

PNAD COVID-19: A powerful new tool for Public Health Surveillance in Brazil

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Abstract *On February 3, 2020, the Brazilian Ministry of Health declared a state of emergency in public health of national relevance due to the pandemic caused by the new coronavirus SARS-CoV-2. As a result, IBGE postponed the 2020 Demographic Census and started to formulate a COVID-19 PNAD. The survey included a total sample of 349 thousand people in about 200 thousand households. Of the total Brazilian resident population, the IBGE estimated in May/2020 that 24.0 million (11.4%) had at least one of the flu-like syndrome symptoms. Of this contingent, 20.2 million (84.3% of all symptomatic patients) did not seek health care. The innovations brought to health surveillance and the IBGE's pioneering spirit show that it is possible, in a continental country that has been experiencing several local epidemics at different times in its territory, that other countries also develop similar household surveys, with weekly data collection (referred to epidemiological weeks) by telephone in an innovative and timely manner. The COVID-19 PNAD also brought new technology to the Institute, reviving its role as an external evaluator of the Unified Health System (SUS).*

Key words Household survey, COVID-19, Brazil

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Introduction

As of July 1st, 2020, Brazil recorded the second-highest number of confirmed cases of COVID-19 (1.4 million) in the world, with a mortality rate of 269/million inhabitants, with 14,445 tests per million inhabitants¹, just behind Uruguay with 19,086 tests per million, Colombia (14,612/million), Argentina (7,798/million), and Paraguay (9,723/million). The case fatality rate in our country was 4.2%, with a note that it should be lower when admitting that at least 40% of cases are asymptomatic² and must configure in the denominator of the indicator when calculating this rate.

In an unprecedented way, the IBGE used in the PNAD COVID-19 the parameter of the epidemiological week, and, thus, published in June 2020 the first results as cases related to the 19th to the 22nd epidemiological weeks³. It is the first National Statistics Institute in a country worldwide to carry out this type of Household Sample Survey, with data collection by telephone interview during the SARS-CoV-2 pandemic. The COVID-19⁴ survey consisted of a small module of seven questions within the Continuous National Household Sample Survey (PNAD-C), which mainly aimed to quantify the main effects of the pandemic on the labor market.

The PNAD COVID-19

In the PNAD COVID-19 conducted in partnership with the Ministry of Health, the data collected built on the Brazilian resident population estimated at 210.1 million inhabitants. In May/2020, the sample surveyed 349,000 people from about 200,000 households. The resident who answered the telephone answered the questionnaire for the data collection on behalf of all residents of the household. The probabilistic samples were designed to allow representative estimates for each of the 27 federative units, and the five geographical macro-regions of the country.

The module entitled “COVID-19” addressed issues related to the 12 flu-like syndrome symptoms. The main question in the module referred to the presence/absence of these signs and symptoms in the previous week (“Over the last week, did you experience [fever, cough, sore throat, difficulty breathing, headache, chest pain, nausea, stuffy or runny nose, fatigue, eye pain, loss of smell or taste, or muscle pain]?”).

The COVID-19 module is complemented by questions that detail other aspects of people with referred symptoms, bringing about questions related to seeking a health facility (including PHC units and family health teams); measures taken to recover from symptoms; places visited to seek care; the need for hospitalization/sedation/intubation and artificial respiration. These questions could also be associated with another PNAD module that characterized each resident or household: gender, age group, skin color or ethnicity, household conditions, schooling, private health insurance plan. For example, the survey’s microdata analysis showed that the higher the level of schooling, the more significant the proportion of people with flu-like symptoms.

Of the total Brazilian resident population, the IBGE estimated in May/2020 that 24.0 million (11.4%) had at least one of the flu-like syndrome symptoms. The results are very close in absolute terms when this data is disaggregated between households with only one resident (single-family schemes) x households with more than one resident (multifamily schemes). In the first case, 10.7 million had some flu-like symptoms, while 13.3 million had such symptoms in multifamily schemes.

Of the 24 million Brazilians who had some flu-like symptoms in May/2020, 20.2 million (84.3% of all symptomatic) did not seek health care for various reasons. Among these, 16.8 million (82.9%) stayed at home, 1.2 million (5.8%) called a health professional, 11.5 million (56.9%) bought or took medicine on their own, 2.9 million (14.5%) bought or took medicine under medical advice, 173 thousand (0.9%) received a visit from a private health professional and 526 thousand (2.6%) received a visit from a PHC health professional of the SUS. Among these residents who received visits from the Family Health Teams, 20% lived in the North, 43.7% in the Northeast, 20.6% in the Southeast, 10.8% in the South, and 5.0% in the Midwest.

Therefore, with these data, it could be hypothesized that the case fatality rate could be lower if we added the total number of people with symptoms indicated by PNAD COVID-19, which were not laboratory-confirmed for COVID-19, to the total 1.4 million cases confirmed by the Ministry of Health.

