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Self-perception of dizziness and the relationship with the easing of COVID-19 social distancing rules, immunization and vitamin supplementation

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ABSTRACT
Objective: To analyze the behavior of people with dizziness when faced with the easing of the COVID-19 social distancing rules, immunization and use of vitamin supplementation. Method: A self-perception questionnaire was applied in electronic format, during the period of easing of the COVID-19 social distancing rules, with 19 closed questions. The following aspects were addressed: identification, general health (COVID-19, influenza, immunization and comorbidities), time of onset of dizziness, means of protection against COVID-19, vitamin supplementation, homemade recipes and use of teas. Results: 667 Brazilians were interviewed, all eligible to participate in the research. Of these, 261 (39.1%) self-reported the presence of dizziness, with a mean age of 37.91 years, with a prevalence of females. The use of masks and hand hygiene were protective measures that continued to be adopted during the easing of the COVID-19 social distancing rules, with 89.2% reporting, even after having been immunized, that they were afraid of contracting SARS COV -two. It was observed that 11.1% triggered dizziness after a positive test for COVID-19; in addition, 32.2% consulted a nutritionist to start the supplementation process (p=0.005), 65.1% used vitamin supplements (p=0.001) and 19.8% reported having used homemade recipes such as Espinheira Santa Tea and Chamomile, Ginko Biloba in order to minimize dizziness. Conclusion: Participants with dizziness were diagnosed with a vestibular disorder by a specialist, since there was a positive relationship with dizziness in the post-COVID-19 period. In order to reduce vestibular symptoms, the interviewees consulted a nutritionist to start vitamin supplementation and used vitamin complexes from A to Z, among others such as zinc, vitamin B12 and homemade teas. Even after the COVID-19 immunization, the participants continued to follow the guidelines for hand hygiene and the use of protective masks.

Keywords: Dizziness, covid-19, quality of life.

1 INTODUCTION

In the last three years, with the advent of COVID-19, the population has gone through several difficulties, due to the implementation of social isolation by SARS-COV 2, which culminated in a financial, emotional and social breakdown.

Among the symptoms of the disease are fever, headache, alteration in smell and taste, diarrhea, difficulty breathing, and the onset and worsening of dizziness, with this vestibular disorder being present in 7 to 12% of subjects who test positive for COVID-19 (Mezzalira, 2022).

It is known that dizziness is characterized by a sensation of spatial disorientation that causes instability, fluctuation, oscillations and may be associated with visual distortion, and such imbalance may occur due to proprioceptive, visual and vestibular changes (Neuhauser, 2016).

However, there are descriptions of the relationship between dizziness and emotional disorders, and the economic and social changes experienced by the population during the period of social confinement of COVID-19 generated changes in mental health. It is believed that the dizziness triggered during this period may be part of the persistent perceptual postural disorder (PPPD), which is caused by emotional disorders, which have been described in the literature as anxiety, depression, insomnia, among others (Marazziti et al., 2021; Shuja et al., 2020; Staab, 2020).

With the implementation of social isolation and the process of mass immunization of the population, the number of deaths and contagion dropped dramatically (FIOCRUZ, 2022). It is known that immunization does not prevent the contamination of SARS-COV2, but it does prevent the most drastic form of the disease.

However, the presence of dizziness in the infected individual, even if immunized, is described, since damage to the central nervous system can occur, which leads to the onset or worsening of the vestibular disorder (Carod-Artal, 2020). Studies also report that this disorder can last for up to 6 months after infection (Santos and Rodrigues, 2022).

In this way, as a preventive measure and even with the aim of reducing the effects and symptoms of COVD-19, the population adhered to vitamin supplementation with vitamins A, B, C, D, zinc, among others, often with use indiscriminately (Shakoor et al., 2021).

Furthermore, the use of supplementation is a common practice among Brazilians, and many people with dizziness also adhere to this integrative practice. In this way, it has been described that in benign paroxysmal positional vertigo (BPPV) there is a low dose of vitamin D, which can be considered one of the causes of dizziness, therefore, supplementation can help to improve this symptom (Abdelmaksoud et al., 2021).

