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Ear problems and COVID-19

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Abstract---Background: Tinnitus and hearing loss are frequent otological symptoms seen in the outpatient Otorhinolaryngology department. There have been reports of hearing loss and tinnitus among patients with coronavirus disease-2019 (COVID-19). There was a lack of interest in studying these symptoms among researchers patients infected with COVID-19. The purpose of this study is to determine the frequency of hearing loss and tinnitus in those who suffer from A hospital has been infected with COVID-19. Materials and Methods: It's an ongoing, descriptive research that includes 96 COVID-19 patients. Hearing loss and tinnitus were investigated as possible side effects of the illnesses. Patients with COVID-19 (22.91 percent) were found. Infections that cause ringing in the ears and ringing in the ears. They all tested positive for COVID-19. By using reverse transcription-polymerase chain reaction (RT-PCR) of the swab, an infection might be detected. For the evaluation of hearing loss, a thorough history and clinical examination of the ear were conducted. and the effects of tinnitus were examined. Results: Out of a total of 22 patients, 45.45 percent had tinnitus and 36.36 percent had hearing loss. 18.18 percent of those surveyed had both hearing loss and tinnitus, which is the most common combination. Conclusion: People with subjective neurological symptoms like hearing loss and tinnitus are more likely to be diagnosed with autism than those without them. In children infected with COVID-19, tinnitus may be present. To be sure, further research is needed. In COVID-19 individuals, what is the underlying pathophysiological mechanism?

Keywords---SARS-CoV-2, tinnitus, infection with COVID-19, hearing loss.

Introduction

The coronavirus family contains numerous diseases that affect both humans and animals. A new coronavirus has been identified as the cause of a series of pneumonia cases in Wuhan and Huanan, China, that had previously been thought to be of unknown origin. Coronavirus disease 2019 (COVID-19) infections were first discovered at the Seafood Wholesale Market. A city in China's Hubei Province that shares this name (1). Rapid transmission of the new coronavirus has resulted in an increasing number of instances have been reported in nations across the globe following an epidemic in China. around the globe (2). There has been a dramatic increase in the number of COVID-19 infections since the first reports surfaced. A total of 81,552 cases were reported in China, while the World Health Organization estimates that there are more than 1,400,000 cases worldwide. WHO to declare a public health emergency in late January 2020 and label it a pandemic in March of that year 2020. (3). There has been a rise in the number of cases as diseases have spread around the globe in recent years. Other countries on all continents, with the exception of Antarctica, have described it. The frequency with which new incidents outside of China has surpassed China's rate, along with the United States, Italy, and Spain. The WHO announced in February of next year that COVID-19 is the name of the illness. Severe acute respiratory syndrome (SARS) is the official designation for the virus that causes COVID-19. previously known as the 2019-nCoV (the novel coronavirus), coronavirus 2 has been identified as the cause of SARS (4).

Diagnosis

According to China's National Health Commission, COVID-19 has been approved. the history of the disease and its symptoms are used to identify it. SARS-CoV-2 infection and symptoms have been confirmed. as a result of one of the approaches listed below: high-throughput polymerase chain reaction (RT-PCR) sequencing of the genome and serological examination of anti-viral immunoglobulins anti-M and anti-G antibodies (IgM and IgG) Diarrhea in People with COVID-19 Dizziness is a medical term that refers to a feeling of dizziness. based on the patient's condition, generally divided into four types: comprising vertigo, dizziness, presyncope, and lightheadedness in its history Patients with vertigo (45–54 percent) see or hear a spinning or whirling motion. an exaggerated sense of movement or rotation that originates in the brain system of the inner ear. Benign paroxysmal vertigo is the most common cause of vertigo. the symptoms of Ménière's disease, vestibular neuritis, and positional vertigo labyrinthitis. Unrest, a sense of unease, or Parkinson's and diabetic neuropathy patients are more likely to report feeling shaky (up to 16 percent). Many medications can cause presyncope, feeling of losing consciousness, or disappearing into thin air (up to 14 percent). The feeling of dizziness and numbness in the hands and feet. such as a sense of alienation from one's surroundings, usually linked to mental or psychogenic causes such as phobias, panic attacks, and somatoform symptoms A range of 10% to 20%. Presyncope and light-headedness frequently co-occur. subjectively and are hard to tell apart unless you look at them. at the same time Meta-analysis of nine publications reveals the following dizziness incidence rate of 12.20 percent (CIs: 0.070–0.204) The COVID-19 cases The inner ear has been found to play a role ischemic and vascular damage are more likely to occur in certain areas. injury

