.8)	27.3 (20.1 – 35.9)	36.7 (32.8 – 40.7)	38.2 (32.6 – 44.2)	0.265
> 4 MW	27.2 (22.6 – 32.2)	29.2 (20.5 – 39.6)	24.5 (18.8 – 31.2)	27.8 (20.0 – 37.1)	

% and 95% CI in parentheses (all such values). *chi-square test. [a]separated/divorced or widowed. MW: minimum wage. Minimum wage value: BRL 1,045.00 ≈ USD 194.25 (1 USD = 5.3797 BRL).

Figure 2 shows the distribution of the census sectors of the urban areas included in each stage of the survey according to data from the IBGE, taking into consideration, the proportionality of the number of households and the average income and ensuring the representativeness of the different socioeconomic levels in the final sample and in each stage of the survey.



	Ouro Preto			Mariana		
	Average Income*	SD**	p-value***	Average Income*	SD	p-value***
Stage 1	USD 460.26	USD 467.61	0.679	USD 342.03	USD 117.79	0.151
Stage 2	USD 432.90	USD 149.69		USD 424.81	USD 163.91	
Stage 3	USD 543.82	USD 223.86		USD 454.85	USD 168.54	
Census tracts not included	USD 434.80	USD 208.46		USD 356.17	USD 175.04	

* 1 USD = 5.3797 BRL. **SD = standard deviation. ***p-value for the ANOVA-oneway test.

Figure 2 - Distribution of the census sectors included in the survey, in the urban areas of the study cities.

The global prevalence of the SARS-CoV-2 infection was 5.5%, being 6.2% in Ouro Preto, and 4.7% in Mariana.

DISCUSSION

The rapid spread of SARS-CoV-2 and the severity of Covid-19 present important diagnostic challenges and require the adoption of techniques capable of ruling out a possible infection, confirming a recent infection, identifying previous infections, and assessing the immune response. In this context, it is essential to understand the prevalence of the virus, so that containment measures can be adopted appropriately [8,9].

Since most patients develop antibodies only in the second week after symptom onset, the use of rapid tests for the detection of antibodies to SARS-CoV-2 in clinical practice is not recommended by the World Health Organization [23,24]. However, the use of these tests in population studies is relevant, because it allows the identification of a previous exposure to infection and the knowledge of the distribution and characteristics of the population that had contact with the virus, indicating geographical areas with higher viral circulation [8,9].

Immunochromatographic tests for antibody detection allow for frequent testing because they are inexpensive and easy to perform, making them useful in limiting the spread of the disease. However, these tests should not replace reference diagnostic tests, such as RT-PCR [8-10,25]. A review study on the efficacy of using immunochromatographic antibody tests in seroprevalence surveys showed that there was a significant increase in the accuracy of the diagnosis of COVID-19 over the first three weeks of symptom onset, with 30% in the first week, 70% in the second week, and over 90% in the third week. The authors also highlighted the low percentage of false-positive results (2%) observed with these tests [8]. Moreover, it is noteworthy that immunochromatographic serology tests perform better when performed with serum or plasma samples, especially in relation to diagnostic sensitivity [26].

In this sense, we believe that the timing of the collection after exposure is a factor that can interfere with the detection of positive cases during serological population studies. This may explain the differences in seroprevalence observed between the cities of Mariana and Ouro Preto in this study. Nevertheless, it is noted that the prevalence found in these two cities in the Inconfidentes region during the months of October to December 2020 was higher than that described in a population-based survey conducted in the state of Rio Grande do Sul, Brazil, from April 11 to May 11, 2020, which found a prevalence of less than 1% [27]. On the other hand, these results are close to those observed in states in the northeastern region of Brazil during a national household survey conducted between May 14 and June 7, 2020, which demonstrated a high heterogeneity in the prevalence of anti-SARS-CoV-2 antibodies in different regions of Brazil [28].

According to the literature, several factors can explain the differences found in SARS-CoV-2 infection rates between regions and distinct population groups, such as disparities in the stage of infections, low testing, and late detection of cases; divergence in the adoption of control strategies, such as restrictions on the movement of people, local sociodemographic and socioeconomic characteristics, and environmental and meteorological factors, such as humidity and air pollution [4,29].

The limitations of our study include the restriction of the sample to two medium-sized Brazilian cities, which represent only 12.2% of the Brazilian municipalities. Residents in rural areas of the municipalities were excluded from the study. Although the refusal rate was within expectations, the response rate of 33.5% was lower than that observed in national surveys conducted in Brazil (53-54%) and Spain (60%) [28,30]. In 41.5% of households it was not possible to collect information from residents because they were absent.

Other studies linked to this project will be developed to further analyze the health conditions of the population studied, related to social isolation and the risk of contamination by SARS-CoV-2, as well as the socioeconomic impacts resulting from them. Therefore, in addition to estimating the prevalence of the SARS-CoV-2 infection in the population, the findings of this study makes it possible to understand the dynamics and profiles of illnesses in the population and their possible determinants, contributing to the improvement of health care, both in the Unified Health System and in the private network.

The results will help deepen the knowledge about social inequalities in the study cities, favoring the implementation of public policies that minimize inequalities and their impacts on health, food, and quality of life of the population.

CONCLUSION

Despite the inherent limitations in the diagnostic efficacy of the rapid serological test for the detection of antibodies against SARS-CoV-2, its use proved to be effective in verifying the seroprevalence of viral infections in the cities evaluated, allowing researchers to assess the circulation of the virus and to determine the percentage of people exposed in the cities, providing a basis for public managers to make effective decisions, in a socio-health and epidemiological context, to reduce the number of cases and deaths. Furthermore, the findings of this study play an important role in providing information with regard the socio-economic and health impacts on the population, resulting from social distancing.

New surveys are needed to understand the pandemic situation in these new phases, including, if possible, rapid antigen tests, which were not yet available in the first wave of the disease. In addition, genotyping is needed to identify circulating viral strains and behavior in the community.

Author contributions

ALM and GLLMC conceived the study and obtained funding for the study. LGL, LAAMJ, HNC, ICSJ, SSM, APD, TSS, AMSR, APB, NNL, BSS, CAS, KFB and CZM supported or conducted data collection. LAAMJ and ICSJ conducted the statistical analyses with support from ACSA. LGL wrote the first version of the manuscript. RDM, JCCC, MCM, RCRMN, LR and WTC reviewed the work substantively. All authors have approved the submitted version.

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Declaration of interests

We declare no competing interests.

REFERENCES

1. Liu Y, Gayle AA, Wilder-Smith A, Rocklöv J. The reproductive number of COVID-19 is higher compared to SARS coronavirus. J Travel Med 2020;27(2):taaa021.

2. World Health Organization. Statement on the second meeting of the International Health Regulations (2005) Emergency Committee regarding the outbreak of novel coronavirus (2019-nCoV). 2020. [online] Available at: https://www.who.int/news/item/30-01-2020-statement-on-the-second-meeting-of-the-international-health-regulations-(2005)-emergency-committee-regarding-the-outbreak-of-novel-coronavirus-(2019-ncov) [Accessed 25 March 2021].

3. Bontempi, E. The europe second wave of COVID-19 infection and the Italy "strange" situation. Environ. Res 2021;193:110476.

