doi: 10.5216/rpt.v50i3.69063

ORIGINAL ARTICLE

PUBLIC PERCEPTION OF COVID-19 IN THE TRIÂNGULO MINEIRO REGION, MINAS GERAIS STATE, BRAZIL: A CROSS-SECTIONAL SURVEY

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ABSTRACT

This was a cross-sectional, anonymous, online survey aimed at assessing the perceptions and basic knowledge of COVID-19, a highly transmissible disease caused by SARS-CoV-2, in a sample population in the Triângulo Mineiro region, Minas Gerais, Brazil. A questionnaire devised by the researchers and distributed through social media was applied between June 16, 2020 and August 21, 2020. The survey consisted of questions about the basic aspects of COVID-19, which included symptoms, risk groups, suspicion of infection, prevention, transmission, and perception regarding social isolation. The average distribution, frequencies, similarities and differences between the responses for the different variables were evaluated. Five hundred twenty valid responses were obtained from participants aged ≥18 years. Most of the respondents showed satisfactory basic knowledge of COVID-19. Moreover, the data showed that the participants scored an average of 87.6%. Sex, age, and socioeconomic vulnerability presented a statistically significant link with knowledge of the disease; women, young participants, and the least socioeconomically vulnerable had the highest scores. This study indicated that the population in the Triângulo Mineiro region able to access social networking platforms were basically well informed regarding COVID-19, although differences were observed depending on the group analyzed.

KEY WORDS: Coronavirus; knowledge; surveys and questionnaires.

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Received for publication: 28/5/2021. Reviewed: 4/10/2021. Accepted: 6/10/2021.

INTRODUCTION

The Coronavirus disease 2019 (COVID-19) is caused by the severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) transmitted by contact of mucous membranes with viral particles released in the respiratory secretions of previously infected people (Pascarella et al., 2020). A minority of those infected by the virus develop signs and symptoms of COVID-19; however, on clinical manifestation, fatigue, fever, dry cough, myalgia, and dyspnea are observed due to the involvement of the lower airways (Li et al., 2020; Oran &Topol, 2020).

First detected in China, COVID-19 quickly spread throughout the world, and in March 2020 was declared a pandemic by the World Health Organization – WHO (Li et al., 2020). Brazil is among the countries most affected by the pandemic. As this manuscript is written (September 27, 2021), Brazil presents the third highest number of cases of COVID-19 in the world, with more than 21 million infected, and the second highest in number of deaths, with more than 590,000 dead (JHUM, 2021). Although vaccination drives have already started in several countries, including Brazil, the small proportion of those vaccinated to date (May 2021) is far from eliminating the virus in the entire population. Therefore, control of the disease is still dependent on general measures of personal hygiene and social distancing to reduce the spread of the virus (Wiersinga et al., 2020).

Another important aspect of COVID-19 is the fact that it is the first pandemic to occur in the digital age. Due to information technology, social networking platforms have enabled decentralized and instantaneous interaction among billions of people. However, although social networking sites enable worldwide communication, it is still difficult to filter the veracity of information, which fuels the sharing of incorrect and unverified content (Gottlieb & Dyer, 2020).Thus, misinformation spread on social networking platforms impairs public commitment to the collective fight against the pandemic (Tagliabue et al., 2020). Additionally, these fake messages spread up to six times faster than verified information (Vosoughi et al., 2018).

The Triângulo Mineiro is a region that plays an essential role in the economy of the Brazilian State of Minas Gerais, namely in agricultural and industrial activities, with one of the highest Gross Domestic Products (GDP) in the state (Oliveira et al., 2020; Ribeiro et al., 2017). Regarding the burden presented by COVID-19, according to the Minas Gerais State Department of Health (2021a), the Triângulo Mineiro is one of the regions most affected by COVID-19 in Minas Gerais, with approximately 214,000 cases and more than 5,000 deaths.

Several studies have demonstrated the importance of knowledge of COVID-19, which directly affects the behavior and attitudes of the population regarding the disease (Puspitasari et al., 2020). In addition, the increasing use of the internet has stimulated the utilization of electronic questionnaires as an

alternative method for obtaining data in scientific research (Faleiros et al., 2016). Considering the importance of the Triângulo Mineiro region to the country, assessing how this population understands the pandemic caused by the new coronavirus can be essential for the development of more effective practices to control the disease. Hence, this study aimed to assess the basic knowledge of COVID-19 in a sample population in the Triângulo Mineiro region in Brazil during the peak of the pandemic.