that may impair hearing as well as balance dysfunction. Vasculitis is another term for inflammatory disease of the Symptoms of COVID-19, such as dizziness, might be seen in the clinic. Vertigo has also been seen in patients with COVID-19. reports. Consider, for example, the story of a young woman who was Acute vestibular disease was found in a female with the COVID-19 code. neuritis. Acute peripheral vestibulopathy and vestibular neuritis both describe the same condition. has to do with inflammation of the viral or post-viral eighth-cranial-nerve vestibular branch. Vertigo is a common symptom of the illness, which can be detected by a doctor. minute by minute to hour by hour. However, the condition known as vestibular neuritis causes Multiple sclerosis is commonly thought of as a single-phase disease. In viral inflammation, the cranial nerves may also be affected. An inability to stand or walk was a symptom of the patient's vertigo. potentially due to irritation/distress, nausea and vomiting may occur. deafferentation of the vestibular emetic tracts nerve/nuclei. As with hearing loss and ringing in the ears, dizziness should be observed at a frequency of interpreted cautiously because of the lack of proof. differences across studies and a lack of standardisation Diagnosis of dizziness can be done using objective methods. An estimate of COVID-19 symptoms Reports include hearing loss, tinnitus, and dizziness such as 7.6 percent, 14.8 percent, and 7.2 percent (CIs: 2.5–15.1) In the range of 0.01 to 26.4. Prevalence numbers are based on the estimates. our meta-results analysis's are on the lower end of this research, which may be due to the difference between the two groups. criteria for inclusion and exclusion in the two investigations. For example, Almufarrij and Munro (2021) found no restriction in terms of the definition of the term "restrictions." of the SARS-CoV-2 diagnostic instrument and included audiovisual comprehensive review and meta-analysis published only recently found that The combined prevalence Antiviral Treatments can cause ototoxicity.

Synthetic quinine products, ribavirin, and Remdesivir Traditional treatments include chloroquine (CQ) and hydroxychloroquine (HCQ). utilised in the treatment of malaria, autoimmune disorders, and other conditions because of their antiviral and antiinflammatory properties properties.⁸ On the basis of a recent update, Randomized control trial in 405 hospitals around the country These drugs have been tested in 30 countries by the WHO Solidarity Trial Consortium. hospitalised patients have little or no effect mortality, commencement of ventilation and COVID-19 were all significantly higher in COVID-19 than in previous studies and the length of the hospitalisation. 13 CQ and HCQ also demonstrate several such as ototoxicity, retinopathy, neuromyopathy, and others cardiomyopathy. However, they can cause temporary or permanent damage. tinnitus and persistent auditory toxicity in the long run it has been reported that both acute and chronic use following CQ.¹⁴, it is impossible to undo. This ototoxicity may result in hearing loss. through the inner ear and neural organs such as the hair neuron fibres, cells, and striatal atrophy are all examples of the striatum's degeneration. the vascularis and the auditory cortex are both affected. The glutamate content in the brain can also be increased by CQ. overproduction of ROS in the extracellular environment is another well-established mediator of neurotoxin exposure in the glia inner ear tissue cells