4. Guimarães-Ximenes-Neto FR, Carneiro-Flor SM, Carvalho-da-Silva RC, Alves-Dorneles J,

Ferreira-Serafim T, Dourado-Júnior FW, et al. Descriptive study of the initial cases of Covid-19 in a city in the interior of Ceará, Brazil. Arch Med (Manizales) 2021;21(2):536-547.

5. Hallal PC. SOS Brazil: science under attack. Lancet 2020;397(10272):373-374.

6. Qiu J. Covert coronavirus infections could be seeding new outbreaks. Nature. 20 March 2020. [online] Available at: https://doi.org/10.1038/d41586-020-00822-x [Accessed 25 March 2021].

7. Li R, Pei S, Chen B, Song Y, Zhang T, Yang W, et al. Substantial undocumented infection facilitates the rapid dissemination of novel coronavirus (SARS-CoV2). Science 2020;368(6490):489-493.

8. Deeks JJ, Dinnes J, Takwoingi Y, Davenport C, Spijker R, Taylor-Phillips S, et al. Antibody tests for identification of current and past infection with SARS-CoV-2. Cochrane Database Syst Rev 2020;6(6):CD013652.

9. Mina MJ, Parker R, Larremore DB. Rethinking Covid-19 Test Sensitivity - A Strategy for Containment. N Engl J Med 2020;383:e120.

10. Ministry of Health, Brazil. Nota Técnica nº 5/2020-SAPS/MS. 2020. [online] Available at: https://egestorab.saude.gov.br/image/?file=20200416_N_NotaTecnican5_7232065694668476750.pdf [Accessed 25 March 2021].

11. World Health Organization. Population-based age-stratified seroepidemiological investigation protocol for COVID-19 virus infection. 2020. [online] Available at: https://apps.who.int/iris/handle/10665/331656 [Accessed 25 March 2021].

12. Brazilian Institute of Geography and Statistics (IBGE). Atlas do Censo Demográfico 2010. 2010. [online] Available at: https://biblioteca.ibge.gov.br/index.php/biblioteca-catalogo?view=detalhes&id=264529 [Accessed 25 March 2021].

13. United Nations Development Program (UNDP). Human Development Atlas in the Brazilian Metropolitan Regions. 2014. [online] Available at: https://onedrive.live.com/?authkey=%21AN8fxURJgcBvLmc&cid=124653557C0404EC&id=124653557C0404EC%2122994&parId=124653557C0404EC%2122848&o=OneUp [Accessed 25 March 2021].

14. Brazilian Institute of Geography and Statistics (IBGE). Ouro Preto - Histórias & Fotos. 2017. [online] Available at: https://cidades.ibge.gov.br/brasil/mg/ouro-preto/historico [Accessed 25 March 2021].

15. Aramburu R. Sorteador de Nomes. Google Play Store. 2018. [online] Available at: https://play.google.com/store/apps/details?id=botecodigital.info.sorteadordenomes&hl=pt_BR&gl=US [Accessed 25 March 2021].

16. National Health Surveillance Agency, Brazil. Nota Técnica GVIMS/GGTES/ANVISA nº 04/2020. 2020. [online] Available at:

https://www20.anvisa.gov.br/segurancadopaciente/index.php/alertas/item/nota-tecnica-n-04-2020-gvims-ggtes-anvisa-atualizada [Accessed 25 March 2021].

17. Moreno AL, Sousa DA, Souza AMFLP, Manfro GG, Salum GA, Koller SH, et al. Factor structure, reliability, and item parameters of the Brazilian-Portuguese version of the GAD-7 questionnaire. Temas psicol 2016;24(1):367-376.

18. Santos IS, Tavares BF, Munhoz TN, Almeida LSP, Silva NTB, Tams BD, et al. Sensitivity and specificity of the Patient Health Questionnaire-9 (PHQ-9) among adults from the general population. Cad. Saúde Pública 2013;29(8):1533-1543.

19. Bertolazi AN, Fagondes SC, Hoff LS, Dartora EG, Miozzo IC, Barba ME, et al. Validation of the Brazilian Portuguese version of the Pittsburgh Sleep Quality Index. Sleep Med 2011;12(1):70-75.

20. Ministry of Health, Brazil. Vigitel Brasil 2019: vigilância de fatores de risco e proteção para doenças crônicas por inquérito telefônico. 2020. [online] Available at: http://bvsms.saude.gov.br/bvs/publicacoes/vigitel_brasil_2019_vigilancia_fatores_risco.pdf [Accessed 25 March 2021].

21. Celer. One Step Covid-2019 Test (Imunocromatografia). 2020. [online] Available at: https://celer.ind.br/wp-content/uploads/2020/04/Instrucao-de-Uso-One-Step-COVID-2019-Test_Rev02_informativo.pdf [Accessed 25 March 2021].

22. Ministry of Health, Brazil. Informações de Saúde (TABNET), Demográficas e Socioeconômicas, População residente, Censo 2010. 2011. [online] Available at: http://www2.datasus.gov.br/DATASUS/index.php?area=0206&id=6942 [Accessed 25 March 2021].

23. Ying L, Yue-ping L, Bo D, Feifei R, Yue W, Jinya D, et al. Diagnostic Indexes of a Rapid IgG/IgM Combined Antibody Test for SARS-CoV-2 [preprint]. medRxiv preprint. 2020. [online] Available at: https://doi.org/10.1101/2020.03.26.20044883 [Accessed 25 March 2021].

24. World Health Organization. Advice on the use of point-of-care immunodiagnostic tests for COVID-19. 2020. [online] Available at: https://www.who.int/news-room/commentaries/detail/advice-on-the-use-of-point-of-care-immunodiagnostic-tests-for-covid-19 [Accessed 25 March 2021].

25. Centers for Disease Control and Prevention. Frequently Asked Questions about Coronavirus (COVID-19) for Laboratories. 2021. [online] Available at: https://www.cdc.gov/coronavirus/2019-ncov/lab/faqs.html?CDC_AA_refVal=https%3A%2F%2Fwww.cdc.gov%2Fcoronavirus%2F2019-ncov%2Flab%2Flab-testing-faqs.html [Accessed 25 March 2021].

26. Santos VA, Rafael MM, Sabino EC, Duarte AJS. Sensitivity of the Wondfo One Step COVID-19 test on using serum samples. Clinics 2020;75:e2013.

27. Silveira MF, Barros AJD, Horta BL, Pellanda LC, Victora GD, Dellagostin AO, et al. Population-based surveys of antibodies against SARS-CoV-2 in Southern Brazil. Nat Med 2020;26:1196-1199.

28. Hallal PC, Hartwig FP, Horta BL, Silveira MF, Struchiner CJ, Vidaletti LP, et al. SARS-CoV-2 antibody prevalence in Brazil: results from two successive nationwide serological household surveys. Lancet Glob Health 2020;8:e1390-98.

29. Copat C, Cristaldi A, Fiore M, Grasso A, Zuccarello P, Signorelli SS, et al. The role of air pollution (PM and NO2) in COVID-19 spread and lethality: a systematic review. Environ. Res 2020;191:110129.