MATERIAL AND METHODS

Participants

This was a cross-sectional, anonymous, online survey carried out using a form in Portuguese on Google Forms (Google LLC). The survey participants were residents of the Triângulo Mineiro region aged ≥18 years with access to social networking platforms. The link to the questionnaire was sent via Facebook, Instagram, Twitter, and WhatsApp through the accounts of the researchers themselves with paid advertisements, selecting only participants aged ≥ 18 years.

All processes were approved by the appropriate review board (CAAE: 31319020.3.0000.5154) and are in accordance with the principles of the Declaration of Helsinki. The Free and Informed Consent Term (ICF), adapted to the online form, was made available to the participants. The survey participants did not receive any financial compensation.

The questions and correct responses were outlined using the information available on the Ministry of Health page on COVID-19 (Ministério da Saúde, 2020b), and the list of incorrect options was prepared using the Ministry of Health website, which assembled some false news on the disease (Ministério da Saúde, 2020a). The recruitment of participants and data collection were carried out between June 16, 2020 and August 21, 2020, namely, during the "first wave" of the disease in the Triângulo Mineiro region when the peak of cases and deaths occurred. It is important to emphasize COVID-19 is a completely new disease with almost daily new findings and scientific publications since its origin and some of the information considered precise at the time of the questionnaire elaboration may currently be slightly different. Therefore, the questions and answers would probably be different if the questionnaire were applied today.

Data Collection and Quality Assurance

The questionnaire consisted of 26 questions (Supplementary Material 1). For this study, we considered only six questions regarding general information about the disease (questions 1, 2, 3, 4, 5, and 12) to analyze knowledge about forms of transmission, main symptoms, conduct in suspected cases, identification of risk groups, perceptions of social isolation, and disease prevention. These

six questions, their options, and the percentage of participants who marked the incorrect options are shown in Supplementary Material 2. At the end of the questionnaire, the participants had access to the correct answers and comments on the questions. We also provided links to official websites on the disease, such as those of the Ministry of Health (Ministério da Saúde, 2020b) and Oswaldo Cruz Foundation (Fiocruz, 2020). The data obtained were transferred onto a Microsoft Excel spreadsheet for further analysis. All responses from individuals residing in municipalities outside the Triângulo Mineiro or under 18 years of age were excluded.

The questionnaire was designed with two different question models: true/false questions, with more than one option, and multiple-choice questions, with a single option. For the true/false questions, scores depended on which alternatives the participants guessed correctly. Thus, the maximum score for these questions corresponded to the number of correct alternatives to the question, so that questions 1, 2, 4, and 12 were worth a total of 7, 9, 10, and 11 points, respectively. On the other hand, questions 3 and 5 had only one correct answer, and participants only scored if they selected the correct alternative. Thus, these two questions had a maximum score of one. The participant who selected the correct alternative gained one point, and the participant who did not select the correct one gained zero points. Considering the final distribution of the two types of questions, the participants could score between 0 and 39 points altogether. The higher the score, the more hits and evidence of knowledge of the different aspects of COVID-19. A score between 0 and 9 was considered poor, between 10 and 19 average, between 20 and 29 good, and between 30 and 39 very good.

Statistical Analysis

The data were tabulated using Excel and analyzed using SPSS 21 (IBM Corp) and GraphPad Prism 7.0 (GraphPad Software, Inc). The data were evaluated for normality using the D'Agostino-Pearson and Shapiro-Wilk tests and variances were compared using the F test and Bartlett test. Unpaired tests were used to compare the distributions of the different variables using the Kruskal-Wallis test with Dunn's multiple comparisons and Mann-Whitney test. The hypotheses were tested using the Chi-square test, Fisher's exact test, or Chi-square test with Yates correction. To evaluate the associations, the odds ratio (OR) (Baptista-Pike) was used with their respective confidence intervals (CIs).

To assess the effect of the associations between the variables tested, the lowest scores (poor results) were compared with the other scores (better results) between the groups. For the grouped variables, the normalized relative frequencies of the scores were calculated and scores of up to 50% were compared with the others (above 50%) between groups.

Spearman's test was used for the correlations. The observed differences were considered significant when $p < 0.05$ (5%) (Arango, 2001).

RESULTS

4,436 responses were sent in. Only those from participants residing in the Triângulo Mineiro were selected, totaling 534 responses; however, 14 were excluded wrongly filled in by children under 18, leaving 520 valid responses. Most of the participants were women, young, and did not have an undergraduate or graduate degree. Moreover, 77.9% of the participants reported that they did not receive any government assistance. Additional information about the characteristics of the participants is provided in Table 1.

