

Biosafety, life and COVID-19: Online questionnaire

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Abstract— COVID-19 or SARS-CoV-2 is a disease caused by a highly transmitted virus that led to the development of a pandemic in 2019-2020 causing many deaths and behavioral changes. Due to this high degree of infection risk, it is extremely necessary to disseminate information on biosafety and the correct compliance with social isolation, aiming at the non-transmission of the pathogen. The general objective of this study was to evaluate the population's knowledge about the means of biosafety used to prevent the spread of the SARS-CoV-2 virus and emotional state and habits in the face of the COVID-19 pandemic. For that, an exploratory-quantitative field research was carried out in a sample of 170 individuals, through a questionnaire via Google Forms. The data collected were evaluated using the IBM SPSS Statistics 25 software and dependence between variables was assessed using Pearson's Chi-square test. as a result, it was found that the interviewees used mainly fabric masks, the use of alcohol 70% was satisfactory, access to information about COVID-19 is vast and the levels of stress and anxiety were obtained. Therefore, it was concluded that a large part of the sample has knowledge and practices of biosafety, probably due to the intense work of social media, which, however, generated panic in most respondents.

I. INTRODUCTION

COVID-19 or SARS-CoV-2 is a disease caused by a virus with high transmission and its main sign and symptom is Severe Acute Respiratory Syndrome (SARS) ¹. Thus, due to the high degree of risk, it is necessary to have a good care concern in order not to transmit this pathogen, and one of the ways of coping with COVID-19 is information ².

The SARS-CoV-2 virus can promote direct transmission, through droplets expelled during coughing or sneezing and indirectly, through contact with contaminated surfaces ³. Thus, due to the simple form of transmission, social isolation and prophylactic measures are necessary to combat the spread of the disease ^{4,5}.

In the search for a fight against the pandemic, several media published information about COVID-19 and gave instructions on ways to prevent the spread of the virus ⁶. According to the WHO ⁷, several means of combating the SARS-CoV-2 Pandemic and infection control can be cited,

such as using disposable masks or tissue, practicing efficient hand hygiene, using the alcohol gel and gloves. According to a set of rules stipulated in the fourth edition of the biosafety manual of the World Health Organization (WHO) laboratory ⁸ the need for adequate disinfectants with proven activity against enveloped viruses, such as the use of alcohol and hypochlorite, was shown.

Moreover, the pandemic brought about changes that caused extensive job losses, consequently threatening the livelihood of millions of people. As a result, companies were forced to close to control the spread of the virus ⁹. Ordinary life has undergone severe changes, such as the government decree on paralyzing on-site teaching in schools and universities and many employees being forced to work from home ⁹.

In clinical and laboratory practice, professionals are required to use Personal Protective Equipment (PPE), which seeks to avoid cross-infection. Among the biosafety rules for coping with COVID-19, the new edition of the

WHO laboratory biosafety manual, such as: washing hands, using 70% alcohol, hypochlorite and social distance is extremely necessary⁷. The WHO also states that, for health professionals and for care aimed at the safety of the population, in addition to the hygiene methods mentioned above, it is necessary to use Personal Protective Equipment (PPE).

PPE is just one of many means necessary to prevent COVID-19¹⁰. In the current context, several means of combating the SARS-CoV-2 Pandemic and controlling acute respiratory infections can be cited; such as the use of medical mask N95 or with disposable upper protection, practice necessary hand hygiene, avoid contact with eyes, nose and mouth and use of gel alcohol⁸. The current challenge is to strictly follow the biosafety protocol¹¹. Thus, it is necessary to mobilize the entire population to contain the progress of this disease.

Based on this knowledge, the present study sought to assess knowledge about biosafety and to analyze the influences of this pandemic scenario in the life of each individual, through the application of an online questionnaire; seeking to evaluate the population's knowledge about biosafety in facing cross-infection with the SARS-CoV-2 virus.

II. METHODS

This study consisted of a field research with a defined universe, being classified as a quantitative exploratory analysis. The data were collected through an *online questionnaire* about biosafety and the influences of the pandemic on the life of each individual. The sample consisted of 170 participants. As inclusion criteria, they should be at least 18 years old and without maximum age, without gender and race restrictions.