30. Ministerio de Ciencia e Innovacion and Ministerio de Salud. Spain. Estudio ENE-COVID19: primera ronda. Estudio nacional de seroepidemiologia de la infección por SARS-CoV-2 en Españha. Informe preliminar 13 mayo de 2020. 2020. [online] Available at: https://www.mscbs.gob.es/ciudadanos/ene-covid/docs/estudio_ene-covid19_primera_ronda_informe_preliminar.pdf [Accessed 25 March 2021].

COVID-Inconfidentes: COVID-19 Epidemiological Vigilance in the Inconfidentes region

DATA COLLECTION INSTRUMENT

1) REGISTRATION DATA AND SYMPTOMATOLOGY

1.1) ID number: _____

1.2) Household status:
( ) Household previously selected (MAP)
( ) Next Neighbor (first)
( ) Second Neighbor
( ) Household from a new draw

1.3) Municipality of residence and notification:
( ) Mariana
( ) Ouro Preto

1.4) Are you foreign?
( ) No
( ) Yes. Country of origin: _____

1.5) Are you a health professional?
( ) No
( ) Yes

1.6) What is your individual taxpayer registry (CPF)? _ _ _. _ _ _. _ _ _ - _ _

1.7) Full name: _____

1.8) Mother's full name: _____

1.9) Date of birth: ___/___/ _____

1.10) Address: _____

1.11) Telephone Contact: ( ) _ _ _ _ _ - _ _ _ _

1.12) What is your gender?
( ) Female
( ) Male *(Skip to 1.13)*

If female:
1.12.1) Are you pregnant?
( ) No
( ) Yes
( ) 77- Not applicable

1.13) In the past 15 days, have you had FEVER, MEASURED BY THERMOMETER?
( ) No *(Skip to 1.14)*
( ) Yes

If so:
1.13.1) How many days ago did start? A: _____
1.13.2) How many days did it last? A: _____/ ( ) I still have this symptom

1.14) In the past 15 days, have you had FEVER SENSATIONS?
( ) No *(Skip to 1.15)*
( ) Yes

If so:
1.14.1) How many days ago did start? A: _____
1.14.2) How many days did it last? A: _____/ ( ) I still have this symptom

1.15) In the last 15 days, did you have a SORE THROAT?
( ) No *(Skip to 1.16)*
( ) Yes

If so:
1.15.1) How many days ago did start? A: _____
1.15.2) How many days did it last? A: _____/ ( ) I still have this symptom

1.16) In the past 15 days, have you had COUGH?
( ) No *(Skip to 1.17)*
( ) Yes

If so:
1.16.1) How many days ago did start? A: _____
1.16.2) How many days did it last? A: _____/ ( ) I still have this symptom

1.17) In the last 15 days, did you fell DIFFICULTY TO BREATH ?
( ) No *(Skip to 1.18)*
( ) Yes

If so:
1.17.1) How many days ago did you start? A: _____
1.17.2) How many days did it last? A: _____/ ( ) I still have this symptom

1.18) In the past 15 days, have you had ARRHYTHMIA?
( ) No *(Skip to 1.19)*
( ) Yes

If so:
1.18.1) How many days ago did you start? A: _____
1.18.2) How many days did it last? A: _____/ ( ) I still have this symptom

1.19) In the past 15 days, have you had DIARRHEA?
( ) No *(Skip to 1.20)*
( ) Yes

If so:
1.19.1) How many days ago did start? A: _____
1.19.2) How many days did it last? A: _____/ ( ) I still have this symptom

1.20) In the last 15 days, did you have VÔMIT?
( ) No *(Skip to 1.21)*
( ) Yes

If so:
1.20.1) How many days ago did start? A:
1.20.2) How many days did it last? A: _____/ ( ) I still have this symptom

1.21) In the last 15 days, did you SMELLED LESS?
( ) No *(Skip to 1.22)*
( ) Yes

If so:
1.21.1) How many days ago did start? A:
1.21.2) How many days did it last? A: _____/ ( ) I still have this symptom

1.22) In the last 15 days, did you TASTED LESS?
( ) No (*Skip to 1.23)*
( ) Yes

If so:
1.22.1) How many days ago did start? A:
1.22.2) How many days did it last? A: _____/ ( ) I still have this symptom

1.23) In the past 15 days, have you felt UNUSUALLY TIRED?
( ) No *(Skip to 1.24)*
( ) Yes

If so:
1.23.1) How many days ago did you start? A:
1.23.2) How many days did it last? A: _____/ ( ) I still have this symptom

1.24) In the last 15 days,did you notice SPOTS ON YOUR SKIN?
( ) No *(Skip to 1.25)*
( ) Yes

If so:
1.24.1) How many days ago did start? A:
1.24.2) How many days did it last? A: _____/ ( ) I still have this symptom

2) SOCIO-DEMOGRAPHIC AND ECONOMIC DATA

2.1) In relation to skin color, how do you consider yourself? *(Interviewer, read the options)*
( ) White
( ) Brown
( ) Black
( ) Indigenous
( ) Yellow

( ) Other
( ) Don't know / Did not answer

2.2) What is your marital status? *(Interviewer, read out options)*
( ) Single
( ) Married/Stable Union
( ) Widower
( ) Divorced/separated

2.3) Do you have children?
( ) No
( ) Yes. How many? _____

2.4) Until what level did you study? *(Interviewer, do not read the options, mark the option according to the report)*
( ) Never attended school
( ) Adult literacy
( ) The first or elementary school I or primary school (1st to 4th grade) incomplete
( ) The first or elementary school I or primary school (1st to 4th grade) complete
( ) Elementary school II or junior high or high school (5th to 8th or 9th grade) incomplete
( ) Elementary school II or junior high or high school (5th to 8th or 9th grade) complete
( ) High school or secondary school or technical or technical or normal or scientific or supplementary school (1st to 3rd year) incomplete
( ) Secondary school or high school or technical or technical or normal or scientific or supplementary school (1st to 3rd year) complete
( ) Third-degree or higher incomplete
( ) Third-degree or higher complete
( ) Specialization or Post-graduation Latu-Sensu
( ) Stricto Sensu Post-Graduation (Master and/or Doctorate)
( ) Don't know / Did not answer

2.5) Who do you currently live with?
( ) Family
( ) Alone
( ) Shared housing (friends/work)
( ) Student Republic

2.6) How many rooms are there in your household, including the bathroom and kitchen? (Do not consider as room: corridors, open balconies, garage and other rooms for non-residential purposes)
A:
( ) Don't know / Did not answer

2.7) How many rooms in your household are dormitories?
A:
( ) Don't know / Did not answer

2.8) How many people live in this household?
A:
( ) Don't know / Did not answer

2.9) BEFORE THE PANDEMIC (until March 2020), what was your monthly family income? Consider the gross monthly income adding up all the members of your family. *(Interviewer, do not read the options, mark the option according to the report)*
( ) Less than 1 minimum wage (less than USD 194.25)
( ) From 1 to 2 minimum wages (USD 194.25 – USD 388.31)
( ) From 2 to 3 minimum wages (USD 388.49 - USD 582.56)
( ) From 3 to 4 minimum wages (USD 582.74 - USD 776.80)
( ) From 4 to 5 minimum wages (USD 776.99 - USD 971.05)
( ) From 5 to 10 minimum wages (USD 971.24 - USD 1,942.30)
( ) From 10 to 15 minimum wages (USD 1,942.48 - USD 2,913.54)
( ) More than 15 minimum wages (more than USD 2,913.73)
( ) Don't know / Did not answer