The economic effect of the COVID-19 pandemic on the family budgets of the participants was analyzed. 27.3% of the participants reported that the pandemic had no effect on their family budget, 34.4% reported that the effect was small, 26.2% reported moderate effect, 10.0% reported larger effect, and 2.1% reported severe impact (Figure 1).

Table 1. Demographic characteristics of participants.

Characteristic	Participants (N=520), n (%)
Sex	
Male	171 (32.9)
Female	349 (66.5)
Age (years)	
18-19	62 (11.9)
20-29	294 (56.5)
30-39	73 (14.0)
40-49	40 (7.7)
50-59	38 (7.3)
≥60	13 (2.5)
Education	
Middle and high school	314 (60.4)
Higher and graduate education	206 (39.6)
Receives government welfare assistance	
Yes	115 (22.1)
No	405 (77.9)
Household members	
1 person	39 (7.5)
2 people	99 (19.0)
3 people	138 (26.5)
4 people	162 (31.2)
5 people or more	82 (15.8)

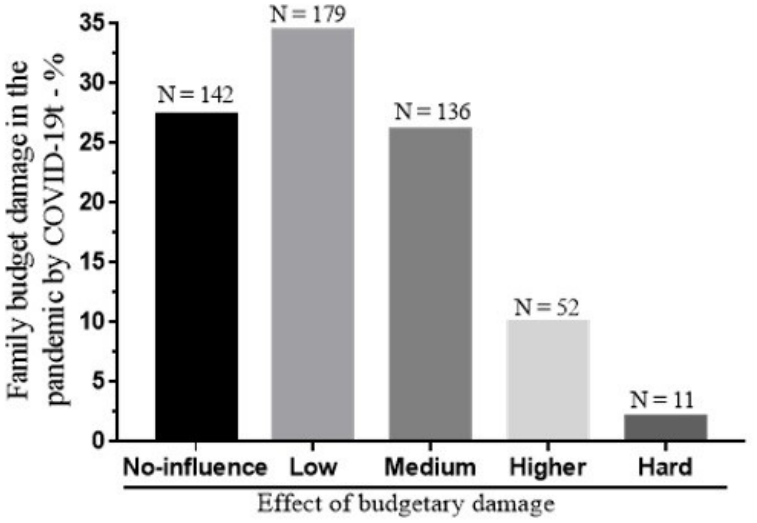

Figure 1. Effect of the COVID-19 pandemic on the family budgets of the study participants. N = number of participants.

After the participants' responses on damage to family budgets in the COVID-19 pandemic, the data were grouped to analyze the overall effect. Participants were classified into five groups that reflect the level of budgetary impact: no influence, low, medium, higher and hard.

The average score of the participants was 34.2, ranging from 26 to 39. These data indicated that the average grade of the participants was 87.6%. 97.1% and 3.1% of the participants proved to have very good and good knowledge of the disease, respectively. No participant had a poor or average score in the questionnaire.

After analyzing the socio-demographic profiles of the participants, the percentage of the population with a better perception of COVID-19 was verified (symptoms, risk groups, conduct on suspicion, prevention, transmission, and social isolation). A statistically significant discrepancy was found across all the variables, and knowledge of the symptoms showed the greatest loss (26.9%), reaching a loss that was 14 times higher than knowledge regarding social isolation (reduction of 1.9%). A critical reduction was also seen in the understanding of risk groups (13.9%), followed by understanding the conduct of suspected SARS-CoV-2 infections (11.7%), prevention (6.4%), and transmission (2.7%) (Figure 2).

After identifying the characteristics of the participants and correct responses by the participants to each question, an analysis was conducted to identify the characteristics and differences between the groups across the study population: sex, educational level, age, socioeconomic vulnerability, and number of household members. All of these parameters were evaluated for their respective distribution in each population (unpaired), as well as for the ORs between those with the lowest scores and those with the highest scores. When the variables were grouped, the ORs between participants with scores of up to 50% and those with scores of >50% were evaluated, as described in the methods section. The results are presented in Table 2.

