




The Role of Otorhinolaryngological Manifestations of Mild Covid-19 Disease in Hilly Terrain: Lessons Learnt at a Secondary Care Hospital

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Abstract We conducted the study to find the prevalence of ENT symptoms amongst mild Covid-19 patients from the hilly region of North India and attempted to propose a solution to curb the spread of Covid-19 through early identification, isolation, and treatment. A retrospective, cross-sectional study at a secondary healthcare center in a hilly region of North India covered 423 mildly symptomatic Covid-19 patients from April 2020 to March 2022. These patients were telephonically contacted or called in person at the outpatient department to answer a preset questionnaire with various parameters such as age, gender, ENT symptoms, and time to recover. The data obtained were statistically analyzed. 207 out of 423 mild Covid-19 patients complained of different ENT symptoms. Cough was the most common ENT symptom and was reported by 162 patients. Dizziness was the least common ENT symptom and was reported by 9 patients. Recovery time for tinnitus was maximum (persistent till six months in 5 patients). A high index of suspicion for Covid-19 disease in patients with ENT symptoms must be practiced. As the Covid-19 restrictions are gradually relaxed, widespread community education for strict adherence to Covid-19 appropriate behaviour and sensitization of General Practitioners as well as Otorhinolaryngologists regarding the importance of ENT symptoms in mild Covid-19 disease will play a pivotal role in the early identification, isolation, and treatment of mild Covid-19 disease, which eventually may curb the future waves.

Keywords COVID-19 · ENT · Hilly terrain · Prevalence · Otorhinolaryngologist

Introduction

The first case of Covid-19 was reported in Wuhan, China, in December 2019 [1]. The SARS-CoV-2 virus has been implicated as the causative agent of the Covid-19 pandemic. It is a member of Sarbecovirus subgenus and a type of β coronavirus [2].

As per WHO, 486,761,597 laboratory-confirmed cases of Covid-19 and 6,142,735 deaths were reported till 1st April 2022, making it the most significant and worst pandemic ever faced by humankind [3]. Covid-19 showed a broad spectrum of clinical manifestations ranging from some patients being asymptomatic to some ending up with fulminant respiratory failure. The mode of transmission of the virus is through aerosols produced during coughing, sneezing, or direct contact with infected people [4, 5]. Baig et al. postulated SARS-CoV-2 virus enters neural tissues through circulation and has specificity towards angiotensin-converting enzyme 2 (ACE-2) receptors [6]. The incubation period for Covid-19 varies from 2 to 14 days [7]. Lackadaisical attitude, ignorance towards symptoms of Covid-19, delay in reporting, and commonality of symptoms with those of upper respiratory tract infection (URTI) played a vital role in the spread of the disease.

Ministry of Health and Welfare, India has defined the mild Covid-19 disease as- the presence of symptoms of upper respiratory tract infection and/or fever without shortness of breath or hypoxia ($SpO_2 \geq 94\%$ on room air, respiratory rate $\leq 24/\text{min}$ without any breathlessness) [8]. General Practitioners (GP) and Otorhinolaryngologists play a pivotal role in early detection of mild Covid-19 disease since

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Table 1 Bilingual Questionnaire for mild Covid-19 patients with ENT symptoms

| Full Name | | | | | |
|-------------|---|--|--------------|--------------|--------------------------|
| Age/ Gender | | | | | |
| Sr No. | Questions (in English and Hindi) | Persistence of the ENT symptoms (yes/no) | | | |
| | | At onset | Till 2 weeks | Till 4 weeks | Persistent till 6 months |
| 1. | Did you experience nasal discharge? क्या आपको जुकाम हुआ था? क्या आपकी नाक बह रही थी? | | | | |
| 2. | Did you experience nasal blockade? क्या आपको नाक से साँस लेने में कोई रुकावट महसूस हुई थी? | | | | |
| 3. | Did you experience loss of/altered smell or taste? क्या आपको सूंघने या स्वाद लेने में कोई परेशानी हुई थी? | | | | |
| 4. | Did you experience throat related issue such as sore throat? क्या आपके गले में खराश थी? | | | | |
| 5. | Did you experience change of voice? क्या आपकी आवाज़ में कोई बदलाव आया था? | | | | |
| 6. | Did you experience hearing loss or ear blockage? क्या आपकी सुनवाई में कोई कमी आयी थी? क्या आपके कान भरी या बंद हो गए थे? | | | | |
| 7. | Did you experience ringing sensation in your ear? क्या आपको कान में सिटी की आवाज़ या कोई अजीब सी गूँज आती थी? | | | | |
| 8. | Did you have a complaint of dry cough? क्या आपको सुखी खांसी हुई थी? | | | | |
| 9. | Did you experience other ENT complaint apart from asked questions? कोई और ENT से सम्बंधित दिक्कत आप बताना चाहते हैं? | | | | |

