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ORIGINAL ARTICLE

PREVALENCE OF TINNITUS AMONG PATIENTS OF POST COVID-19

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ABSTRACT

Background: The Corona Virus disease-2019 (COVID-19) pandemic is caused by the new corona virus 2019 (coV-19). It is an infectious disease that spreads easily affecting the respiratory system and can be fatal. Despite the pulmonary difficulties, it can also have a negative impact on the hearing system. **Objective**: To find out the prevalence of tinnitus among post covid 19 patients. **Methodology**: From May 2023 to November 2023 a descriptive cross-sectional study was conducted at Jinnah Hospital Lahore and university of Lahore Teaching Hospital, Pakistan to ascertain the of prevalence of tinnitus among patients who had recovered from COVID-19. Sample size was 110 patients which was calculated through online calculator. Calculated on the basis of prevalence of tinnitus 76% by using 95% confidence level and 5% confidence interval through online calculator. The technique of non-probability purposive sampling was employed. Patients of both sexes aged, 20-45,who complained of tinnitus either before or after COVID-19,were also included .Patients with comorbidities(e.g diabetes, cardiovascular disease, hypertension etc) were excluded. A self-design performa, was used. Data was analyzed through SPSS version 25.0 package. **Results**: There were 110 patients total, with 69 (62.7%) men patients and 41 (37.3%) women patients. Most patients 59 (53.6%) were in age group 41-45 years. 45 (40.9%) patients experienced tinnitus from which 19(17.2%) experienced bilaterally, 26(23.6%) patients experienced unilaterally. 20(18.2%) patients experienced tinnitus in less than one year,18(16.4%) experienced tinnitus in one year and 7(6.4%) patients experienced in 2 years Vertigo 30 (27.3%) was also seen as a symptom. **Conclusion**: This study concluded that tinnitus is one of the most frequent complications COVID-19 participants

Keywords: COVID-19, Tinnitus, Vertigo, Questionnaire

INTRODUCTION

The Coronavirus disease-2019 COVID-19 pandemic is happened due to the new CoronaVirus-2019(Cov-19). December 2019 saw the discovery of the outbreak was in Wuhan, China. Globally, COVID-19 has altered the lives of 71,429 people.[1] The outbreak was deemed a Public Health Emergency of International Concern by the World Health Organization on 30 January, and a pandemic was proclaimed on 11 March, 2020.[2] Moe than 3.5 million cases of COVID-19 had been documented in over 187 nations and territories as of May 1,2020, resulting in more than 250,000 deaths.[3]

China, Pakistan's neighboring country where the COVID-19 outbreak initially happened, was one among the hardest hit. The first COVID-19 case in Pakistan was confirmed by the Ministry of Health, Government of Pakistan, on February 26, 2020 in Karachi, Sindh province. Another case was confirmed by the Pakistan Federal Ministry of Health in Islamabad on the same day. After fifteen days, out of 471 suspected instances, twenty (20) were confirmed cases (COVID-19 Positive), with Sindh province having the highest number, followed by Gilgit Baltistan[4]. Other upper respiratory infections can cause similar symptoms to COVID-19, such as fever (43%–98%), cough (68%–82%), exhaustion (38%–44%), sore throat (13.9%–17.4%), dry cough (59.4%), chills, cough, coryza, congestion (4.8%), rhinorrhea (4%), sputum production (28%–33%), dysosmia and dysgeusia.[5]

Males appear to be more prone to severe COVID-19 than females, probably due to hormonal and genetic causes. While children and young adults often have milder episodes, certain pediatric groups with underlying health issues may experience more severe cases.[6] Hypoxia of the hearing center may cause irreversible damage, leading to persistent hearing loss and tinnitus, since SARS-CoV-2 deoxygenates the erythrocytes. [7]

Tinnitus is a condition that is defined as "the conscious awareness of a tonal or composite noise for which there is no identifiable corresponding external acoustic source." According to estimations, the prevalence of tinnitus, a clinical symptom associated with changes in the auditory and other brain systems, varies geographically and ranges from 11.9% to 30.3% in the general adult population. It may be objective (heard by the clinician) or subjective (heard only by the patient).[8] 12,247 cases of coronavirus post-vaccination tinnitus were reported to the Vaccine Adverse Event Reporting System (VAERS) up till September 14, 2021.[9] According to 12 research [10], the estimated prevalence of tinnitus following COVID-19 infection was 14.8% (CI: 6.3 to 26.1) in December 2020 systematic examination of audio-vestibular symptoms. [10]