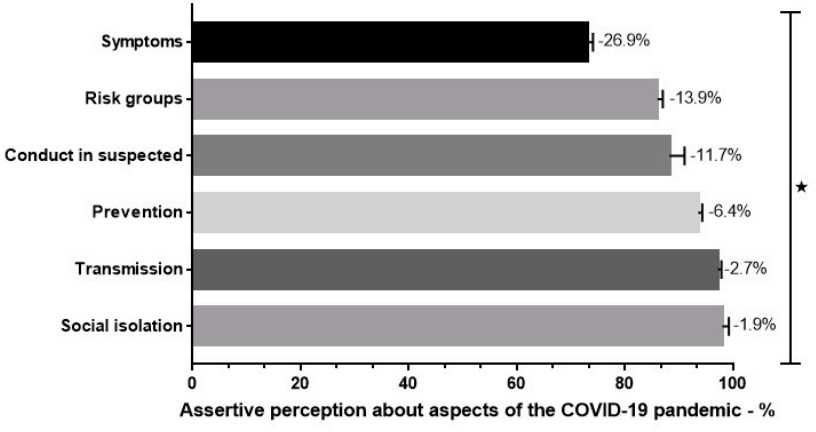

Figure 2. Indicator of health accuracy education about COVID-19 in the macro-region of the Triângulo Mineiro in the State of Minas Gerais, Brazil.
* Statistically significant differences between groups (Kruskal-Wallis test with Dunn's multiple comparison tests).

After the participants' responses on the different disease themes, such as symptoms, risk groups, suspicious behavior, prevention, transmission, and perception of social isolation, the data were normalized for relative frequency and compared. Data were expressed as means and 95% confidence intervals.

Table 2. Statistical analysis of the sample based on socio-demographic profiles.

Transmission Variable	Description	$\dot{X} \pm \sigma$	Statistical test	P value	H_0 (P Value)	OR	95% CI
Sex	Male	6.8 ± 0.6	M-W Test	0.56	0.06	2.60	1.09 to 6.29
	Female	6.8 ± 0.5					
Educational level	Middle and High	6.8 ± 0.5	M-W Test	0.93	0.78	0.79	0.34 to 1.94
	Higher/Graduate	6.8 ± 0.5					
Age - years	18 to 19	6.8 ± 0.6	K-W	0.15	0.08	----------	----------
	20 to 29	6.8 ± 0.5					
	30 to 39	6.9 ± 0.4					
	40 to 49	6.8 ± 0.6					
	50 to 59	6.7 ± 0.6					
	≥ 60	6.6 ± 0.8					
	18 to 73	6.8 ± 0.5	Spearman r	0.95	----------	----------	-0.09 to 0.08
Socio-economic vul.	RGS	6.8 ± 0.6	M-W Test	0.23	0.39	3.54	0.18 to 67.46
	No-RGS	6.8 ± 0.5					
People/residence - N	1 to 15	6.8 ± 0.5	Spearman r	0.23	----------	----------	-0.03 to 0.14

Symptoms							
Sex	Male	6.7 ± 1.1	M-W Test	0.15	0.41	0.50	0.15 to 1.58
	Female	6.5 ± 1.1					
Educational level	Middle and High	6.6 ± 1.1	M-W Test	0.19	0.31	0.22	0.02 to 1.46
	Higher/Graduate	6.5 ± 1.1					
Age - years	18 to 19	6.4 ± 1.4[ab]	K-W	0.007*	0.02*	----------	----------
	20 to 29	6.8 ± 1.0[a]					
	30 to 39	6.5 ± 0.9[ab]					
	40 to 49	6.8 ± 1.0[ab]					
	50 to 59	6.1 ± 1.2[b]					
	≥ 60	6.3 ± 1.1[ab]					
	18 to 73	6.6 ± 1.1	Spearman r	0.89	----------	----------	-0.08 to -0.09
Socio-economic vul.	RGS	6.7 ± 1.2	M-W Test	0.33	>0.99	0.88	0.26 to 2.78
	No-RGS	6.6 ± 1.1					
People/residence - N	1 to 15	6.6 ± 1.1	Spearman r	0.58	----------	----------	-0.11 to 0.06

Socio-economic vul. = socio-economic vulnerability; N = number; RGS = receiving government support; $\dot{X}$ = mean; σ = standard; M-W = Mann Whitney; * = statistically significant difference; H_0 = null hypothesis (were tested by Chi-square, Fisher's exact or Chi-square with Yates' correction tests); OR = odds ratio; CI = confidence interval; a, b, c, and d = statistically significant difference between groups