Within a total of 24 million, 4.2 million had combined symptoms associated with COVID-19, as highlighted by recent literature⁵⁻⁹. That is, people who had: (1) loss of taste or smell; (2) fever +

cough + difficulty breathing; or (3) fever + cough + chest pain.

Innovations brought by PNAD COVID-19 - IBGE

Information is essential for the control of any disease, but it becomes especially important in the case of a new communicable disease, without effective drugs or vaccines available, in which control measures depend so intrinsically on epidemiological knowledge. Health surveillance is responsible for systematically collecting information relevant to the health of the population, traditionally using case reports that appear in health units and laboratories as their primary source of data. As an alternative to data generated during health care, initiatives such as serological surveys, participatory surveillance, and even online activity related to specific keywords, have been used. In this context, PNAD COVID-19 brought a set of innovations to health surveillance.

Firstly, it appears as a robust tool in the search for health information. Its strength is related to the association with PNAD-C, an instrument of validity established with a representative sample for all federative states. Active health surveillance initiatives usually lack this statistical basis that IBGE's unique experience and expertise give to the methodology, which even estimates the variation coefficients for each statistic found.

Secondly, it looks for signs and symptoms. PNAD COVID-19 collects 12 signs and symptoms possibly associated with COVID-19. Rather than looking for diagnoses or risk factors, it is a syndromic surveillance survey. Its results bring different information from what was available until June 2020, and it is essential to understand how to use it best. One of the limitations of most sources of information is restricting their case definitions to a small number of clinical manifestations. In the case of acute infectious diseases in general, and particularly in the case of new emerging diseases still being characterized clinically, using three or four symptoms to classify suspected cases – and even defining who will be tested for laboratory confirmation – it excludes a massive contingent of cases with clinical presentation, sometimes not so atypical, from official figures. Even studies that look for clinical predictive factors for diagnosis suffer from inclusion bias. The possibility of using different combinations of signs and symptoms as definition

criteria, recognizing that they will show different sensitivity and specificity, increases their flexibility and make the data useful for different contexts and analysis objectives.

Thirdly, it draws a longitudinal perspective. PNAD COVID-19 collects data weekly and refers to the same epidemiological week concept used by health surveillance, allowing unique serial monitoring of Brazilian households, a characteristic that distinguishes it from other cross-sectional surveys with independent samples.

Fourthly, it performs a data survey peculiar to the outcome. When unlinking from data collection in health units, the survey brings data that would not be collected by traditional health surveillance mechanisms. The PNAD COVID-19 design collects information about oligosymptomatic agents, relevant in the transmission chain. It also breaks the barrier of access to health services, which is a barrier not only for health care but also for data collection through surveillance.

Fifthly, it allows analyzing the integration between primary care and health surveillance, which is fundamental in times of a pandemic, because as it is known since the first published study that classified the COVID-19 symptoms¹⁰, 80.9% of people who had the disease had mild symptoms, and therefore would not require hospitalization. For this reason, primary care and its integration with health surveillance have been highlighted in some countries such as Portugal, which, from the beginning, opened “COVID-19 exclusive areas” (CDA) coordinated by primary health care¹¹. This initiative has been cited as one of the reasons for the success of combating COVID-19 in that country, besides mass testing (more than 10% of the resident population), social distancing, and the use of PPE by the population.

PNAD COVID-19 pointed out that among those with flu-like symptoms and that sought a health facility, most went to a PHC unit and sought a Family Health Team (FHT) professional. The demand for emergency and hospital services would have been much more significant had it not been for the FHT's territorial actions. In Portugal, for example, these actions by primary care teams prevented the collapse in hospital units.

Sixthly, the survey allows associating data from Brazilians over 14 years of age with flu-like syndrome symptoms with labor market data, which is also collected to measure the pandemic effects in this area.

Finally, its design to collect data using an epidemiological week allows comparison with the data reported in e-SUS and SIVEP-Gripe.

Final considerations

New confirmed case data, both from serological surveys and health care, should be used to find the correspondence between PNAD COVID-19 data and the circulation of SARS-CoV-2 in the country at each federative unit (UF), given that other respiratory viruses will cause similar symp-

toms. The comprehensive analysis of this information will allow extracting the main epidemiological conclusions of PNAD COVID-19.

IBGE's pioneering spirit shows that it is possible, in a continental country that has been experiencing several local epidemics at different times in its territory, that other countries also develop similar household surveys, with data collection by telephone in an innovative and timely manner. PNAD COVID-19 also brings new technology to the Institute, reviving the role as the external evaluator of the Unified Health System (SUS).

Collaborations

GO Penna, J Cerbino Neto, and LF Pinto collected data and drafted the first version of the text. JAA Silva and JG Temporão participated in the following versions and critically reviewed them.

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