Instruments and Techniques

A prospective and descriptive study was conducted between July 2020 and July 2021 at hospital. A comprehensive medical examination was performed on each subject. examination and pertinent history were recorded, such as how long they've been infected with COVID-19 their seriousness and the location of the patient's seclusion treatment. the adult's parents/caregivers informed consent was given by all who participated in the study in the study and agreed to the use of anonymised information in the study according to the survey results [Table 1]. Those grown-up people individuals who have recovered from infection with the confirmed pathogen COVID-19 tinnitus and hearing loss were reported participating in this research. Adults having a history of mental illness were included in this investigation. a history of a SARS-CoV-2 positive nasopharyngeal swab, regardless of the severity of the illness Providing treatment patients with more oxygen. The extent of the recovery was outlined in advance to show that reverse transcription polymerase is not working a series of events building on one other. Participants in this study were 18 years of age or older. over the legal drinking age of eighteen. Included in the list of exclusions were: of subjectively intense COVID-19 infections SARS-CoV-2-infected patients at the hospital for treatment of sound/acoustic trauma or persistent loud exposure prior to the confirmation of any previously suspected otological illnesses, the Oral or mental health history that includes COVID-19 infection or surgery on the ear canal coronary artery disease or hydroxychloroquine/chloroquine medicinal therapy Hypertension, diabetes, and a family history of diabetes are all whether the patient has taken any steroids during the course of treatment All of it was recorded. Also, all of the contestants were any loss of smell or taste sense during or after the procedure. COVID-19 infections have been successfully treated Otoscopic hearing evaluations that include examinations and tuning fork tests Of those who participated, proper methods were employed. measures of safety. Using Telephonics TDH39 earbuds, you can hear better. At frequencies of 250, 500, and 1,000 hertz, a pure tone audiometry study was conducted. Hz: 2,000, 4,000, and 8,000. The results of the audiometric assessment were: using a clinical GSI 61 sound-proof booth audiometer. The average threshold for hearing loss was found to be One hundred and twenty thousand hertz (Hz). Defining hearing loss as An average of more than 25 dB of pure tone. In order to eliminate the possibility of a midway A plaid was used to do tympanometry, an examination of the inner ear. Analyzers for the middle ear. All patients with unilateral tinnitus underwent MRI scans. to rule out the possibility of a single-sided sensorineural hearing loss (SNHL) to rule out any lesions on the cerebellopontine angle. Software for the Social Sciences (SPSS), version 23.SPSS, Inc.

Table 1: Questionnaire for evaluation tinnitus among COVID-19 patients

	Questionnaire	Response
1	Have you ever experienced hearing loss and tinnitus before the COVID-19 diagnosis?	Yes/no
2	Have you started experiencing hearing loss and tinnitus after diagnosis of COVID-19 infection	Yes/no
3	.Specify the characteristic of your tinnitus	Occasional/continuous

		floating/persistent, pulsatile/continuous
4	Along with tinnitus, do you have hearing loss?	Yes/no
5	Along with hearing loss and tinnitus, do you have a balance problem?	Yes/no
6	Do you suffer from migraine?	Yes/no
7	Indicate the severity of your tinnitus?	0–10 score

Results

During the current COVID-19 epidemic, 96 patients with positive nasopharyngeal/oropharyngeal swabs for SARS-CoV 2 were tested for hearing loss and tinnitus, 22 were presented with hearing loss and tinnitus. The age range of COVID-19 patients with tinnitus was 21–65 years with a mean age of 43 (standard deviation [SD] ± 12 ; median 26).

Table 2: Clinical profile COVID-19 patients

Clinical profile	Number of patients (n = 22)	Percentage (%)
Male	13	59.09
Female	9	40.90
Age ranges		
18–30years	10	43.18 56.81
31–65 years	12	
Hospitalized	7	25
Home quarantine	15	75
Hearing loss	8	36.36
Tinnitus	10	45.45
Both hearing loss and tinnitus	4	18.18
Balance disorder	2	11.36