Furthermore, there are also reports of the use of medicinal teas such as Espinheira Santa, Chamomile and Ginko Biloba, which are linked to cultural issues with anxiolytic, calming and anti-inflammatory action (Chaves et al., 2020; Laccourreye et al., 2017).

In relation to the improvement of the dizziness symptom, studies mainly elucidate the use of Ginko Biloba, which acts in vestibular compensation (Lindner et al., 2019).

In this way, the objective of this study is to analyze the conduct of the person with dizziness in

face of the relaxation of the rules of social distance of COVID-19, immunization and use of vitamin supplementation.

2 MATERIAL AND METHOD

This is a cross-sectional, quantitative, observational, analytical study with the general population, which went through the public emergency of COVID-19. The research was approved by CEP da UFS 51563521.5.000.5546 opinion nº 5.168.695.

All participants were informed about the purpose of the study and provided consent to participate in it, with digital acceptance of the free and informed consent form. Ethical precepts followed resolutions 466/2012 and 510/2016 of the National Health Council and the researchers complied with the use of personal data, as provided for in the General Data Protection Law - LGPD - No. 13,709, of August 14, 2018.

The casuistry was composed of adult individuals (over 18 years old), of both genders, for convenience. The means of linking the questionnaire was electronic with registration in Google forms, which is a format capable of enhancing data collection, since it reduces costs and allows coverage of several states and cities (Faleiros et al., 2016).

Initially, the research was disseminated virtually in the researchers' What's App groups and by e-mail to the scientific community. In this way, the participants who received the material (invitation and link with the electronic address for completing the questionnaire), in a virtual environment, were encouraged to disseminate the research among their peers.

The protocol used was a self-perception questionnaire with 19 objective, multiple-choice questions, structured and prepared by the researcher in charge.

The instrument addressed the following aspects: identification (gender, age, state of residence in Brazil), general health (COVID-19, immunization against influenza and COVID-19, comorbidities considered predisposing to contracting COVID-19: obesity, Diabetes Mellitus, heart and respiratory diseases, hypertension and chronic diseases), when tinnitus/dizziness appears, means of protection against COVID-19 and use of vitamin supplementation, homemade recipes and teas.

The questions sought to elucidate two periods permeated by the population: the period of social confinement of COVID-19 (period in which social isolation was imposed by the government with the closure of all non-essential activities, between 2019 and 2020) and the period of easing of social distancing rules (opening of non-essential activities and return of the population to face-to-face activities in 2021).

Among the eligibility criteria, participants should be adults over the age of 18, residing in Brazil, literate, and able to access the material sent via Google Forms. Participants who did not complete all questions in the questionnaire were excluded.

The instrument was released virtually between the months of January and June 2022 and had the participation of 667 interviewees, who met all the inclusion criteria, of which 261 presented self-reports of complaints of dizziness.

Furthermore, the data collection period took place during the easing phase of social distancing rules, which started in 2021, when all establishments were open and the population had returned to face-to-face activities (Martins and Guimarães, 2022).

In addition, the immunization policy was advanced, and in 2022, the data collection period, the 2nd booster dose of COVID-19 was being offered, since the population had already had access to three doses of the vaccine against to SARSC-COV 2.

For statistical analysis of the data, the Statistical Package for Social Sciences, version 20 (SPSS, Chicago, USA) was used. The critical level set was 5% ($P<0.05$) to admit difference in means as statistically significant.

Data were expressed as mean values ± standard deviation of the mean. The Chi Square test was used as well as the Pearson and Spearman tests to assess the correlation between the dependent and independent variables.

As a dependent variable there is the presence of a complaint of dizziness and the independent variables: gender, period in which the complaint of dizziness arose, influenza, measures taken to prevent the transmission of COVID-19 (use of masks and hand hygiene), consultation with a specialist doctor/nutritionist and use of vitamin supplementation.

3 RESULTS

In total, 667 questionnaires were answered by participants residing and domiciled in Brazil with at least one representative from each Brazilian state.