2.10) AFTER THE PANDEMIC start (March 2020), was there a CHANGE in the monthly family income? *(Interviewer, read the options)*
( ) No, no change (Skip to 2.11)
( ) Yes, it did. The impact was small
( ) Yes, it did. The impact was great
( ) Yes, increased
( ) Don't know / Did not answer

If so:
2.10.1) What is your CURRENT monthly family income? Consider the monthly gross income adding up all the members of your family. *(Interviewer, do not read the options, mark the option according to the report)*
( ) Less than 1 minimum wage (less than USD 194.25)
( ) From 1 to 2 minimum wages (USD 194.25 – USD 388.31)
( ) From 2 to 3 minimum wages (USD 388.49 - USD 582.56)
( ) From 3 to 4 minimum wages (USD 582.74 - USD 776.80)
( ) From 4 to 5 minimum wages (USD 776.99 - USD 971.05)
( ) From 5 to 10 minimum wages (USD 971.24 - USD 1,942.30)
( ) From 10 to 15 minimum wages (USD 1,942.48 - USD 2,913.54)
( ) More than 15 minimum wages (more than USD 2,913.73)
( ) Don't know / Did not answer

2.11) Do you are CURRENTLY working?
( ) No (*Skip to 3.1)*
( ) Yes
( ) Don't know / Did not answer

If you work:
2.11.1) What is your current main job or activity?
A:

2.11.2) After the start of the pandemic (March/2020) your regime/contract of work, has changed? *(Interviewer, read the options)*
( ) No
( ) Did not work before the pandemic
( ) Yes, there was a reduction in the workload WITHOUT loss of pay
( ) Yes, there was a reduction in the workload WITH loss of pay
( ) Yes, there was the cancellation of the contract/dismissal
( ) Don't know / Did not answer

2.11.3) Currently, how is your work routine regarding location? *(Interviewer, readout options)*
( ) All work activities are being performed at my home.
( ) Part of the activities are performed in the traditional work environment, and some days at home and others at the workplace.
( ) All work activities are being performed in my work environment.
( ) Don't know / Did not answer

2.11.4) Do you work in shifts?
( ) No (*Skip to 3.1)*
( ) Yes
( ) Don't know / Did not answer

If so:
2.11.4.1) If yes, what kind of shift have you worked?
( ) Night
( ) Alternating shift
( ) 12/36h shift
( ) 24h/48h shift
( ) OtheA: _____
( ) Don't know / Did not answer

2.11.4.2) How long have you been working in shifts?
A: (*years*_____*)* _____*(months)*
( ) Don't know / Did not answer

3) LIFESTYLE HABITS

3.1) Are you currently in social distancing? *(Social isolation is the reduction in interaction and contact between people in a community to reduce the speed of transmission of the virus; different from social isolation, which is a measure that aims to separate sick people from non-sick people, to prevent the spread of the virus)*
( ) No (*Skip to 3.2)*
( ) Yes, totally
( ) Yes, partially
( ) Don't know / Did not answer

If so:
3.1.1) How long have you been in social distancing?
A: _____months_____ days

3.2**)** How is yourroutine? *(Interviewer, read the options. You can mark more than one option)*
[ ] I go out every day for work, study or other regular activity
[ ] I go out to exercise
[ ] I go to the gym to do some physical activity
[ ] Go to restaurants and/or bars
[ ] I participate in celebrations and/or gatherings (such as barbecues, birthday parties)
[ ] I visit close family and friends
[ ] I go out only for essential needs like buying food/ medicine
[ ] I stay at home all the time
[ ] Don't know / Did not answer

3.3) Most of the time, do you have the behaviors described below? *(Interviewer, read the options. You can mark more than one option)*
[ ] Wear masks when going out
[ ] Use masks to receive people or products that are delivered to my home
[ ] Avoid touch eyes, nose, and mouth after contact with surfaces or people outside the home
[ ] Maintain a distance of at least 1.5 meters from other people when you are away from home
[ ] Change clothes when you get home
[ ] Take off your shoes when you get home
[ ] Wash your hands with soap and water or apply alcohol whenever you get home or receive some product
[ ] Sanitize with soap and water, alcohol, or sanitizers (bleach, etc.) all products purchased outside the home
[ ] Avoid crowds of people, such as parties, meetings, or bars/restaurants
[ ] None of the alternatives
[ ] Don't know / Did not answer

3.4) CURRENTLY, from Monday to Sunday do you expose yourself to the sun at any time during the day?
( ) No *(Skip to 3.5)*
( ) Yes

If so:
3.4.1) From Monday to Sunday, how many times a week are you exposed to the sun BEFORE 10:00 AM?
( ) I am not exposed *(Skip to 3.4.3)*
( ) 1 time
( ) 2 times
( ) 3 times
( ) 4 times
( ) 5 times
( ) 6 times
( ) 7 times
( ) Don't know / Did not answer *(Skip to 3.4.3)*

3.4.2) How long are you exposed to the sun BEFORE 10:00?
A: (hours_____) _____(minutes)

3.4.3) From Monday to Sunday, how many times a week are you exposed to the sun BETWEEN 10:00 AM and 3:00 PM?
( ) I am not exposed *(Skip to 3.4.5)*
( ) 1 time
( ) 2 times
( ) 3 times
( ) 4 times
( ) 5 times
( ) 6 times
( ) 7 times
( ) Don't know / Did not answer *(Skip to 3.4.5)*

3.4.4) How long are you exposed to the sun between 10:00 and 15:00?
A: (hours_____) _____(minutes)

3.4.5) From Monday to Sunday, how many times a week are you exposed to the sun AFTER 3:00 PM?
( ) I am not exposed *(Skip to 3.4.7)*
( ) 1 time
( ) 2 times
( ) 3 times
( ) 4 times
( ) 5 times
( ) 6 times
( ) 7 times
( ) Don't know / Did not answer *(Skip to 3.4.7)*

3.4.6) How long are you exposed to the sun AFTER 3:00 PM?
A: (hours_____) _____(minutes)

3.4.7) Do you use any kind of protection when exposed to the sun? (Interviewer, read the options; you can mark more than one option)
[ ] No
[ ] Yes, hat/bonnet
[ ] Yes, covers
[ ] Yes, long-sleeved clothes
[ ] Yes, sunscreen
[ ] Yes, I use umbrellas or umbrella/sun

3.5) BEFORE THE PANDEMIC (March/2020) did you expose yourself to the sun at any time during the day? *(Interviewer, read the options)*
( ) No
( ) Yes, I exposed myself to the sun the same frequency and time as this days
( ) Yes, but sun exposure was GREATER
( ) Yes, but sun exposure was LESS
( ) Don't know / Did not answer

3.6) During the first few months of the pandemic (March to July/2020), there was a change in your sun exposure? *(Interviewer, readout options)*
( ) No
( ) Yes, I INCREASED my sun exposure
( ) Yes, it DIMINED my exposure to the sun
( ) Yes, I INTERRUPT my sun exposure
( ) Don't know / Did not answer