The questionnaire was composed of closed questions about knowledge of ways to reduce infection by the SARS-CoV-2 virus, biosafety, emotional state and the daily life of the general population, based on several articles¹²⁻¹⁴ and was applied from October to December 2020 through *Google Forms*. The questionnaire was summarized below (fig. 1).

The interviewees were also instructed about the research and signed the *Free and Informed Consent Term* (ICF). The variables addressed in the questionnaire were:

age, sex, education level, health professionals and students, use of mask and gloves, use of alcohol 70 as a disinfectant, and the observation of health professionals' biosafety by the population, daily during the pandemic, the probability of contracting the virus, taking the vaccine against the virus, means that information was acquired, level of stress and anxiety, physical activity and weight fluctuation during the pandemic.

For data analysis, the software *IBM SPSS Statistics 25* was used and, through the chi-square test, dependence between variables can be verified, with the level of statistical significance being $p < 0.05$.

III. RESULTS

Table 1 presents several data, for which the sample consisted of 63.5% female participants and 36.5 male participants. We can also observe, regarding the age group, most of the sample or 73.5% represented individuals aged 18 to 25 years; 12.5%, from 26 to 35 years old; 7.6% from 36 to 45 years old and 6.5% from 46 years old or more.

When the participants were investigated in relation to any procedure in the health area: "*Passed or accompanied someone in some type of health care procedure during the pandemic: did the professional take appropriate precautions to prevent the spread of COVID-19?*"; only 56.5% of them stated that the professional performed all biosafety practices, while of the interviewees 15.9% reported that the professionals left something to be desired (Table 1). The rest of the sample (27.6%) did not pass or follow any health procedure.

Regarding whether or not you know that only 70 alcohol is effective against microorganisms - "*Did you know that only 70% alcohol is effective for disinfecting?*" - 97.1% of respondents reported having such knowledge and the remainder or 3.9% said they didn't know (Table 1). Regarding the use of disinfectant to perform hand hygiene (Table 2) - "*Do you use 70% alcohol to perform hand hygiene?*" - 80% reported always using alcohol and 20% use it when necessary. When correlating with age, no statistical differences were obtained ($p > 0.05$); however, its use is more widespread among younger people. Of the sample, those who answered "*Yes Always*", 74.3% were 18-25 years old, against 11%, 8.1% and 6.6% for the others.

Questionnaire: biosafety, life and COVID-19

- How old are you?
() 18-25; () 26-35; () 36-45; () 46 or more.
- Gender:
() Female; () Male.
- Scholarity:
() I didn't study; () Incomplete elementary school; () Complete elementary school; () Incomplete high school; () Complete high school; () Incomplete higher education; () Complete higher education.
- Are you a health professional?
() Yes ; () No.
- If the answer to the previous question is "yes", which area of health do you work in / study?
() Medicine; () Dentistry; () Nursing; () Pharmacy; () Physical Education; () Physiotherapy; () Other; () Not applicable.
- In relation to your daily life: during the quarantine, what has changed?
() Anything. I work and/or maintains my social life normally; () I leave home just for work; () I leave home just to do essential tasks; () I don't leave the house under any circumstances;
- Have you used any type of protection when leaving home and / or getting in touch with other people?
() Disposable mask; () Fabric mask; () Mask and gloves, both disposable; () Fabric mask and disposable gloves; () Other.
- You use 70% alcohol to perform hand hygiene?
() Yes always; () Yes sometimes; () I never use.
- Did you know that only 70 % alcohol is effective for disinfecting?
() Yes; () Not so far.
- Passed or accompanied someone in some type of health care procedure during the pandemic: did the professional take appropriate precautions to prevent the spread of COVID 19?
() He took proper care (use of mask, gloves, alcohol gel and sterile equipment); () He left something to be desired; () Not applicable.
- Have you ever contracted COVID-19?
() Yes, and I had a good recovery; () Yes, but I had complications with the disease; () Doesn't contract the disease.
- According to a personal analysis of your daily practices, how likely are you to contract COVID-19?
() High; () Reasonable; () Low.
- Would you get the vaccine for COVID-19 that will be made available by the Ministry of Health?
() Yes, because vaccination is the only form of immunization against COVID-19; () No, because the vaccine is not reliable and / or effective.
- Which social media platform (s) do you use to get news and information about COVID-19? (you can check more than one option):
() Facebook; () WhatsApp; () Instagram; () YouTube; () I don't use any social networks; () Other.
- Did the news on social media about COVID-19 spread panic among people?
() Yes; () No; () Neutral.
- In this context of pandemic and quarantine, how would you rate your level of stress and anxiety?
() Normal; () Light; () Moderate; () Severe; () Extremely severe.
- How would you rate your concern about yourself or a family member / friend getting COVID 19?
() Without worry; () Mild; () Moderate; () Severe; () Extremely severe.
- Do you regularly practice any physical activity?
() Yes, even before the pandemic; () Yes, I started during the pandemic; () No, even before the pandemic; () No, I stopped during the pandemic.
- Regarding your weight, during the pandemic you:
() Gained weight; () Lost weight; () Kept his weight.