nasal passage acts as the entry point for the virus and the GP invariably is the first doctor consulted by the patient. Many patients reported with ENT related symptoms like nasal discharge, nasal congestion, sore throat, dry cough, or repeated clearing of throat, which are usually part of the spectrum of URTI due to various other causes. Patients expressed confusion in comprehending the significance of these symptoms as they were in a state of dilemma owing to the commonality of the symptoms between mild Covid-19 and URTI. Also, some patients ignored their symptoms due to the fear of contracting Covid-19 infection due to travel and visit to Flu Clinic, while some hid their symptoms in fear of being ostracized due to social stigma associated with Covid-19 infection during initial wave. This resulted in delayed reporting and further spread of the Covid-19 pandemic. However, ENT symptoms like loss of or altered smell, loss of or

altered taste, change of voice, hearing loss, aural fullness, tinnitus, or dizziness, which are usually not seen in URTI, were commonly seen at the early stage in mild Covid-19 patients during all waves [9]. Thus, we have learned from our experience in the past three waves of Covid-19 disease that early identification of the mild Covid-19 patients is possible with the knowledge of these symptoms. Early detection also significantly decreases the morbidity of the disease; eventually leading to a break in the transmission chain [1, 9].

The primary objective of our study is to find the prevalence of these symptoms amongst mild Covid-19 patients from a hilly region of North India. Using a protocolized module developed by our team, the secondary aim is to propose a solution to curb the spread of future Covid-19 waves through early identification of these symptomatic patients, isolation, and treatment.

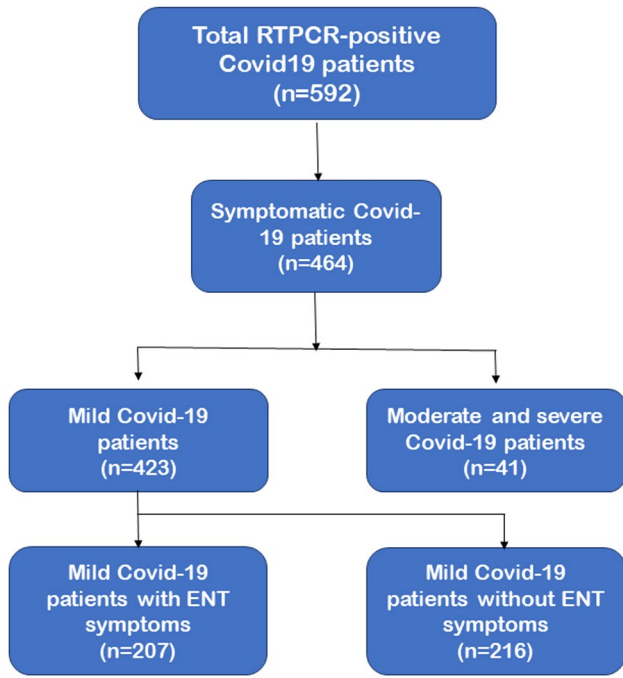


Fig. 1 Schematic distribution of RT-PCR-positive Covid-19 patients

Table 2 Age distribution of mild Covid-19 patients with ENT symptoms

| Age range (in years) | Number of patients |
|---|--------------------|
| 13–20 | 7 |
| 21–30 | 63 |
| 31–40 | 90 |
| 41–50 | 39 |
| 51–60 | 8 |
| Mean age (in years) = 34.37 years | |
| Standard Deviation (in years) = ± 8.19 years | |
| Interquartile range (in years) = 29 to 40 years | |

Material and Method

A retrospective, cross-sectional study was conducted at a secondary care hospital located at the height of 7238 ft (2276 m) [10] in the hilly terrain of North India. The study covered all the patients with Covid-19 reporting to this hospital from April 2020 to March 2022. Patients with RT-PCR positive, mild Covid-19 disease, irrespective of gender, age between 12 and 60 years were included in the study. Exclusion criteria were as follows:

1. Patients under the age of 12 years or above 60 years, as:

- a. Chronic ENT problems such as tonsillitis, adenoid hypertrophy, glue ear, are common in patients below 12 years.
- b. Chronic ailments such as cervical spondylosis, benign positional vertigos, nasal crusting and stuffiness, hearing loss, or tinnitus are more common among elderly patients above 60.

2. Patients who had a history of chronic ENT ailments before the Covid-19 pandemic.
3. Patients who did not give the consent to the study.

Clinical records of all mildly symptomatic Covid-19 patients, containing detailed clinical history, examination, and lab workup, were analyzed. Patients were either called in person in the outpatient department or telephonically contacted to answer a preset bilingual (English and Hindi) questionnaire (Table 1) regarding the onset, duration, progression, and resolution of the ENT symptoms. The results were statistically analyzed and for continuous variables, the mean and standard deviation was used.

Results

As per the registry for Covid-19 disease maintained at this hospital, 592 patients contracted the Covid-19 infection. The authors contacted a total of 464 (78.37%) patients who were symptomatic, out of which, 423 (91.16%) patients were mildly symptomatic whereas moderate and severe Covid-19 disease was present in 41 (8.83%) patients. Patients with mild Covid-19 infection presenting with ENT symptoms constituted 207 (48.93%) of the mildly symptomatic population. Since the study was focused only on patients with mild Covid-19 infection, asymptomatic, moderate, and severe cases (169 cases) were excluded. (Fig. 1).