Conduct in suspected infection							
Sex	Male	0.9 ± 0.3	M-W Test	0.57	0.57	1.17	0.66 to 2.02
	Female	0.9 ± 0.3					
Educational level	Middle and High	0.9 ± 0.3	M-W Test	0.61	0.61	0.87	0.51 to 1.47
	Higher/Graduate	0.9 ± 0.3					
Age - years	18 to 19	0.9 ± 0.3[ac]	K-W	<0.0001*	<0.0001*	-------- ---	----------
	20 to 29	0.9 ± 0.3[a]					
	30 to 39	0.9 ± 0.3[ac]					
	40 to 49	0.7 ± 0.5[bc]					
	50 to 59	0.8 ± 0.4[ac]					
	≥ 60	0.6 ± 0.5[c]					
	18 to 73	0.9 ± 3.2	Spearman r	0.0005*	----------	-------- ---	-0.24 to -0.06
Socio-economic vul.	RGS	0.8 ± 0.4	M-W Test	0.07	0.10	1.71	0.94 to 3.08
	No-RGS	0.9 ± 0.3					
People/residence - N	1 to 15	0.9 ± 3.2	Spearman r	0.89	----------	-------- ---	-0.09 to 0.08

Risk groups							
Sex	Male	8.4 ± 1.2	M-W Test	0.02*	0.33	3.10	0.63 to 17.55
	Female	8.7 ± 1.1					
Educational level	Middle and High	8.6 ± 1.1	M-W Test	0.25	>0.99	0.98	0.20 to 5.58
	Higher/Graduate	8.7 ± 1.1					
Age - years	18 to 19	8.2 ± 1.4[a]	K-W	0.008*	0.12	----------	----------
	20 to 29	8.6 ± 1.1[ab]					
	30 to 39	8.9 ± 1.0[b]					
	40 to 49	8.8 ± 1.0[ab]					
	50 to 59	8.5 ± 1.0[ab]					
	≥ 60	8.1 ± 1.3[ab]					
	18 to 73	8.6 ± 1.1	Spearman r	0.01*	----------	----------	0.02 to 0.20
Socio-economic vul.	RGS	8.5 ± 1.2	M-W Test	0.38	0.02*	5.93	1.54 to 22.58
	No-RGS	8.6 ± 1.1					
People/residence - N	1 to 15	8.6 ± 1.1	Spearman r	0.21	----------	----------	-0.14 to 0.003

Socio-economic vul. = socio-economic vulnerability; N = number; RGS = receiving government support; $\dot{X}$ = mean; σ = standard; M-W = Mann Whitney; * = statistically significant difference; H_0 = null hypothesis (were tested by Chi-square, Fisher's exact or Chi-square with Yates' correction tests); OR = odds ratio; CI = confidence interval; a, b, c, and d = statistically significant difference between groups

Social isolation							
Sex	Male	1.0 ± 0.2	M-W Test	0.25	0.31	2.07	0.67 to 6.39
	Female	1.0 ± 0.1					
Educational level	Middle and High	1.0 ± 0.1	M-W Test	0.98	>0.99	0.98	0.26 to 3.12
	Higher/Graduate	1.0 ± 0.1					
Age - years	18 to 19	0.9 ± 0.3[a]	K-W	0.03*	0.03*	-------- ---	----------
	20 to 29	1.0 ± 0.1[ab]					
	30 to 39	1.0 ± 0.0[b]					
	40 to 49	1.0 ± 0.0[b]					
	50 to 59	1.0 ± 0.2[ab]					
	≥ 60	1.0 ± 0.0[b]					
	18 to 73	1.0 ± 0.1	Spearman r	0.48*	----------	-------- ---	-0.06 to 0.12
Socio-economic vul.	RGS	1.0 ± 0.1	M-W Test	0.35	0.70	0.39	0.03 to 2.37
	No-RGS	1.0 ± 0.2					
People/residence - N	1 to 15	1.0 ± 0.1	Spearman r	0.42	----------	-------- ---	-0.12 to 0.05

Prevention							
Sex	Male	10.2 ± 1.0	M-W Test	0.03*	0.25	4.12	0.47 to 59.83
	Female	10.4 ± 0.9					
Educational level	Middle and High	10.3 ± 1.0	M-W Test	0.47	>0.9999	1.31	0.15 to 19.13
	Higher/Graduate	10.3 ± 1.0					
Age - years	18 to 19	9.9 ± 1.1[a]	K-W	0.006*	0.04*	----------	----------
	20 to 29	10.3 ± 0.9[b]					
	30 to 39	10.3 ± 1.0[ab]					
	40 to 49	10.5 ± 0.9[b]					
	50 to 59	10.3 ± 1.3[b]					
	≥ 60	10.5 ± 0.9[ab]					
	18 to 73	10.3 ± 1.0	Spearman r	0.003*	----------	----------	0.04 to 0.22
Socio-economic vul.	RGS	10.3 ± 0.9	M-W Test	0.35	0.53	1.77	0.12 to 15.29
	No-RGS	10.3 ± 1.0					
People/residence - N	1 to 15	10.3 ± 1.0	Spearman r	0.83	----------	----------	-0.08 to 0.10