3.7) Do you CURRENTLY practice some kind of physical exercise (walking, running, weight training, functional training, pilates, crossfit, yoga, etc)?
( ) No *(Skip to 3.8)*
( ) Yes
( ) Don't know / Did not answer *(Skip to 3.8)*

If so:
3.7.1) What physical exercise/sport do you currently practice? How many days a week do you usually practice this physical exercise or sport? And on the day that you practice this exercise or sport, how long does this activity last? *(Interviewer, do not read the options, mark the option according to the report. You can mark more than one option)*

[ ] Walking
Frequency (days in the week) and time (minutes) A:
[ ] Race
Frequency (days in the week) and time (minutes) A:
[ ] Cycling
Frequency (days in the week) and time (minutes) A:
[ ] Bodybuilding
Frequency (days in the week) and time (minutes) A:
Aerobics (spinning, step, jump)
Frequency (days in the week) and time (minutes) A:
[ ] Stretching
Frequency (days in the week) and time (minutes) A:
[ ] Yoga
Frequency (days in the week) and time (minutes) A:
[ ] Pilates
Frequency (days in the week) and time (minutes) A:
[ ] Water aerobics
Frequency (days in the week) and time (minutes) A:
[ ] Swimming
Frequency (days in the week) and time (minutes) A:
[ ] Fights and martial arts (jiu-jitsu, karate, judo, capoeira)
Frequency (days in the week) and time (minutes) A:
[ ] Team sports (soccer, basketball, volleyball, tennis)
Frequency (days in the week) and time (minutes) A:
[ ] Dance (ballet, ballroom, axé, forró).
Frequency (days in the week) and time (minutes) A:
[ ] Other A:
Frequency (days in the week) and time (minutes) A:

3.8) BEFORE the PANDEMIC (March/2020) did you practice physical exercise? *(Interviewer, read the options)*
( ) No
( ) Yes, practiced as this days, considering the frequency and duration of the exercise
( ) Yes, but my practice of physical exercise was GREATER
( ) Yes, but my practice of physical exercise was LOWER
( ) Don't know / Did not answer

3.9) DURING THE FIRST MONTHS OF PANDEMIC (March to July/2020), did you change your exercise practice? *(Interviewer, readout options; you may mark more than one option)*
[ ] No
[ ] Yes, I INTERRUPT the practice of physical exercise
[ ] Yes, IDECREASE the practice of physical exercise
[ ] Yes, I STARTED practicing some physical exercise
[ ] Yes, I CHANGED the TYPE of exercise
[ ] Yes, I CHANGED only the PLACE of exercise
[ ] Yes, I INCREASED the practice of physical exercise
[ ] Don't know / Did not answer

3.10) CURRENTLY, from Monday through Friday, how much time (in hours) do you currently stay seated (include time used for cell phone, TV, computer, tablet, books, car, public transportation)?
A:

3.11) BEFORE PANDEMIA (March/2020), from Monday to Friday, how much time (in hours) per day did you stayed seated (include time used for cell phone, TV, computer, tablet, books, car, public transportation)?
A:

3.12) DURING THE FIRST MONTHS OF THE PANDEMIC (March to July/2020), from Monday to Friday, how much time (in hours) per day did you stayed seated (include time used for cell phone, TV, computer, tablet, books, car, public transportation)?
A:

3.13) Do you smoke or have you ever smoked cigarettes or any other tobacco product? *(Interviewer, read the options)*
( ) No, never smoked *(Skip to 3.14)*
( ) Yes, I have smoked but quit more than six months ago *(Skip to 3.14)*
( ) Yes, I have smoked but quit less than six months ago *(Skip to 3.14)*
( ) Yes, I smoke since before the pandemic
( ) Yes, I started smoking after the beginning of the pandemic

If so:
3.13.1) CURRENTLY how many cigarettes on average do you smoke a day?
A:

3.13.2) BEFORE THE PANDEMIC (March/2020), your cigarette consumption was different?
( ) No *(Skip to 3.14)*
( ) Yes

If so:
3.13.2.1) BEFORE THE PANDEMIC how many cigarettes on average did you smoke per day?
A:

3.14) CURRENTLY, how often do you usually consume some alcoholic beverage?
( ) I do not use alcoholic beverages *(Skip to 3.15)*
( ) From 1 to 2 times a month
( ) From 3 to 4 times a month
( ) From 1 to 2 times a week
( ) 3 to 4 times a week
( ) From 5 to 6 times a week
( ) Every day of the week

If so:
3.14.1) (MALE) In the last 30 days, have you consumed 5 or more doses of an alcoholic beverage on a single occasion? Consider a dose of alcoholic beverage as equivalent to a can of beer or a glass of wine, or a dose of cachaça, whiskey, or any other distilled alcoholic beverage.
(FEMALE) In the past 30 days, have you had 4 or more drinks at one time? Consider a dose of alcohol as equivalent to a can of beer or a glass of wine, or a dose of cachaça, whiskey, or any other distilled alcoholic beverage.
( ) No
( ) Yes
( ) Don't know / Did not answer

3.15) BEFORE THE PANDEMIC (March/2020), your alcohol consumption was different?
( ) No *(Skip to 3.16)*
( ) Yes

If so:
3.15.1) BEFORE THE PANDEMIC (March/2020), how often did you consume some alcoholic beverage?
( ) Did not use alcoholic beverages
( ) From 1 to 2 times a month
( ) From 3 to 4 times a month
( ) From 1 to 2 times a week
( ) 3 to 4 times a week
( ) From 5 to 6 times a week
( ) Every day of the week

3.16) Do you have any beliefs/religions?
( ) No *(Skip to 4.1)*
( ) Yes

If so:
3.16.1) BEFORE THE PANDEMIC (March/2020), how often did you go to temples, churches, religious services/celebrations?
( ) More than once a week
( ) Once a week
( ) Two to three times a month
( ) A few times a year
( ) Once a year or less
( ) Never
( ) Don't know / Did not answer

3.16.2) And CURRENTLY, how often are you attending religious services/celebrations in person or online?
( ) More than once a week
( ) Once a week
( ) Two to three times a month
( ) A few times a year
( ) Once a year or less
( ) Never
( ) Don't know / Did not answer

4) HEALTH CONDITION

4.1) Would you classify your health condition as: *(Interviewer, read the options)*
( ) Very good
( ) Good
( ) Regular
( ) Poor
( ) Very bad
( ) Don't know / Did not answer

4.2) Compared to the same month last year, would you rate your health condition as: *(Interviewer, read the options)*
( ) Much better than now
( ) A little better than now
( ) The same as now
( ) A little worse than now
( ) Much worse than now
( ) Don't know / Did not answer

4.3) CURRENTLY, do you feel any physical pain (pain in the body) most of the days?
( ) No *(Skip to 4.4)*
( ) Yes
( ) Don't know / Did not answer

If so:
4.3.1) How long have you felt physical pain (pain in the body) most of the days? *(Interviewer, read the options)*
( ) Less than 3 months
( ) Between 3 and 6 months
( ) More than 6 months
( ) Don't know / Did not answer