Fig. 1: Questionnaire used in this study

Table 2 also presents the results on what types of individual protection the interviewee used - "Have you used

any type of protection when leaving home and / or getting in touch with other people?". Most of the total sample or

79.4% responded using only fabric masks, however when asked about disposable masks, only 17.1% said they used them. Regarding the use of disposable gloves, it was found that 1.2% of the survey participants used disposable gloves, both relating to fabric masks and disposable masks. In addition, when correlating with age, it became evident that these forms of protection are more used by younger people ($p < 0.05$).

Table 3 presents the results in the way that the participants obtained knowledge about COVID-19 - “Which social media platform (s) do you use to get news and information about COVID-19?” - of the 170 respondents, 94.1% or 160 individuals stated that they had obtained information about the SARS-CoV-2 or COVID-19 pandemic through the media and / or social platforms. The “Instagram” and “Facebook” platforms were the most sought after, with 58.6% and 55% respectively. “WhatsApp” and “YouTube” reached close values, 37.3% and 32% respectively. The other information media, such as websites, blogs, Twitter and other digital platforms obtained 32.5% of utilization in the search for information about COVID-19. And, in addition, only 5.9% said they did not seek information on digital media or social platforms.

Moreover, when related to information obtained from social media and/or platforms with possible emotional changes - “Did the news on social media about COVID-19 spread panic among people?” - Table 1 showed that 55.9%

of the interviewees believed that the news caused panic in society, 21.18% said that they did not and 22.94% responded as neutral. Despite this point, when comparing the age and the panic that the news from COVID-19 may have caused, table 2 shows that the youngest are the most susceptible, with 75.8% for the 18-25-year-old age group, while older - age group 46 or older - only 6.3% said that news received from the SARS-CoV-2 pandemic caused panic. However, when analyzing the entire sample, there were no statistical differences ($p > 0.05$).

Regarding the levels of stress and anxiety during the pandemic, table 1 shows that 43.5% of the interviewees stated that they were “Moderate”, 28.8% as “Severe”; 11.8% as “Light”; 8.8%, “Extremely severe”; and only 7.1% said they had no stress or anxiety due to the pandemic.

When the participants were asked about their daily lives during the pandemic (Table 4) - “In relation to your daily life: during the quarantine, what has changed?” - most of the sample or 61.8% reported leaving home only to perform essential tasks, 23.5% answered leaving only for work and 1.8%, reported not leaving the house under any circumstances, 12.9% of the total sample answered that nothing has changed and work and/or maintain social life normally. Therefore, it presented statistical differences when compared to age, for all the statements raised ($p < 0.05$).