An infection with COVID-19 can result in otological symptoms such vertigo, tinnitus, hearing loss, and otalgia. Due to COVID-19 infections' involvement with the cochlea and eustachian tube, otological symptoms may result. Research on the new finding of COVID-19 infection's harmful effects on the inner ear is still pending. While fever and cough are more common in COVID-19 patients than hearing loss, tinnitus, and vertigo, auditory-vestibular symptoms nevertheless significantly affect quality of life. Moreover, tinnitus and other otoneurologic symptoms may become worse due to the anxiety brought on by COVID-19 infections. [11]

Little information about novel coronaviruses and tinnitus is currently available. However, the American Tinnitus Association asserts that because of the stress and melancholy linked to social isolation and infection avoidance, people with previous behavioral issues are more likely to experience tinnitus. [12]

Very limited data is available on prevalence of tinnitus in post covid 19 patients so the current study will comprehensively investigate current evidence about tinnitus caused by COVID-19 in the context of Pakistan.

MATERIALS AND METHODS

Study Design: Descriptive cross -sectional study was used.

Study Settings: Data was collected from Jinnah Hospital and University of Lahore Teaching Hospital, Lahore Pakistan.

Duration of Study: Duration was 6 months (May 2023 to October 2023) after the approval of departmental research committee.

Sample Size: On the basis of prevalence of tinnitus among patients of post covid -19, the sample size was calculated 110 through an online sample size calculator.

Sampling Technique: It was non-probability purposive sampling technique.

Sample Selection:

Inclusion Criteria:

Patients were included if:

- Patient's age was 20 to 45 years of both gender (male and female).
- Tinnitus complaints during or after COVID-19.

Exclusion Criteria:

Patients were excluded with other Comorbidities (e.g., diabetes, cardiovascular disease, hypertension etc.).

DATA COLLECTION PROCEDURE

The University of Lahore Audiology department was approached for ethics approval. Following permission, participants were solicited in hospitals. The individuals' eligibility was determined utilizing an inclusion/exclusion checklist as well as screening instruments. All eligible individuals provided written consent. For those who were unable to read or write, the consent process and verbal consent were also documented. Patients were interviewed with the help of self-design questionnaire. If patient was not available then we asked questions on phone call. It depended upon patient's availability.

DATA ANALYSIS PROCEDURE

Data was analyzed through SPSS (version 25.0) software. Data e.g., age, gender was analyzed through frequency and percentage.

RESULTS

According to table 1, the majority of patients 59(53.6%) are in the age groups 41-45 years. and there are 69 (62.7%) males and 41(37.3%) females. According to table 2,45 (40.9%) of patients experienced tinnitus from which 19(17.2%) experienced bilaterally and 26 (23.6%) experienced unilaterally. 20(18.2%) patients experienced tinnitus in less than one year,18(16.4%) experienced tinnitus in one year and 7(6.4%) patients experienced in 2 years.

Table 1: Demographics characteristics

Variables	Sub- Variables	Frequency *(f)* Percentage (%)
Age	20-25	5(4.5%)
	26-30	14(12.7%)
	30-35	9(8.2%)
	36-40	23(20.9%)
	41-45	59 (53.6%)
Gender	Male	69 (62.7%)
	Female	41(37.3%)

Table 2: Frequency distribution of Tinnitus and laterality and duration

Variables	Sub- Variables	Frequency *(f)* Percentage (%)
Tinnitus	Yes	45(40.9%)
	No	65(59.0%)
	Bilateral	19(17.2%)
	Unilateral	26(23.6%)
Duration of tinnitus	Less than one year	20(18.2%)
	1 year	18(16.4%)
	2 years	7(6.4%)

DISCUSSION

COVID-19 has some negative impact on audio-vestibular system which causes tinnitus with other symptoms like hearing loss and vertigo. The result of the present study shows that 40.9% patients have tinnitus. In contrast a study was conducted by Shivesh Maharaj in 2020 to access COVID-19 effects on tinnitus. In the study, 3 out of 28 patients reported tinnitus. So according to their study, tinnitus can be one of the complications of COVID-19 infection.[13]