Socio-economic vul. = socio-economic vulnerability; N = number; RGS = receiving government support; $\dot{X}$ = mean; σ = standard; M-W = Mann Whitney; * = statistically significant difference; H_0 = null hypothesis (were tested by Chi-square, Fisher's exact or Chi-square with Yates' correction tests); OR = odds ratio; CI = confidence interval; a, b, c, and d = statistically significant difference between groups

Grouped variables							
Sex	Male	33.9 ± 2.5	M-W Test	0.3	0.04*	2.02	1.03 to 3.92
	Female	34.3 ± 2.1					
Educational level	Middle and High	34.1 ± 2.3	M-W Test	0.76	0.69	1.23	0.62 to 2.56
	Higher/Graduate	34.2 ± 2.1					
Age - years	18 to 19	33.1 ± 2.6[a]	K-W	<0.0001*	<0.0001*	----------	----------
	20 to 29	34.4 ± 2.1[b]					
	30 to 39	34.5 ± 1.8[b]					
	40 to 49	34.5 ± 1.8[ab]					
	50 to 59	33.4 ± 2.5[ab]					
	≥ 60	33.1 ± 2.1[ab]					
	18 to 73	34.2 ± 2.2	Spearman r	0.11	----------	----------	-0.02 to 0.16
Socio-economic vul.	RGS	34.0 ± 2.4	M-W Test	0.76	0.59	1.33	0.65 to 2.77
	No-RGS	34.2 ± 2.1					
People/residence - N	1 to 15	34.2 ± 2.2	Spearman r	0.31	----------	----------	-0.13 to 0.04

Socio-economic vul. = socio-economic vulnerability; N = number; RGS = receiving government support; $\dot{X}$ = mean; σ = standard; M-W = Mann Whitney; * = statistically significant difference; H_0 = null hypothesis (were tested by Chi-square, Fisher's exact or Chi-square with Yates' correction tests); OR = odds ratio; CI = confidence interval; a, b, c, and d = statistically significant difference between groups

Regarding sex, the main differences observed were regarding the women's knowledge of risk groups (3.1% higher, $p = 0.02$) and prevention (1.6% higher, $p = 0.03$), with no differences in the OR; when the variables were grouped, there was a greater probability of less knowledge by males (OR = 2.0, 95% CI = 1.0–3.9). No significant differences were found regarding information on transmission, symptoms, conduct in suspected cases, and social isolation ($p>0.05$).

After grouping the variables, participant age influenced the understanding of the symptom indicators, conduct in suspected cases, risk groups, social isolation, and prevention ($p<0.05$). The younger the participants, the better the understanding of these parameters. There were no statistically significant differences in the transmission indicator ($p>0.05$). Additionally, a negative and significant correlation ($p<0.05$) was observed in conduct in suspected cases, knowledge of risk groups, social isolation, and prevention. On the other hand, no significant correlation was observed between transmission and symptom indicators ($p>0.05$). After grouping the variables, there was no negative correlation between age and scores ($p>0.05$).

The influence of socioeconomic vulnerability in the survey scores was estimated through social welfare aid, i.e., its receipt was linked with greater socioeconomic vulnerability. No statistically significant differences were found in any of the variables analyzed ($p>0.05$); however, there was a greater probability of less knowledge in the socioeconomically vulnerable group regarding the recognition of risk groups (OR = 5.9, 95% CI = 1.5–22.6).

Regarding the influence of educational level and number of household members on knowledge of COVID-19, no statistically significant differences were found between the groups analyzed and the variables tested ($p>0.05$)

An analysis of the influence of the variables tested on the family budget during the pandemic was also performed (Table 3). There were statistically significant differences ($p<0.05$) according to sex, educational level, socioeconomic vulnerability, and number of household members. There were no statistically significant differences according to age groups ($p>0.05$) regarding family budget during the pandemic.

Table 3. Influence of gender, educational level, age, socioeconomic vulnerability and number of household members in the family budget in times of pandemic, in the Triângulo Mineiro region, MG, Brazil.