Most resided in the State of Sergipe, where the research was idealized; the average age of respondents being 36.68 years (±13.66) and most participants were women (79.8%).

Of the 667 questionnaires answered, 261 respondents self-reported the presence of dizziness, which is equivalent to 39.1% of participants.

The mean age of those with dizziness was 37.91 years (±14.53), with the majority residing and domiciled in Sergipe (66.33%).

At the time of the social isolation of COVID-19, 71.23% self-reported having followed government guidelines to the letter, and 18% reported belonging to the risk group (elderly and those

with comorbidities such as Diabetes Mellitus, hypertension, obesity, heart disease, respiratory and patients with chronic diseases) for SARS-COV2.

It was also observed that 97.9% of respondents were immunized against COVID-19, with 51.3% adhering to the second dose and 45.6% to the booster dose.

Furthermore, 52% (n=137) self-reported having been immunized against influenza. However, the fear of contracting the disease was still imminent among the participants, who reported making constant use of protective masks and hand hygiene (Table 1)

Table 1. Analysis of participants with self-reported dizziness, regarding variables related to COVID-19 (n=261).

Variables	**Presence of dizziness**	**Absence of dizziness**	**P value**
Gender	n (%)	n (%)	0,001*
Female	225 (86,2)	307(75,6)	
Male	36 (13.8)	99 (24,4)	
Fulfilled social distancing during the pandemic period			0,089
Ever	186(71,3)	259(63,8)	
Rarely	73(28,0)	139(34,2)	
Never	2(8,0)	8(2,0)	
Fear of contracting COVID-19			0,000*
Yes, even with the easing of the rules	105(40,2)	132(32,5)	
Yes, even after taking the vaccine	129(49,2)	224(55,2)	
No	27 (1,13)	50(12,3)	
Used a mask in public places during flexibility			0,585
Regularly	224(85,8)	340(83,7)	
Only in required places	37(14,2)	65(16)	
No	0(0)	1(0,2)	
Performed hand hygiene in public places during flexibility			0,726
Regularly	184(70,5)	286(70,4)	
sporadically	71(27,2)	114(28,1)	
Never	6(2,03)	6(1,5)	

Statistical analysis: Chi square test *p<0,05

Of the participants with complaints of dizziness, 18.4% self-reported aggravation of dizziness during the COVID-19 pandemic period. In addition, 55.6% (n=145) of the participants who were diagnosed with COVID-19, 11.1% (n=29) reported triggering post-contagion dizziness.

It was also observed that the search for a specialist professional to obtain the diagnosis of dizziness was statistically significant (Table 2).

Table 2. Analysis of participants, with self-report of dizziness, regarding the time of onset of dizziness, positive test for COVID-19 and use of vitamin supplementation (n=261)

	n (%)	P Value
Dizziness		
Didn't freak out in the pandemic	125 (47,9)	
Triggered in the pandemic	21(8,0)	
It got worse in the pandemic	48(18,4)	
Triggered after COVID-19	29(11,1)	
Sporadic associated with physician-diagnosed metabolic disease	38(14,6)	
Tested positive for COVID-19		0,001*
Once	106(40,6)	
Twice	30(11,5)	
Three times or more	9(3,4)	
Never contracted the disease	116(44,4)	
Contracted influenza		0,054
Yes	114(43,7)	
No	147(56,3)	
Consult a physician for the diagnosis of dizziness during the COVID-19 pandemic		0,000*
Yes	102(39,2)	
No	158960,8)	

Statistical analysis: Chi square test. *p<0,05

The majority (65.1%) of the participants in the present research, with self-reported dizziness, used vitamin supplementation, and the interviewees went to the nutritionist to start the supplementation process (p=0.001). Thus, 82.4% used vitamins: A, B, C, D, E, zinc and omega 3, in combination or alone; 17.6% of the participants self-reported using the vitamin complex from A to Z.

Furthermore, 19.8% also reported having made use of homemade recipes such as Espinheira Santa Tea and Chamomile, Ginko Biloba, in addition to Vitamin D, B12 and zinc, in order to reduce the vestibular symptom (Table 3).