Table 1: Responses obtained for various variables

Questions	Answers	Frequency	Percentage
Gender	Female	108	63.5%
	Male	62	36.5%
Age Range	18-25	125	73.5%
	26-35	21	12.4%
	36-45	13	7.6%
	46 or more	11	6.5%
Are you a health professional?	No	42	24.7%
	Yes	128	75.3%
Passed or accompanied someone in some type of health care procedure during the pandemic: did the professional take appropriate precautions to prevent the spread of COVID-19?	He took proper care	96	56.5%
	He left something to be desired	27	15.9%
	Not applicable	47	27.6%
Did you know that only 70% alcohol is effective for disinfecting?	Yes	165	97.1%
	Not so far	5	2.9%
Did the news on social media about COVID-19 spread panic among people?	Yes	95	55.9%
	No	36	21.2%

	Neutral	39	22.9%
	Normal	12	7.1%
	Light	20	11.8%
Level of stress and anxiety	Moderate	74	43.5%
	Severe	49	28.8%
	Extremely severe	15	8.2%

Table 2: Crossing of the variables "type of protection used when contacting other people", "Did the news on social media about COVID-19 spread panic among people?" and "Do you use 70% alcohol for hand hygiene?" with "Age group".

Questionnaires		Age range								Total	
		18-25		26-35		36-45		46 or more		n	%***
		n	%**	n	%**	n	%**	n	%**		
A. Have you used any type of protection when leaving home and/or getting in touch with other people?	Disposable mask	14	48.3%	5	17.2%	7	2.1%	3	10.3%	29	17.1%
	Fabric mask*	110	81.5	15	11.1%	3	2.2%	7	5.2%	135	79.4%
	Mask and gloves, both disposable	1	50.0%	0	0.0%	1	50.0%	0	0.0%	2	1.2%
	Fabric mask and disposable gloves	0	0.0%	1	50.0%	0	0.0%	1	50.0%	2	1.2%
	Other	0	0.0%	0	0.0%	2	100%	0	0.0%	2	1.2%
Total										170	100%
p<0.05 (p=0.0)											
B. You use 70% alcohol to perform hand hygiene?	Yes always	101	74.3%	15	11.0%	11	8.1%	9	6.6%	136	80.0%
	Yes sometimes	24	70.6%	6	17.6%	2	5.9%	2	5.9%	34	20.0%
	I never use	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
Total										170	100%
p>0.05 (p=0.751)											
C. Did the news on social media about COVID-19 spread panic among people?	Yes	72	75.8%	9	9.5%	8	8.4%	6	6.3%	95	55.9%
	No	22	61.1%	7	19.4%	4	11.1%	3	8.3%	36	21.2%
	Neutral	31	79.5%	5	12.8%	1	2.6%	2	5.1%	39	22.9%
Total										170	100%
p>0.05 (p=0.496)											

***Percentage referring to the total sample, that is, 170 participants; **Percentage in relation to the total number of participants who responded to the analyzed statement; *Cloth factory masks.

Table 3: Social media in which the sample obtained information about COVID-19

	Frequency*	Percentage**
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Which social media platform(s) do you use to get news and information about COVID-19?		
Facebook	93	55.0%
WhatsApp	63	37.3%
Instagram	99	58.6%
YouTube	54	32.0%
I don't use social networks	10	5.9%
Other	55	32.5%

*Frequency for the total sample, that is, 170 participants; **Percentage referring to the total sample, that is, 170 participants.

Table 4: Crossing of variable "In relation to your daily life: during the quarantine, what has changed?" with "Age range"

	Age range								Total		
	18-25		26-35		36-45		46 or more		n	%**	
	n	%*	n	%*	n	%*	n	%*			
In relation to your daily life: during the quarantine, what has changed?	Anything. I work and / or maintain my social life normally	18	81.6%	4	18.2%	0	0.0%	0	0.0%	22	12.9%
	I leave home just for work	21	52.5%	5	12.5%	7	17.5%	7	17.0%	40	23.5%
	I leave home just to do essential tasks	83	79.0%	12	11.4%	6	5.7%	4	3.8%	105	61.8%
	I don't leave the house under any circumstances	3	100%	0	0.0%	0	0.0%	0	0.0%	3	1.8%
Total										170	100%
p<0.05 (p=0.008)											

**Percentage referring to the total sample, that is, 170 participants; *Percentage in relation to the total number of participants who responded to the analyzed statement.