Variable	Description	Family budget			
		Affected - N (%)	Not affected - N (%)	OR (95% CI)	P Value
Sex	Male	54 (27.1)	117 (36.5)	1.54	0.03*
	Female	145 (72.9)	204 (63.6)	(1.05 to 2.26)	
Educational level	Middle and High	138 (69.4)	176 (54.8)	1.86	0.001*
	Higher/Graduate	61 (30.7)	145 (45.2)	(1.29 to 2.71)	
Age - years	18 to 19	28 (14.1)	34 (10.6)	----------	0.35
	20 to 29	114 (57.3)	180 (56.1)		
	30 to 39	31 (15.6)	42 (13.1)		
	40 to 49	12 (6.0)	28 (8.7)		
	50 to 59	10 (5.0)	28 (8.7)		
	≥ 60	4 (2.0)	9 (2.8)		
Socio-economic vul.	RGS	68 (34.2)	47 (14.6)	3.03	<0.0001*
	No-RGS	131 (65.8)	274 (85.4)	(1.99 to 4.57)	
People/residence - N	1 until 5	183 (92)	314 (97.8)	0.25	0.003*
	6 until 15	16 (8.0)	7 (2.2)	(0.10 to 0.61)	

Socio-economic vul. = socioeconomic vulnerability; N = number; RGS = receiving government support; * = statistically significant difference; CI = confidence interval.

DISCUSSION

COVID-19 is a complex disease, and since it emerged only recently, the scientific community is still attempting to understand it fully. Vaccination against the new coronavirus began recently and though about 90% of the population have received the first dose, just over 45% of the population of the Triângulo Mineiro have received the second dose (Secretaria de Estado de Saúde de Minas Gerais, 2021a) (data from September 27, 2021). These data highlight the importance of basic prevention to control COVID-19, with information being of the utmost importance for effective public cooperation. Misinformation spread on social networking platforms, which are major tools of communication in modern society, can lead to the impairment of COVID-19–related knowledge and lack of precautionary measures in a population, which in turn can result in an increase in the number of cases, a greater burden on the health system, and a higher number of deaths.

Thus, the central issue analyzed in this study concerned understanding the basic aspects of COVID-19 by users of social networking platforms and residents in the Triângulo Mineiro region. The study population, which consisted predominantly of women who were young and not college graduates, demonstrated good general knowledge of the basic aspects of the disease, with an average of 87.6% correct answers. However, there were differences in knowledge among the different stratified groups. The statistical analysis demonstrated that in the Triângulo Mineiro region, males and elderly people were less well informed regarding the disease.

A previous application of the same questionnaire on a national level detected that in addition to males and elderly participants, another determinant showed statistical significance: not having a degree in higher education (Guimarães et al., 2021). Our study found that this variable was not associated with COVID-19–related knowledge in the Triângulo Mineiro. Due to a restricted regional profile and a more homogeneous population in the Triângulo Mineiro region, we might have found a restriction regarding determinants in the dissimilarities of COVID-19–related knowledge in the population, especially when considering a continental country with social and economic inequalities such as Brazil. These determinants can be reduced from the several that are prevalent at the national level to just two in the Triângulo Mineiro region: old age and being male. These two groups with the least knowledge also presented highest mortality rates in the region (Secretaria de Estado de Saúde de Minas Gerais, 2021b). Although the influence of knowledge in these groups on the observed mortality rates is not measurable, the result highlights the importance of broadcasting correct information that will positively affect specific decisions and help prevent the disease. Different results for particular regions of Brazil show that findings at national levels cannot be generalized to each region of Brazil, demonstrating the importance of undertaking studies similar to this.

Therefore, our findings warrant regional and better-directed studies to improve resource allocation and implement strategies to enhance scientific knowledge of COVID-19 in the general population.

Another aspect observed was that the most frequent correct answers were on the perception of social isolation, transmission, and prevention. However, the level of social isolation, from the start of this study until the time of manuscript-drafting (May 2021), remained considerably limited in the Triângulo Mineiro region, which has been found to be below the Brazilian average (Secretaria de Estado de Saúde de Minas Gerais, 2021b). Uberlândia, the largest city in the region with almost 700,000 inhabitants (IBGE, 2021), presented only 39% adherence to social isolation, while the WHO recommended 70% (Prefeitura de Uberlândia, 2021). This finding demonstrated that the high proportion of correct answers obtained by the study population did not mean this knowledge was put into practice, showing that other factors may have influenced this point. Thus, it is imperative to analyze thoroughly the possible economic, social, and cultural determinants that may affect the practice of these measures by the residents of the region.