4.4) Has any doctor or other health professional ever told you that you have *(Interviewer, readout options)*:
[ ] Hypertension or high blood pressure?
[ ] Diabetes or blood sugar?
[ ] Asthma or bronchitis?
[ ] Chronic lung disease?
[ ] Cancer (any type)?
[ ] Chronic kidney disease?
[ ] Any heart disease?
[ ] Depression?
[ ] Anxiety disorder?
[ ] Sleep apnea?
[ ] Hypo or hyperthyroidism?
[ ] Other: _____
[ ] None of the above

4.5) In the last 30 days, have you used any medication?
( ) No *(Skip to 4.6)*
( ) Yes. How many? _____

If yes, answer questions 4.5.1 to 4.5.5.1 for all the drugs you use:
4.5.1) name of the drug?
A: _____

4.5.2) What is the indication (what do you use the medicine for)?
A: _____

4.5.3) Who or where was it prescribed/recommended?
( ) Doctor's appointment
( ) Another health professional

( ) Radio/TV/newspapers/internet
( ) Indication of relatives/friends/neighbors
( ) Other A: _____

4.5.4) How long have you been using this medication?
( ) Use as needed *(Skip to 4.6)*
( ) Less than 30 days
( ) From 1-3 months
( ) From 3-12 months
( ) More than 1 year

4.5.5) Have you stopped taking this medication in the last 7 days?
( ) No (*Skip to 4.6)*
( ) Yes
( ) Not applicable

4.5.5.1) If yes, what was the reason?
( ) Forgot to take
( ) Had adverse (side) effect
( ) For lack of money to buy
( ) Decided to discontinue use
( ) Other reason A: _____
( ) Not applicable

4.6) In the last 3 MONTHS have you used any vitamin or mineral supplements?
( ) No *(Skip to 4.7)*
( ) Yes

If so:
4.6.1) If yes, did they contain any of the vitamins below? *(Interviewer, read out options; you may check more than one option)*
[ ] Folate or folic acid or vitamin B9
[ ] Vitamin B6 or Pyridoxine
[ ] Vitamin B12 or cobalamin
[ ] Vitamin D or cholecalciferol or codfish oil supplementation
[ ] Multivitamin. Which one? _____
[ ] OtheA: _____
[ ] Don't know / Did not answer
[ ] Does not apply

4.7) Do you believe you are infected withCOVID-19 at this moment?
( ) No
( ) Yes
( ) Don't know / Did not answer

4.8) Do you believe you have ever had COVID-19?
( ) No
( ) Yes
( ) Don't know / Did not answer

4.9) Have you sought medical attention at any time for suspected you had COVID-19?
( ) No
( ) Yes
( ) Don't know / Did not answer

4.10) Have you ever been tested for COVID-19?
( ) No *(Skip to 4.11)*
( ) Yes
( ) Don't know / Did not answer

If so:
4.10.1) What is the result of the test?
( ) Negative
( ) Positive
( ) Don't know / Did not answer

4.10.2) What type of test was performed? *(Interviewer, readout options)*
[ ] Blood test ("taken from the vein")
[ ] Blood test ("taken from the tip of the finger")
Swab (cotton swab) in the nose or mouth
( ) Don't know / Did not answer

4.11) Have you ever had contact with someone who is or has been infected by COVID-19? *(Interviewer, read the options)*
( ) No
( ) Don't know
( ) Probably yes, but not confirmed with a test
( ) Yes, confirmed with a test

4.12) In your household, are any residents considered to be in risk for COVID-19? People over 60 years old or with cardiovascular disease, diabetes, respiratory disease, neurological or renal disease, immunosuppression, obesity, asthma, pregnant women or women who have had children less than 42 days ago (who are pregnant).
( ) No
( ) Yes
( ) Don't know / Did not answer

4.13) What is your current weight? *(In case you don't know your exact weight, fill in an approximate value)*
A: (Kg_____)
( ) Don't know / Did not answer

4.14) What was your weight before the pandemic (March/2020)? *(If you do not know your exact weight, fill in an approximate value)*
A: (Kg_____)
( ) Don't know / Did not answer

4.15) How tall you are? *(In case you don't know your exact height, fill in an approximate value)*
A: ()
( ) Don't know / Did not answer

5) MENTAL HEALTH

Now let's talk about how you have felt during the **last two weeks**.The options of answers are: Not at all; Several days; More than half of the days; Almost every day.

During the LAST TWO WEEKS, how often were you bothered by any of the following problems?		No time	Several days	More than half of the days	Almost every day
5.1)	You felt nervous, anxious, or very tense *(Readout options)*	( )	( )	( )	( )
5.2)	Was not able to prevent or control your worries	( )	( )	( )	( )
5.3)	It was very concerned about several things	( )	( )	( )	( )
5.4)	Had difficulty to relax	( )	( )	( )	( )
5.5)	You have become so agitated that it was difficult to remain seated	( )	( )	( )	( )
5.6)	Easily upset or irritated	( )	( )	( )	( )
5.7)	felt afraid as if something horrible was going to happen	( )	( )	( )	( )
5.8)	had little interest or pleasure in doing things	( )	( )	( )	( )
5.9)	Felt "down", depressed or without perspective	( )	( )	( )	( )
5.10)	Difficulty getting to sleep, or staying asleep, or sleeping more than usual?	( )	( )	( )	( )
5.11)	Felt tired or low on energy	( )	( )	( )	( )
5.12)	Lack of appetite or overeating?	( )	( )	( )	( )
5.13)	Felt bad about yourself or think that you are a failure or that you have let your family or yourself down	( )	( )	( )	( )
5.14)	Difficulty concentrating on things, like reading the newspaper or watching TV	( )	( )	( )	( )
5.15)	Slow to move or speak, or were so agitated that you were pacing back and forth	( )	( )	( )	( )

5.16)	Thought about getting hurt in some way or that you would be better off dead?	( )	( )	( )	( )

INTERVIEWER, IF YOU HAVE SIGNED ONCE OR MORE ANY OF THE ABOVE PROBLEMS, please ask:

5.17) How difficult it was for you to do your job, take care of things at home, or socialize with other people? *(Interviewer, read out options)*
( ) No difficulties
( ) Little difficulty
( ) Very difficult
( ) Extreme difficulty
( ) Don't know / Did not answer
( ) Not applicable

6) SLEEPING HABITS

PSQI Index

6.1) During the LAST MONTH, what time did you usually go to bed at night?
A: h: min
( ) Don't know / Did not answer

6.2) During the LAST MONTH, how long (in minutes) did you usually take to go to sleep at night?
A: _____min
( ) Don't know / Did not answer

6.3) During the LAST MONTH, what time did you usually get up in the morning?
A: h: min
( ) 99- Don't know / Did not answer

6.4) During the LAST MONTH, how many hours of sleep did you get each night? This may be different from the number of hours you stayed in bed:
A: h
( ) Don't know / Did not answer

Now let's talk about your sleep in the LAST MONTH, the answer choices are: Not once in the last month; Less than once a week; 1 or 2 times a week; 3 or more times a week