Table 3. Analysis of participants with self-reported dizziness regarding aspects related to consultation with the nutritionist, use of vitamin supplements and teas (n=261).

	n (%)	P Value
Consultation with a nutritionist to start supplementation		0,005*
Yes	84(32,2	
No	177(67,8)	
Made use of vitamin supplementation		0,001*
Did not use during the pandemic	91 (34,9)	
Started using it during the pandemic	40 (15,3)	
Continued use during the pandemic	74 (28,4)	
Increased usage during the pandemic	40 (15,30	
Initiated post-influenza use	14 (5,4)	
Increased post-influenza use	2 (8,0)	
Made use of homemade recipes for dizziness		
Did not use	209 (80,1)	
Yes with medical prescription	25 (9,6)	
Yes without medical prescription	27 (10,3)	

Statistical analysis: Chi square test. *p<0,05

4 DISCUSSIONS

The present research was carried out in the period of easing of the social distancing rules of COVID-19; however, the study was carried out electronically and had the presence of 667 participants from almost all Brazilian states.

Accordingly, it is observed that answering the questionnaires electronically is capable of enhancing data collection, since it reduces costs and can cover several countries, states and cities (Faleiros et al., 2016).

It is known that with the advent of COVID-19, in 2019, all Brazilian states implemented social distancing, with a proposed lockdown, which culminated in the closure of almost all commercial establishments.

In the present research, 66.7% reported having adhered to the social isolation of COVID-19 (Table 1), which corroborates the literature, since studies show that adherence was approximately 70% of the Brazilian population (Aquino et al.., 2020).

Of the 667 interviewees, dizziness was found in 261 participants, which is equivalent to 39.1% of the sample. Furthermore, of the subjects complaining of dizziness, 71.3% reported having followed the rules of social distancing strictly, that is, they adhered to the lockdown.

The literature reports dizziness as a "pandemic effect" (Mezzalira, 2022), and there are reports of the triggering/worsening of the symptom, in the population that strictly complied with the social distancing of COVID-19, between 2019 and 2020, with a positive relation to emotional changes. (Oliveira et al., 2022).

It was observed that, among the interviewees, 8% self-reported having triggered the vestibular symptom and 18.4% presented worsening during the COVID-19 lockdown period. It is believed that dizziness may have arisen as a result of emotional problems triggered during the period of social confinement, such as anxiety, difficulty sleeping, these factors being considered as triggers (Ammar et al., 2020).

This vestibular disorder was named TPPP, by the International Classification of Vestibular Disorders in 2017, since there is a close relationship with emotional changes (Staab, 2020).

Furthermore, during the period of social confinement, there were significant changes in eating habits, such as higher intake of processed foods with high sodium content and indiscriminate use of alcoholic beverages, factors that may also predispose the population to trigger dizziness (Matsungo and Chopera, 2020).

Furthermore, the change from work activities to the home office generated ergonomic problems, and the residential furniture was not suitable for such activities, thus providing inadequate trunk posture, as well as long hours of work and excessive exposure to electronic devices, factors that

considered as triggering dizziness, which may be linked to muscle pain in the cervical region, known as cervicogenic dizziness (Wrisley et al., 2000).

It is known that the easing of social distancing rules was established at the end of April 2021, which culminated in a decrease in cases of COVID-19, as well as in incidence rates, occupation in ICUs and the number of deaths. In this way, measures to reopen commercial establishments were intended to reduce the economic and social impact experienced during the lockdown (Martins and Guimarães, 2022).

However, with the loosening of social distancing, a new wave of COVID-19 was observed, with an increase in the number of cases, and as a consequence there was an increase in the number of deaths, mainly in the male population and in the elderly (Escobar et al., 2021; Galvão and Roncalli, 2021).

However, clinical trials related to immunizers were already being produced and had to be accelerated.

Thus, the Brazilian Health Surveillance Agency approved the emergency use of Coronavac, which was produced on a large scale in Brazil, by the Butantã Institute (Agência Brasil, 2021).

Thus, immunization was implemented in January 2021, being considered one of the most effective measures to prevent the spread and contagion of the disease.