COVID-19 = coronavirus disease 2019

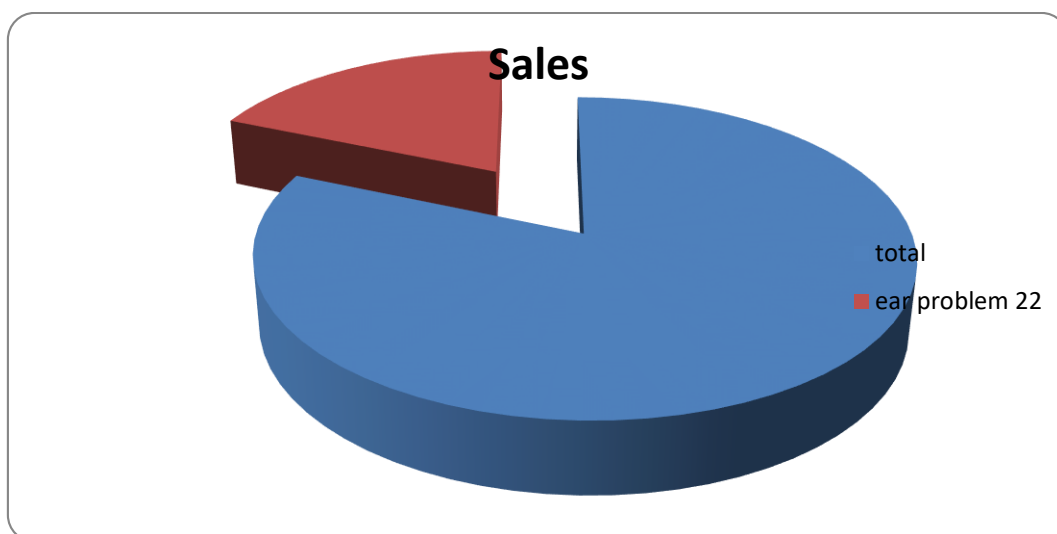


Figure 1 show number of patient

Table 3: Tinnitus characteristics in COVID-19 patients

Characteristic of tinnitus	Number of patients (n = 14)	Percentage (%)
Sporadic tinnitus	8	53.57
Recurrent tinnitus	7	46.42
Tinnitus of fluctuating intensity	7	50
Persistent but with changing intensity	4	28.57
Persistent with the same intensity	2	14.28
Pulsatile tinnitus	1	7.14

Table 4: Clinical profile of COVID-19 patients with hearing loss and tinnitus

Clinical profile Number	(n = 22)	Percentage (%)
Patients taking steroids during treatment	8	36
Smell disorder	11	52.27
Taste disorder	10	45.45
Migraine	2	11.36
Patients with diabetes mellitus	13	54
Patient with hypertension	15	67