	During the LAST MONTH, how often have you been bothered by any of the problems below:	Not once in the last month	Less than once a week	1 or 2 times a week	3 or more times a week
6.5)	Could not fall asleep within 30 minutes *(Interviewer, readout options)*	( )	( )	( )	( )
6.6)	Woke up in the middle of the night or early in the morning	( )	( )	( )	( )
6.7)	Had to get up to go to the bathroom	( )	( )	( )	( )

6.8)	He couldn't breathe comfortably	( )	( )	( )	( )
6.9)	Coughed or snored heavily	( )	( )	( )	( )
6.10)	Felt very cold	( )	( )	( )	( )
6.11)	Felt very hot	( )	( )	( )	( )
6.12)	Had bad dreams	( )	( )	( )	( )
6.13)	He had pain	( )	( )	( )	( )
6.14)	Others: _____	( )	( )	( )	( )

6.15) During the LAST MONTH, how often did you take medicine (prescribed or "on your own") to help you sleep? *(Interviewer, readout options)*
( ) Not at all in the last month
( ) Less than once a week
( ) 1 or 2 times a week
( ) 3 or more times a week
( ) Don't know / Did not answer

6.16) During the past month, how often have you had difficulty staying awake while driving, eating, or participating in social activity (party, gathering with friends, work, study)? *(Interviewer, readout options)*
( ) Not at all in the last month
( ) Less than once a week
( ) 1 or 2 times a week
( ) 3 or more times a week
( ) Don't know / Did not answer

6.17) During the LAST MONTH, how difficult was it for you to maintain enthusiasm for doing things (your usual activities)? *(Interviewer, read out options)*
( ) No difficulties
( ) A mild problem
( ) A reasonable problem
( ) A big problem
( ) Don't know / Did not answer

6.18) During the LAST MONTH, how would you rate the quality of your sleep in general? *(Interviewer, read out options)*
( ) Very good
( ) Good
( ) Poor
( ) Very bad
( ) Don't know / Did not answer

7) FOOD AND NUTRITION

Now let's talk about your diet in the LAST THREE MONTHS.

	In the LAST THREE MONTHS, how many days a week do you usually eat?	Never	1 to 2 days a week	3 to 4 days a week	5 to 6 days a week	Every day (including Saturday and Sunday)
7.1)	Beans (or soybeans, peas, lentils, chickpeas)?	( )	( )	( )	( )	( )
7.2)	Oilseeds (nuts, peanuts, walnuts, almonds, macadamia nuts, among others)?	( )	( )	( )	( )	( )
7.3)	Vegetables (lettuce, tomato, carrot, chayote, eggplant, zucchini - do not consider potato, cassava, or yam)?	( )	( )	( )	( )	( )
7.4)	Dark green vegetables (spinach, kale, watercress, arugula)?	( )	( )	( )	( )	( )
7.5)	Red meat (beef and pork)?	( )	( )	( )	( )	( )
7.6)	Chicken?	( )	( )	( )	( )	( )
7.7)	Fish (sardines, tuna, salmon)?	( )	( )	( )	( )	( )
7.8)	Eggs?	( )	( )	( )	( )	( )
7.9)	Fruit?	( )	( )	( )	( )	( )
7.10)	Soda or artificial juice (powder, carton, or bottle)?	( )	( )	( )	( )	( )
7.11)	Chocolate drinks or flavored yogurt?	( )	( )	( )	( )	( )
7.12)	Milk, cheese, or other dairy products?	( )	( )	( )	( )	( )
7.13)	Industrialized (packaged) cookies?	( )	( )	( )	( )	( )
7.14)	Packaged snacks (Cheetos, Ruffles, or any other brand)?	( )	( )	( )	( )	( )
7.15)	Noodles or instant soups?	( )	( )	( )	( )	( )
7.16)	Hamburgers, sausages, sausage, , salami, ham, turkey breasts?	( )	( )	( )	( )	( )
7.17)	Frozen products (pizza, ready meals, nuggets, French fries)?	( )	( )	( )	( )	( )
7.18)	Canned food (corn, olives, vegetable)?	( )	( )	( )	( )	( )
7.19)	hamburger bread, hot dog bread, or other sweet bread?	( )	( )	( )	( )	( )

7.20)	Bread, simple cakes, and pasta?	( )	( )	( )	( )	( )
7.21)	Candy and sweets (candy, gum, candy, ice cream, jelly, chocolate, etc.)?	( )	( )	( )	( )	( )
7.22)	Do you exchange your lunch meal for sandwiches, snacks, pizza, or other snacks?	( )	( )	( )	( )	( )
7.23)	Do you exchange you dinner meal for sandwiches, snacks, pizza, or other snacks?	( )	( )	( )	( )	( )

7.24) Did you notice, in general, any change in the price of food during the pandemic? *(Interviewer, read the options)*
( ) No *(Skip to 7.25)*
( ) Yes, prices have increased
( ) Yes, prices have decreased *(Skip to 7.25)*
( ) Don't know / Did not answer

If so:
7.24.1) If you have observed a price increase, for which foods? *(You can mark more than one option)*
[ ] Fruit, vegetables
[ ] Meat
[ ] Rice, beans
[ ] Oilseeds (nuts, peanuts, walnuts, almonds, macadamia nuts, among others)
[ ] Milk, cheese, and yogurt
Frozen products (pizza, ready meals, nuggets, French fries)
[ ] Sweets and candies
Other industrialized/ ultra-processed foods (soft drinks, packaged snacks, canned food, etc.)

7.25) What foods have you consumed that give you pleasure, comfort, and well-being sensation? *(Interviewer, do not read the options. You can mark more than one option)*
[ ] Potato chips
[ ] Ice cream
[ ] Cookies/Cakes
[ ] Chocolates/sweets
[ ] Pasta/pizza
[ ] Greens, vegetables/salad
[ ] Soup
[ ] Breads (French bread, sweet bread, cheese bread, bread with cream)
[ ] Meat or barbecue
[ ] Hamburger/sandwich
[ ] I have not consumed
[ ] OtheA: _____
( ) Not applicable

7.26) Compared to BEFORE THE PANDEMIC, have you modified your consumption of foods that give you pleasure, comfort, and well-being sensation?
( ) Yes, increased
( ) Yes, it decreases
( ) No, I did not change consumption

( ) Don't know / Did not answer

Now I will ask questions about your diet now and before the pandemic (March/2020):

7.27) CURRENTLY, what is the main way you purchase food items? *(Interviewer, read out options)*
( ) In person
( ) Delivery (delivery service) via phone/whatsapp
( ) Delivery (Delivery service) via application/website
( ) Does not buy
( ) OtheA: _____

7.28) BEFORE the PANDEMIC (March/2020), what was the main way you purchased food items? *(Interviewer, read out options)*
( ) In person
( ) Delivery (delivery service) via phone/whatsapp
( ) Delivery (Delivery service) via application/website
( ) Does not buy
( ) OtheA: _____

7.29) CURRENTLY, what are the top three places where you get most of your food? *(IntervieweA: Do not readout options. You can mark up to **THREE** options)*
[ ] Supermarkets and hypermarkets
[ ] Fruit and vegetable store
[ ] Butchery and fishmonger
[ ] Local or neighborhood markets (including a grocery store, mini-market, and warehouse)
[ ] Fairs
[ ] Home garden
[ ] Direct from the farmer
[ ] Convenience store or gas station
[ ] Street vendor and informal sales (including a trailer, food truck, etc.)
10- Bakery
[ ] Snack bar (includes tea houses, juice houses, ice cream parlors, pastry shops, and the like)
[ ] Bars and restaurants
[ ] Donation
[ ] Other: _____
( ) Don't know / Did not answer

7.30) BEFORE THE PANDEMIC (March/2020), what were the three main places where you got most of your food? *(IntervieweA: Do not readout options. You can mark up to **THREE** options)*
[ ] Supermarkets and hypermarkets
[ ] Fruit and vegetable store

[ ] Butchery and fishmonger
[ ] Local or neighborhood markets (including a grocery store, mini-market, and warehouse)
[ ] Fairs
[ ] Home garden
[ ] Direct from the farmer
[ ] Convenience store or gas station
[ ] Street vendor and informal sales (including a trailer, food truck, etc.)