Therefore, after vaccination, the number of infected people and deaths from the disease dropped dramatically (FIOCRUZ, 2022; Guimarães, 2020).

Regarding immunization, the participants of this research adhered in masse to the COVID-19 vaccination, and 51.3% were immunized with the second dose and 45.6% with the booster dose.

On the other hand, the literature reports higher rates of adherence to the second dose (74.3%) in the general population (FIOCRUZ, 2022).

However, the fear of contagion of the disease in the participants of the present research was imminent (89.7%) and even with the immunization process, the infection or reinfection by COVID-19 generated a milder form of the disease, without the presentation of symptoms serious.

In the present research, the self-report of cases of reinfection, even after immunization, was 3.4%, and the interviewees reported having been infected 3 or more times, without association with the severe phase of the disease.

The literature confirms this data, since the lethality rate is 40.4% lower in immunized individuals (Passarelli-Araujo et al., 2022).

Even with the advancement of COVID-19 vaccination, the Ministry of Health (2021), FIOCRUZ (2021), the Brazilian Society of Infectious Diseases (2021) and the Brazilian Society of

Immunizations (2021) recommended maintaining prevention measures and control against the spread of SARS-CoV-2.

However, in April 2022, the Federal Government published an ordinance in the Official Gazette related to the non-mandatory use of masks indoors (GOV, 2022).

On the other hand, the subjects of the present research, with complaints of dizziness, did not abandon the old practices regarding preventive measures, and 85.8% of the participants, even with the loosening of social distancing, continued to use protective masks in environments public and 70.5% reported washing their hands regularly (Table 1).

In addition, government health agencies in Brazil instituted the National Vaccination Campaign against Influenza, since the symptoms of influenza are similar to those of COVID-19.

Immunization allows reducing the circulating burden of influenza in the population, as well as protecting against complications, mainly secondary bacterial pneumonia (BRASIL, 2023).

Initially, the vaccine was applied to the elderly and children up to 5 years of age, and was later expanded to the general population.

The vaccination target set by the Ministry of Health was 78 million; however, 63 million were vaccinated, with a deficit of 10 million people (BRASIL, 2022).

Thus, it was found that only 52% of participants with self-reported vestibular disorder were immunized against influenza.

Low adherence can be described by the data collection period (January to June 2022), which began before the Influenza vaccination period administered by the Municipal Ministry of Health in March 2022 (Brasil, 2020).

Among the participants, 29 (11.1%) diagnosed with COVID-19 complained of dizziness. The literature corroborates the findings, since infection with SARS-COV2, in addition to causing respiratory changes, can also trigger auditory and vestibular changes in different degrees of impairment.

The relationship of the viral action of COVID-19 on the neural pathways involved in balance is described; however, the mechanisms are still not well described (Fancello et al., 2021; Mezzalira, 2022).

It is hypothesized that the SARS-COV 2 virus is dependent on angiotensin-converting enzyme 2 receptor and serine transmembrane protease 2 to enter the central nervous system.

After viral binding to these receptors, there is infection of the vestibular nerve and, consequently, dizziness (Almufarrij, Uus and Munro, 2020; Luca, De et al., 2021).

In the present study, a statistically positive relationship was also observed for dizziness in the female population.

This fact may be due to the fact that women were part of the vulnerable group during the period of social confinement of COVID-19, since changes in daily life habits generated overload in activities, as well as the feeling of inability to protect family members against the disease and the pervasive economic and social difficulties.

During this period, they triggered mental health disorders such as anxiety, depression and insomnia, often with the use of psychotropic drugs (Marazziti et al., 2021). These emotional disorders may have triggered the PPPD (Hwang et al., 2019).

One of the ways used by the participants of this research, with self-report of dizziness to minimize contamination by COVID-19, in addition to immunization, use of a mask and frequent hand hygiene, was the adoption of vitamin supplementation.

Thus, 65.1% of the participants used supplements, with 17.6% using a complex from A to Z and 82.4% using vitamins A, B, C, D, E, zinc, omega 3 isolated or combined form (table 3).