In this study, 75.29% of the sample consisted of health professionals or students and 24.7% of non-professionals (Table 1). However, when the crossing of the variables "Are you a health professional or student?" and "According to a personal analysis of your daily practices, how likely are you to contract COVID-19?" (Table 5), it was identified that both groups have statistically equal concerns about the probability of contracting COVID-19 (p>0.05). 16.7% - non-professionals and 16.4% - health professionals answered that they are very afraid of contracting the disease; 54.8% - non-professional and 54.7% - health professionals reported having moderate fear; and 28.6% - non-professionals and 28.9% - health professionals said they had little fear that their daily

activities could cause contamination of COVID-19. In this study, 75.29% of the sample consisted of health professionals or students and 24.7% of non-professionals (Table 1). However, when the crossing of the variables "Are you a health professional or student?" and "According to a personal analysis of your daily practices, how likely are you to contract COVID-19?" (Table 5), it was identified that both groups have statistically equal concerns about the probability of contracting COVID-19 (p>0.05). 16.7% - non-professionals and 16.4% - health professionals answered that they are very afraid of contracting the disease; 54.8% - non-professional and 54.7% - health professionals reported having moderate fear; and 28.6% - non-professionals and 28.9% - health

professionals said they had little fear that their daily activities could cause contamination of COVID-19.

Table 5: Crossing of the variable "I According to a personal analysis of your daily practices, how likely are you to contract COVID-19" with "Are you a health professional or student?"

		According to a personal analysis of your daily practices, how likely are you to contract COVID-19?				Total
		High	Reasonable	Low		
Are you a health professional or student?	No	n	7	23	12	42
		%	16.7%*	54.8%*	28.6%*	24.7%***
	Yes	n	21	70	37	128
		%	16.4%**	54.7%**	28.9%**	75.3%***
Total		n	28	93	49	170
		%	16.5%***	54.7%***	28.8%***	100.0%***

p>0.05 (p=0.999)

***Percentage in relation to the total sample, that is, 170 participants; **Percentage in relation to 128 health professionals; *Percentage in relation to 42 non-health professionals.

IV. DISCUSSION

The biosafety assessed in this study, as reported in others in the literature^{15,16}, confirmed that the entire sample uses some type of facial protection, either through disposable or tissue masks. Arruda *et al.*¹⁶ conducted a questionnaire among health students from a public university in Brazil and also reported that the entire sample used a mask for protection. Erthal *et al.*¹⁵ conducted a study that the sample was composed of health professionals and non-professionals in the area; in its results it was also verified the satisfactory use of the mask by the evaluated population.

Furthermore, in this study, mainly young people, use tissue masks, as recommended by the World Health Organization (WHO)⁵, as an effective and low-cost means for individual protection. In addition, social isolation and hygiene measures must be strictly followed so that maximum control of the spread of the virus occurs⁴, as the vaccine against SARS-CoV-2 is currently unavailable, broadly and unrestrictedly

As already reported, general hygiene precautions are crucial to minimize the risk of contamination, and it is necessary to emphasize the use of gloves, especially for medical teams¹⁷. An infected health professional is a potential vehicle for the spread of the virus, as stated by Solomom *et al.*¹⁷ and protecting the hands with disposable

gloves minimizes the spread of COVID-19⁹. In this study, although the use of a mask is recurrent, the portion interviewed who uses gloves for protection is very small.

As for those who underwent or accompanied someone in some type of health care procedure during the pandemic, a significant portion reported that the professional left something to be desired in the practice of biosafety, worrying data, because the situation at the moment the world lives in calamity and intense spread of the virus. However, several official health institutions, such as the Ministry of Health of Brazil¹⁸ and the Federal Council of Dentistry¹⁹, affirm the need that professionals follow biosafety guidelines for coping with the disease. WHO²⁰ has established several protocols for health professionals such as the use of Personal Protective Equipment (PPE) (boots, long-sleeved gown, heavy-duty gloves, mask, and goggles or a face shield) and hand and surface hygiene with 70% alcohol.