10- Bakery
[ ] Snack bar (includes tea houses, juice houses, ice cream parlors, pastry shops, and the like)

[ ] Bars and restaurants
[ ] Donation
[ ] OtheA: _____
( ) Don't know / Did not answer

7.31) CURRENTLY, how often do you have meals outside your home? Consider any food prepared and consumed away from home.
( ) I do not have this habit
( ) From 1 to 2 times a month
( ) From 3 to 4 times a month
( ) From 1 to 2 times a week
( ) 3 to 4 times a week
( ) From 5 to 6 times a week
( ) Every day of the week
( ) Don't know / Did not answer

7.32) BEFORE THE PANDEMIC (March/2020), how often did you have meals outside your home? Consider any food prepared and consumed away from home.
( ) I do not have this habit
( ) From 1 to 2 times a month
( ) From 3 to 4 times a month
( ) From 1 to 2 times a week
( ) 3 to 4 times a week
( ) From 5 to 6 times a week
( ) Every day of the week
( ) Don't know / Did not answer

7.33) CURRENTLY, how often do you have meals at home that have been prepared elsewhere? (Such as delivery or picked up at the restaurant/location to be consumed at home)?
( ) I do not have this habit
( ) From 1 to 2 times a month
( ) From 3 to 4 times a month
( ) From 1 to 2 times a week
( ) 3 to 4 times a week
( ) From 5 to 6 times a week
( ) Every day of the week
( ) Don't know / Did not answer

7.34) BEFORE THE PANDEMIC (March/2020), how often did you have meals at home that were prepared elsewhere? (Such as delivery or picked up at the restaurant/location to be consumed at home)?
( ) I do not have this habit
( ) From 1 to 2 times a month
( ) From 3 to 4 times a month
( ) From 1 to 2 times a week
( ) 3 to 4 times a week
( ) From 5 to 6 times a week
( ) Every day of the week
( ) Don't know / Did not answer

7.35) CURRENTLY, considering the meals that were prepared outside your home (restaurants or delivery), what is the MAIN group of foods that you consume? *(IntervieweA: readout options)*

( ) Food and meals in natural or minimally processed, such as fruits, vegetables, legumes, rice, beans, meat, and others
( ) Ultra-processed foods, such as salty snacks, pizza, sandwiches, nuggets, potato chips
( ) Sweets and candies, such as desserts, candies, chocolates, ice cream, and others
( ) Don't know / Did not answer

Food Safety Scale - EBIA

Now, I will ask you some questions about your household's access to food. In all of the questions, you must answer for the LAST 3 MONTHS. Some questions are similar to each other, but you must answer them all

7.36) In the last 3 months, were you worried that the food in your home would end before you could buy more food?
( ) No
( ) Yes
( ) Don't know / Did not answer

7.37) In the last 3 months, did the food end before you had money to buy more?
( ) No
( ) Yes
( ) Don't know / Did not answer

7.38) In the last 3 months, did you run out of money and you could not have a healthy and varied diet?
( ) No
( ) Yes
( ) Don't know / Did not answer

7.39) In the last 3 months, did the residents in your home eat only some food in your meals, because there was not enough money to buy food?
( ) No
( ) Yes
( ) Don't know / Did not answer

7.40) In the last three months, has any resident 18 years of age or older skip meals because there was not money to buy food?
( ) No
( ) Yes
( ) Don't know / Did not answer

7.41) In the last three months, did any resident 18 years of age or older ever eat less than you thought you should have because there was not enough money to buy food?

( ) No
( ) Yes
( ) Don't know / Did not answer

7.42) In the last three months, has any resident 18 years of age or older ever hungry but did not eat because there was not money to buy more food?
( ) No
( ) Yes
( ) Don't know / Did not answer

7.43) In the last three months, has any resident 18 years of age or older ever go without eating for a whole day or have just 1 meal in a whole day because there wasn't enough money to buy food?
( ) No
( ) Yes
( ) Don't know / Did not answer

7.44) Are there any residents under 18 years old?
( ) No (Finish the questionnaire)
( ) Yes

If so:
7.44.1) In the last three months, has any resident under the age of 18 could not have a healthy and varied diet because there was not enouth money to buy food?
( ) No
( ) Yes
( ) Don't know / Did not answer

7.44.2) In the last three months, has any resident under the age of 18 eat less than what you thought you should because there wasn't enough money to buy food?
( ) No
( ) Yes
( ) Don't know / Did not answer

7.44.3) In the lastt three months, have you ever reduce the size of meals because there wasn't enough money to buy food?
( ) No
( ) Yes
( ) Don't know / Did not answer

7.44.4) In the last three months, have any residents under the age of 18 ever have to skip a meal because there wasn't enough money to buy food?
( ) No
( ) Yes
( ) Don't know / Did not answer

7.44.5) In the last three months, have any residents under the age of 18 ever hungry but you just couldn't buy more food?
( ) No
( ) Yes
( ) Don't know / Did not answer

7.44.6) In the last three months, have any residents under the age of 18 ever go without eating for a whole day or have just 1 meal in a whole day because there wasn't enough money to buy food?
( ) No
( ) Yes
( ) Don't know / Did not answer

Thank you!!!

Covid-Inconfidentes
Universidade Federal de Ouro Preto

GPENSC
GRUPO DE PESQUISA E ENSINO EM NUTRIÇÃO E SAÚDE COLETIVA - ENUT-UFOP

UFOP
Universidade Federal de Ouro Preto

SURVEILLANCE OF OFCOVID-19 IN THE INCONFIDENTES REGION

Your household was randomly selected to participate in a health survey conducted by the Universidade Federal de Ouro Preto (UFOP) and the City Halls of Ouro Preto and Mariana

HOW WILL I PARTICIPATE?

One adult, over the age of 18, will be selected to participate in the survey, free of charge. The selected adult will answer a questionnaire that assesses lifestyle and health status, and will be tested for COVID-19

WHEN CAN I PARTICIPATE?

The UFOP team will stop by your house on Friday or Saturday or Sunday. So it is very important that you are at home and welcome us

You will be able to identify us by our badge, and we will be wearing all PPE to ensure everyone's safety!

SURVEILLANCE OF COVID-19 THE INCONFIDENT REGION

Ouro Preto and Mariana City Halls

How does the research happen?

The research ""Surveillance of

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