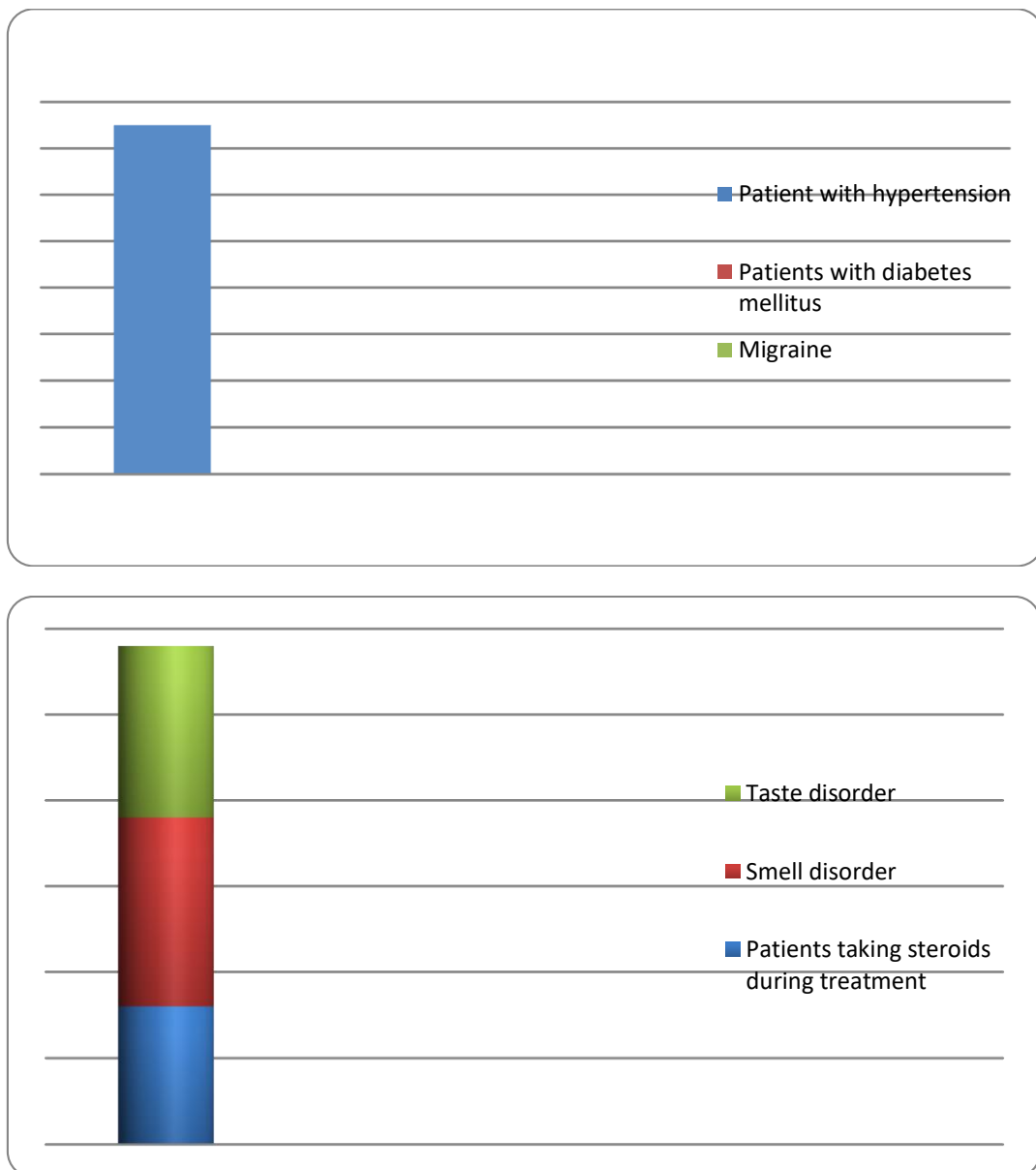


Figure 2: Clinical profile of COVID-19 patients with hearing loss and tinnitus

Discussion

Patients in the outpatient department frequently complain of hearing loss and tinnitus. of the Otolaryngology. People who are normally deaf impedes communication and speech in daily life. [10] When there is no external sound source, a sound called tinnitus is heard. Sound that comes from an external or internal source and has a big impact a patient's well-being and happiness. There is a link between SNHL and tinnitus infected with a virus is the most common cause hair cells in the labyrinth; nevertheless, some cells are unaffected It is

possible for viruses to affect the auditory brainstem. [12] COVID-19 a new pathogen causes infection, a highly contagious disease. SARS-CoV-2 is a new strain of the virus that causes COVID-19 infections. tinnitus, hearing loss, and other otoneurological symptoms.[13] features of neurotrophic and neuroinvading characteristics that are common to infections with COVID-19 [14] Coronavirus neuroauditory disorders can be caused by brain damage.impairment. [15] There is a possibility that the harm to the central nervous system or to the blood vessels SARS-CoV-2 causes vasculitis in a manner similar to that of the virus. HIV/AIDS and varicella-zoster are two examples of contagious viruses. SARS-CoV-2 infection-induced vasculopathy hypercoagulability causes this. [16] In this case, the therapy towards the onset of the pandemic COVID-19 infection It is also known that the drugs chloroquine and hydroxychloroquine result in tinnitus and sensorineural hearing loss (SNHL) by damaging the auditory nerve. [17] It has been demonstrated that infection with COVID-19 has detrimental One study looked at the effects on the cochlea's outer hair cells. [18] The pathophysiology of viral damage to the auditory nerve direct injury to the Corti organ is also part of the damage to the stria vascularis, also known as the spiral ganglion, caused by against proteins that have been secreted by viruses cytomegalovirus (CMV) and immunodeficiency HIV and bacterial infections of the inner ear Diabetic mellitus can exacerbate the symptoms of measles.[19] the cause of sensorineural and auditory impairment. [20] When it comes to this topic, Diabetes mellitus was found in 4.54 percent of patients, according to the study. As a result, they were all hypertensives. Juvenile diabetes mellitus requiring insulin, according to one study exhibited a hearing loss of 21%, and they were all affected by In addition, SNHL also affected every frequency. [21] SARS-CoV-2 virus involvement in the cochleovestibular system and patient stressThere have been more cases of cochlear damage during the current pandemic.symptoms like tinnitus are possible. Infection occurred during this time period [22]. Typically, a COVID-19 patient is quarantined at home or in a facility. therefore they're isolated from the rest of society, lonely and depressed because of their inability to get enough sleep, they're at greater risk of getting hearing loss is worsening. In the wake of the COVID-19 outbreak, emotional, social, and interpersonal aspects of the relationship are expected to continue for a lengthy period of time. The effects on health could last for a long period. COVID-19 A common complaint among those who suffer from hearing loss or tinnitus is Because they are ignored by health care specialists because they are not given adequate attention Because of their morbidity, I can sympathise with their hardships. symptoms.[22] Hearing Problems with COVID-19 Patients According to this meta-analysis of four research, Hearing loss has a 3.10 percent (confidence intervals: 0.010–0.090) annual incidence rate. COVID-19 has lost confirmed cases. However, in this instance, be treated with caution due to the small amount of significant heterogeneity (e.g., research without a control group) anywhere in the stack. Considering that data is inherently subjective, the data that has been collected, the studies also offer no evidence that the degree (from mild to extensive) and type of hearing loss that the individual has For example, conductive hearing loss (i.e., sensorineural hearing loss) as well as the possibility of hearing loss (CHL, or combined hearing loss) Involvement of pathology Additionally, in descriptive or self-report research, it is probable that just little alterations to one's hearing are taking place. neglected patients, especially those suffering from a serious illness When it comes to this topic, recent research on the frequency of occurrences