On different types of inanimate surfaces, the virus can remain infectious from 2 hours to 9 days at room temperatures²¹. That is, this is the time that a person can be infected by touching a contaminated object if they don't perform hand hygiene later. In the study by these same authors, it was identified that ethanol (78 and 95%), 2-propanol (70 and 100%), the combination of 2-propanol (45%) with 1-propanol (30%), glutardialdehyde (0.5 and 2.5%), formaldehyde (0.7 and 1%), povidone iodine (0.23

and 7.5%), sodium hypochlorite (minimum concentration of 0.21%) and hydrogen peroxide (0.5%) had satisfactory antimicrobial action against strains identical to human coronavirus. Currently there are several studies and searches to provide cleaning of difficult surfaces, as described in the work of Queiroz *et al.* ²², which suggests the possibility of using photodynamic therapy as a possible disinfecting action for surfaces and combating SARS-CoV-2. However, chemicals that are easily accessible to the population are more effective and faster tools, such as 70% alcohol and its high effectiveness in combating the new coronavirus.

When approached the subject of the use of 70% alcohol for hand and surface hygiene, it was observed that no individual answered that “*never uses*”, something positive to the study since this disinfectant is essential in fighting COVID-19 and preventing cross-infection ²⁰. The knowledge that only 70% alcohol is effective against the microorganism has shown positive results, reaching the mark above 90%. Thus, it is of great importance to emphasize this point, since the concentration of this disinfectant used in society has an excellent microbial control action, as demonstrated in the studies by QUEIROZ *et al.* ²³, GRAZIANO *et al.* ²⁴ and KANF *et al.* ²¹. However, negative values were also found when a considerable number of individuals said to use this tool only sometimes. That is, in general, the sample understands the importance of using 70% alcohol, but many don't use it routinely.

The COVID-19 pandemic resulted in several ways to decrease the transmission of the virus, one of which was social isolation ²⁵, with this, the rate of stress and anxiety increased moderately in most participants and a significant portion opted for the severe increase option. As indicated by Wang *et al.* ²⁶, many people report anxiety and stress symptoms after experiencing outbreaks of infectious diseases. Therefore, the COVID-19 pandemic hasn't only threatened physical health, but also the mental health of society.

In view of the great movement of the media and social networks on the subject, the majority of the interviewees stated that the news about SARS-CoV-2 led to the population's panic, as reported, since the sudden change in social habits led to the fear increased by the abnormal ¹⁰. Other studies are consistent with this study ^{27,28}, where a large part of the sample is scared and under post-traumatic stress.

About the situation of labor crisis that the pandemic caused²⁹, a significant portion of the interviewees continued to follow their tasks normally, showing a higher value among the younger population. In this work it was also noticed that a higher percentage continues to just go out

to work showing the economic need of the population. According to the literature ³⁰⁻³³, attitudes that don't follow social isolation and that prioritize economics above all, as the political position of Brazil president of the current year - 2020, contribute to a greater number of hospitalizations and deaths resulting from COVID-19.

It is of great relevance to remember that oral health professionals show higher rates of COVID-19 infection, since the transmission of the virus is through aerosols and this was shown in the study according to a personal analysis by health professionals ³⁴. In this study, a large part of the sample was composed of professionals and students of dentistry. The percentage of responses from these in the item “*high*” for the probability of contracting COVID-19, was 3 times higher than the percentage of responses from the other interviewees.

Furthermore, the dental surgeon is significantly vulnerable to contagion due to the unique characteristics of dental procedures ¹¹, because, due to direct contact with droplets of the infected patient's saliva, the risk of cross-infection is increased among these professionals and the patient. Thus, WHO ⁷ affirms the importance of using protective equipment and hygiene measures. Thus, professionals and other people guarantee greater security for themselves and for others.

V. CONCLUSION

Therefore, this research found that the concern about the probability of contracting the SARS-CoV-2 virus isn't related to being a health professional or not. The virus has a high rate of transmission and this makes the disease more worrying and even more contagious. For this reason, hand hygiene care and the use of masks is extremely important. Most of the people who composed this study are practicing biosafety measures and have a close knowledge of the subject, such as the effectiveness of gel alcohol. In addition, this work showed the interviewees' concern and fear about the virus and panic due to the intense production of news, which resulted in high levels of stress and anxiety.

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