Such use stems from the importance of increasing the action of the immune system. In this way, it is known that the B complex vitamin is a class of water-soluble vitamins, found in meat and vegetables (fish, cabbage), which act in the normal functioning of the immune system and participate in the regulation and production of energy in the body.

Vitamin C is known as ascorbic acid and is considered a water-soluble nutrient, which acts on the immune system during infectious processes and promotes phagocytosis of leukocytes, in addition to developing and maturing T lymphocytes (Jovic et al., 2020).

There are studies that relate vitamin C to the treatment of Covid, with high-dose intravenous injection to stimulate the immune system (WG, 2020).

Vitamin D is fat-soluble and acts on mineral homeostasis, mainly calcium, magnesium and phosphate and is present in fish oils and egg yolks, and increases immunity by promoting and releasing nutrients, which have antimicrobial effects (Jovic et al., 2020).

Studies also report that this vitamin is potent in reducing the incidence and severity of respiratory infectious diseases (Siuka, Pfeifer and Pinter, 2020).

Vitamin E is considered a potent antioxidant that neutralizes free radicals; acts on the immune system through the mechanisms of decreasing nitrogen oxide production, while Zinc blocks viral replication and acts on the anti-inflammatory process and is used in the treatment of Covid-19 positive subjects (WG, 2020).

The literature also reports that vitamins A, C, D, E, B6, B12 and folate act as promoters of improvement in the immune response, and the adequate supply of these nutrients increases the activity of T lymphocytes, antibodies, as well as providing regulation the production of cytokines, defensins and other compounds that participate in the immune response (Jovic et al., 2020; Shakoor et al., 2021).

There is a consensus in the literature that nutritional interventions and some bioactive compounds can be potential interventions for COVID-19 (Zhang and Liu, 2020).

In consensus, in the present study, participants with complaints of dizziness sought help from a nutritionist to perform vitamin supplementation, with a positive relationship (p=0.005), and there is a relationship between dizziness and vitamin D deficiency; therefore, supplementation may improve vestibular symptoms (Abdelmaksoud et al., 2021).

Furthermore, 19.8% of respondents in this research self-reported the use of medicinal teas to treat dizziness, such as Espinheira Santa tea, Chamomile and Ginko Biloba.

It is known that Espinheira Santa tea has healing, anti-inflammatory, gastroprotective, antiglycemic and antioxidant actions (Silva et al., 2023). vestibular symptoms. Espinheira Santa is used in the acute phase to relieve vertigo and nausea (Jeong, Kim and Kim, 2013).

Chamomile tea has a calming action, topical anti-inflammatory power, and reduces anxiety, insomnia, among others (Chaves et al., 2020).

Thus, it is believed that the sufferer of dizziness has used this tea, due to the close connection between psychiatric disorders in the population with vestibular disorder, mainly anxiety, depression and panic syndrome (Beh, 2021).

Furthermore, Gingko Biloba has antioxidant properties, acts to reduce lipid peroxidation, and the plant extract acts to protect outer hair cells, which can be an ally in the treatment of dizziness (fukaya; kanno, 1999)

It is common for all studies to present limitations, and the fact that it was done online, despite reaching a large number of participants, ended up restricting people without access to the virtual environment, or even people with difficulty in handling the data. electronic devices.

The research has self-reports of dizziness, and this complaint was not evaluated objectively, since the data collected follow the participant's perspective.

Diagnostic studies of dizziness in the population that tested positive for COVID-19, as well as those who went through the period of social confinement of COVID-19, are necessary in order to obtain more data related to the vestibular symptom.

5 CONCLUSION

Those with dizziness self-reported having been diagnosed with a specialist physician about the vestibular disorder (p=0.001), as well as consulting a nutritionist to start vitamin supplementation (p=0.005). They underwent immunization against COVID-19 and influenza, and even so, the fear of contagion made most of them continue to follow the guidelines for hand hygiene and use of protective

masks. Ademics, to reduce the spread of COVID-19 and minimize the symptom of dizziness, made use of vitamin complexes from A to Z, among others such as zinc, vitamin B12 and homemade teas.

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