deficiency in olfaction in COVID-19 patients impressively different outcomes when compared to using the normal method subjective data collecting compared to objective tests .In other words, 86.6 percent of the time versus 36.64%. The disparity is likewise supported by previous research. between objective hearing exams and subjective evaluations self-reports. If you're concerned about hearing loss, case studies are a great resource. objective hearing assessments are used in the case reports have reported mainly SNHL, which could be a result Corti was directly impacted by SARS-CoV-2. Hearing loss, tinnitus, and dizziness in confirmed COVID-19 patients are listed in Table 1. stria vascularis and/or spiral ganglion. In three examples, for example, case studies and a single case study Tinnitus and moderate to severe high-frequency SNHL Intra-tympanic steroid injections have had little to no effect. were made public. This condition is known as "Sudden SNHL." at least three consecutive days with an SNLH of 30 dB or more frequency more than 72 hrs. There's no doubt about the prevalence of this form of hearing loss a complication of a number of viral illnesses structure or increase inflammation leading to the formation of ear structures The abrupt SNHL. ' Unilateral CHL was only reported in one case. Tinnitus and otalgia were found. Tinnitus in COVID-19 Virus Infected Patients Tingling in the ears without any external source of sound is known as tinnitus. a sound coming from somewhere else (phantom perception of sound). It's evident. 10 percent to 15 percent of adults in the United States self-report or by filling out case history forms/self-assessment questionnaires. Cochlear anomalies resulted in the patient's condition. long-term noise exposure, ototoxicity, and other known dangers medications, ageing, and genetic predispositions), as well as the accompanying neuronal degeneration Tinnitus is thought to have its genesis in changes to the ear. According to our meta-analysis of six studies, there is evidence of 0.12–0.153 percent (CIs: 0.012–0.153) of patients with tinnitus had the condition SARSCoV-related changes in COVID-19 could explain this discovery. There are two ways to focus on the auditory system. the pandemic's emotional toll. The studies that were analysed supplied no further information, but, in light of sound (i.e., how it seems), and volume (e.g., mild to loud). Loudness; Location; Intensity; Intensity; Intensity; Intensity; Intensity severe impairment), as well as timeframe (e.g., intermittent or constant), which may be useful in interpreting the results in the future. Three studies using questionnaires found that people with tinnitus (without the use of COVID-19) in order to investigate the epidemic of mental illness People who found the circumstance uncomfortable and bothersome experienced an increase in tinnitus-related handicaps and distress, according to the study. The following is an example of surveys of 3,500 people were used to gather data for the investigations. tinnitus sufferers from around the world, and the emotional toll it takes The pandemic was linked to an increase in tinnitus symptoms. 42 percent of individuals who took part, particularly those who were by themselves, alone and/or with sleep and physical limitations activity. It is consistent with other research that show this. tinnitus modulation is influenced by environmental variables. Diarrhea in People with COVID-19 Dizziness is a medical term that refers to a feeling of dizziness.based on the patient's condition, generally divided into four types: comprising vertigo, dizziness, presyncope, and lightheadedness in its history Patients with vertigo (45–54 percent) see or hear a spinning or whirling motion. an exaggerated sense of movement or rotation that originates in the brain system of the inner ear. Benign paroxysmal vertigo is the most common cause of vertigo. the