Regarding the lower number of correct responses, the question with the highest error rate was related to disease symptoms. Several symptoms had already been reported, but up to the time the questionnaire was made available the following three were most common: fever, cough, and persistent tiredness (Grant et al., 2020). Although a large proportion of the participants correctly recognized cough and fever, only a minority correctly marked persistent tiredness as one of the three most common symptoms of the disease. In place of this symptom, shortness of breath was a more frequent response. Despite being a possible symptom, it is usually restricted to a smaller proportion of cases. The wide media focus on more severe cases may have influenced the overvaluation of this symptom, a phenomenon already observed in other surveys with similar questions in other countries (Zhong et al., 2020; Hayat et al., 2020; Roy et al., 2020).

The question with the second-highest error rate was about risk groups. Only a small proportion selected pregnant women, which was later included as a risk group for COVID-19 by the Ministry of Health. The scientific literature presents evidence of risk for this group, highlighting maternal and fetal complications when infected by the new coronavirus, which include spontaneous abortion, intrauterine growth restriction, and premature birth (Dashraath et al., 2020). The lack of information on the heightened risk in this group during the early stages of the pandemic was likely responsible for the small recognition of pregnant women as a risk group. This delay may be concerning as it could lead to a decrease in precautionary measures in this group, which in turn could have negative consequences.

The findings of the present study can guide authorities in formulating public health policies and the media in the Triângulo Mineiro region in implementing strategies and plans to fight disinformation on COVID-19 and help contribute to the population's awareness. Spreading more information can be an effective strategy, especially for groups such as men and the elderly, who were the survey participants with the lowest scores; this could help transform COVID-19–related knowledge into positive actions that would aid in lowering the risk of mortality due to COVID-19.

Another important aspect analyzed by this study was the effect of the pandemic on the participants' budgets. At the height of the "first wave" of the pandemic in theTriângulo Mineiro region, most of the study participants reported that their budgets were affected by the pandemic. However, most reported that the loss was "low". Additionally, this was mainly reported by females, lower educational level participants, receivers of government aid, and larger households.

The COVID-19 pandemic persisted months after data collection, and it may be likely that the budgets of a larger proportion of participants were affected. However, a fundamental characteristic of these results was that specific groups were significantly more affected. Thus, cases of adverse economic impact due to the COVID-19 pandemic deserve special attention by policymakers. However, it is necessary to assess the long-term effect of restrictive measures on the budgets of the different social groups to reach more definite and credible results.

Our study presented some limitations. Participants could search for answers on the Internet or select random alternatives, which could have made some data unfeasible. To reduce this bias, we conducted the survey voluntarily and anonymously, where the participant knew their level of information would not be exposed. This made them more comfortable about answering the questions. In addition, broadcasting and recruitment of the participants were done through social media, signifying the sample may not be representative of the entire population of the Triângulo Mineiro, and the data may not reflect the reality of this region. Therefore, a certain amount of caution is necessary when generalizing the results obtained, especially concerning people who do not have access to social media. It is noteworthy that online surveys, despite having some limitations, are useful tools to assess the knowledge of a population during a pandemic due to their greater broadcasting ease and speed, the potential to reach a large number of people, and lower costs, which makes them viable alternatives for conducting research in the current global scenario (Ball, 2019).

In general, the study population demonstrated good basic knowledge of COVID-19 despite the differences between the groups analyzed. Being male and elderly were associated with less information about COVID-19 in the Triângulo Mineiro region, in contrast to the application of the same form on

a national level that detected more determinants. Thus, greater propagation of scientifically credible information to increase knowledge is required through investments in public policies and campaigns that reinforce information on the basic aspects of the disease for these specific groups. In addition, we found that the budgets of the majority of the participants were affected during the first few months of the pandemic in the Triângulo Mineiro. Hence, strategies and policies that minimize these impacts are necessary, especially for women with no higher education living large households.

ACKNOWLEDGMENTS

The authors would like to thank the participants in the study for their contribution to the research allowing an investigation representative of a great part of the Triângulo Mineiro population. This study was supported by the Minas Gerais Research Funding Foundation, National Council for Scientific and Technological Development, and Coordination for the Improvement of Higher Education Personnel (finance code 001).We would like to thank Editage (www.editage.com) for the English language editing.

CONFLICT OF INTEREST

The authors declare no conflict of interest.

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