Another study was conducted by Pramod Chirakkal in 2021 to evaluate COVID-19 effect on tinnitus. A case report of post covid patient of 35 year old female suffering from tinnitus and hearing loss was studied. Tinnitus assessment was completed and recurrence and power matching of tinnitus was finished. Tinnitus was observed at 4kHz at 10 dB using frequency and intensity matching evaluation. It suggested that COVID-19 had negative effect on tinnitus.[14]

A previous study was conducted in 2021 by Ibrahim Almufarrij ·A systemic review was undertaken in December 2020 in order to evaluate the audio vestibular symptoms present in covid 19 patients. There were 28 case reports and there was an estimated prevalence of 14.8% of tinnitus seen along with other audio vestibular disorders. Their results also showed that audio-vestibular symptoms were associated with COVID-19.[15]

A study was conducted by Jeyaskathy Saniasiaya in 2020. In this study, a sum of 7 articles was taken containing 3 cross sectional reviews and 4 case reports.35 post covid patients were studied who were complaining tinnitus, vertigo, hearing loss and otalgia. Tinnitus complaint was present in 4 cases. These results showed tinnitus as one of the clinical manifestations of SARS-CoV-2.[16]

Another study was conducted by Virigina Fancello in 2021.A systemic review of 15 case reports was conducted. All cases reported a new onset of audio vestibular symptoms. Out of 20 patients, tinnitus was reported among 10 patients. It was concluded that tinnitus was a frequent audio vestibular symptom described occurring in association with hearing loss and vertigo.[17] Another previous study was conducted in 2020 by Souheil Zayet .He investigated the clinical features of covid 19 confirmed cases through retrospective study. Out of 70 patients, tinnitus was reported in 10% patients and hearing loss in 6%. Their findings also suggested that tinnitus and hearing loss were symptoms that have been seen in patients with both COVID-19.[18]

Present study indicates that 23.6% patients of covid 19 suffer from unilateral tinnitus and 17.2% covid patients suffer from bilateral tinnitus. A study was conducted by Daniela Parrino in July 2021 to investigate the effects of covid 19 on audio vestibular system of patients by using case description. Three cases of unilateral tinnitus were reported to him.[19] A study was conducted by Nikolina Golec in 2023. 87 covid 19 patients were analyzed who have persistent complaints of tinnitus from 3 months including 45 males and 42 female patients. Out of which, 73 patients experienced tinnitus and unilateral tinnitus was found in 68 patients while only 5 patients suffered from bilateral tinnitus. It was concluded that covid 19 had adverse effects on audio vestibular systems of covid 19 patients.[20]

Present study revealed the duration of tinnitus in patients with post covid 19. According to this study, 44.4%patients had tinnitus for less than one year, 40% patients had tinnitus for one year and 15.5% patients experienced tinnitus from 2 years after covid 19. In contrast, a study was conducted by Jacqueline Niewolik in 2022.The web based study was finished by a German companion of 1082 grown up lengthy corona virus patients after a mean time of 43.2 weeks ±23.4 weeks after COVID 19. This study showed that 30% patients complained tinnitus. In addition, a self reported assessment was also done using the scale of one to ten. According to this self assessment, 332 patients reported tinnitus with a mean severity of 4.8 and a standard deviation of 3.Thus it showed that more cases of tinnitus were present in patients having duration less than one year. [21] Another study was conducted by Mert Kilic in 2023.The study aimed to collect data from 279 individuals who recovered from COVID 19 within one month without any chronic disorder. Tinnitus was reported in 28% patients. It was concluded that clinicians should kept in mind that tinnitus can be caused by covid 19.[22]

CONCLUSION

This study concluded that tinnitus is one of the most common complications among patients of post COVID-19.

RECOMMENDATION: Early identification of tinnitus is critical for early management which results in a favourable outcome. The fact that much more research is still needed in this sector with bigger study populations.

Author's Contributions
KF: Main idea and write up, **GB**: Data collection, **RN**: Data collection, **HA**: Analysis and interpretations, **SS**: Literature search and data collection , **ZA**: Data collection, discussion write up, **SAB**: Main write up and proof reading

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