symptoms of Ménière's disease, vestibular neuritis, and positional vertigo labyrinthitis. Unrest, a sense of unease, or The term "wobbly" is more commonly used to describe Parkinson's patients. and neuropathy in diabetics (up to 16 percent). There are a lot of medicines out there. it can produce presyncope, which is the sensation of losing consciousness, as well as presyncope disappearing into thin air (up to 14 percent). The feeling of dizziness and numbness in the hands and feet. such as a sense of alienation from one's surroundings, usually linked to mental or psychogenic causes such as phobias, panic attacks, and somatoform symptoms (ten percent to twenty percent). Presyncope and light-headedness frequently co-occur. subjectively and are hard to tell apart unless you look at them. at the same time Meta-analysis of nine publications reveals the following dizziness incidence rate of 12.20 percent (CIs: 0.070–0.204) The COVID-19 cases The inner ear has been found to play a role ischemic and vascular damage are more likely to occur in certain areas. injury that may impair hearing as well as balance dysfunction. Vasculitis is another term for inflammatory disease of the Symptoms of COVID-19, such as dizziness, might be seen in the clinic. Vertigo has also been seen in patients with COVID-19. reports. Consider, for example, the story of a young woman who was Acute vestibular disease was found in a female with the COVID-19 code. Neuritis of the vestibular nerve has to do with inflammation of the viral or post-viral eighth-cranial-nerve vestibular branch. Vertigo is a common symptom of the illness, which can be detected by a doctor. minute by minute to hour by hour. However, the condition known as vestibular neuritis causes Multiple sclerosis is commonly thought of as a single-phase disease. In viral inflammation, the cranial nerves may also be affected. An inability to stand or walk was a symptom of the patient's vertigo. potentially due to irritation/distress, nausea and vomiting may occur. deafferentation of the vestibular emetic tracts nerve/nuclei. As with hearing loss and ringing in the ears, dizziness should be observed at a frequency of taken with caution due to the lack of information

Conclusion

COVID-19-infected people have a greater chance of developing a bacterial infection symptoms such as tinnitus and impaired hearing sensorineural hearing loss is a form of and tinnitus is common in SARS-CoV-2 patients. the problem is not clearly stated. The pathophysiology, symptoms, and diagnosis Human transmission can lead to problems such as deafness or hearing loss. All aspects of this condition remain obscure. such that this inner ear aetiology is thoroughly understood. If a patient has COVID-19 symptoms, they should be evaluated. Regularly inspected. Inherited deafness and ringing in the ears tuning fork tests, pure tone audiometry, and other screening methods among COVID-19, otoacoustic emission should be considered. ideal for early diagnosis patients who test positive rehabilitation. Patients with COVID19 have an increased risk of developing otologic diseases. is getting more and more obvious. Evaluation of Protecting those with hearing loss is of the utmost importance. to maintain and improve cochlear function and avert its eventual decline hair cells in the cochlea [13, 14]. the virus's presence. An abrupt vertigo crisis can be a symptom of dizziness. traits that are not central. Diagnosis alternatives include: a stroke into the posterior fossa is required. 2 Some patients have a hard time coping. mild paroxysmal postural vertigo has developed (BPPV) when infected with COVID-19.

Reasons to believe Macula-specific inflammation would result as a result of this. circulatory microthrombi, which can cause thrombosis otolith detachment and degeneration.

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