The male to female sex ratio was approximately 4:1. The overall mean age of patients at presentation was 34.37 ± 8.19 years (interquartile range of 29–40 years). The majority of the patients were in the age range between 31 and 40 years old (43.47%), followed by 30.43% of patients in the age range between 21 and 30 years old. (Table 2).

On analyzing the data of ENT symptoms, it was found that the most common symptom was dry cough (n = 162, 78.26%) followed by nasal discharge (n = 146, 70.53%), sore throat (n = 135, 65.21%), and nasal congestion (n = 121, 58.45%). The combination of symptoms of loss of or altered smell and taste was seen in 98 (47.34%) patients. Isolated loss of or altered smell was seen amongst 15 (7.24%) patients, while isolated loss of or altered taste was found in 8 (3.86%) patients. While 43 (20.77%) patients complained of voice change, it was consistently associated with the

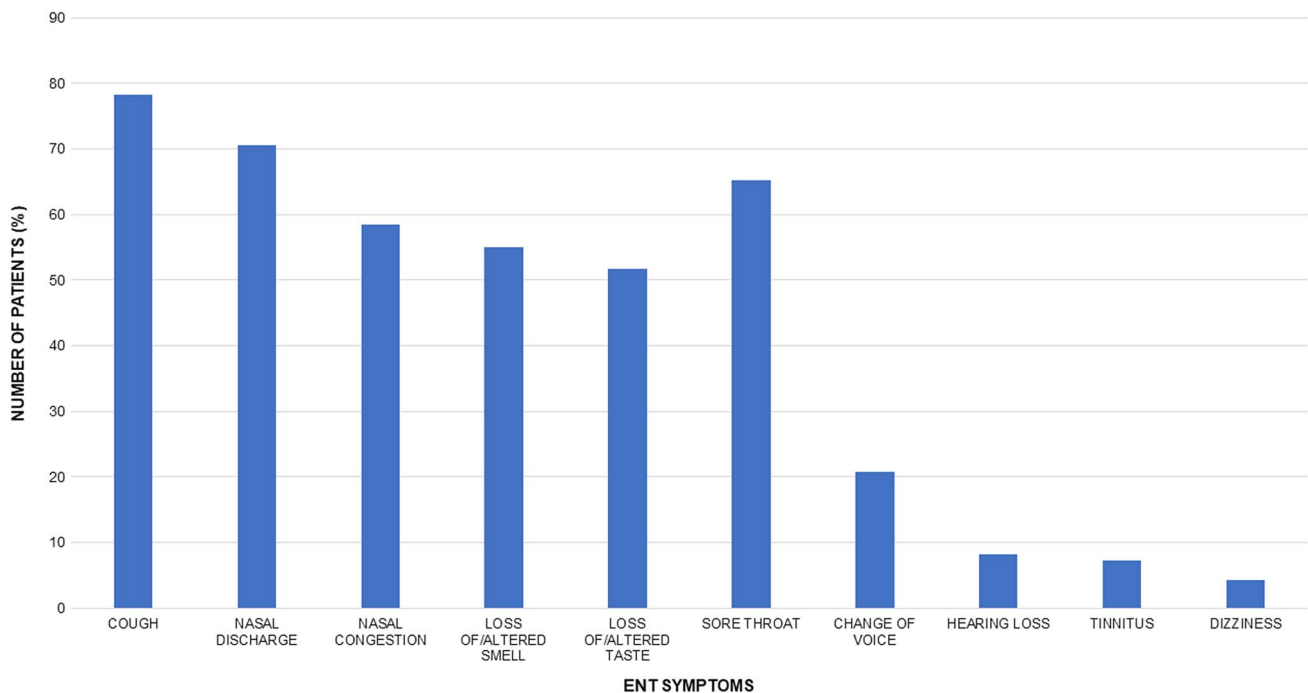


Fig. 2 Prevalence of ENT symptoms among patients with mild Covid-19 disease

simultaneous complaint of sore throat. The prevalence of hearing loss, tinnitus, and dizziness were 8.21% ($n = 17$), 7.24% ($n = 15$), and 4.34% ($n = 9$), respectively. As per the results of our study, dizziness was the least common symptom among the mild Covid-19 patients (Fig. 2).

Only 12 (5.79%) patients presented with a single symptom, while the rest ($n = 195$, 94.21%) had two or more symptoms. Most of the patients recovered within two weeks ($n = 101$, 48.79%), 83 (40.09%) patients took 2 to 4 weeks to recover, and the rest ($n = 23$, 11.11%) were symptomatic for more than one month. The symptom that took the longest time for recovery was tinnitus in 5 (2.41%) patients, which persisted until six months of follow-up. (Fig. 3).

Discussion

In 2020, Guan et al. reported that although the nasal cavity acts as a primary entry point and the site for Covid-19 viral replication, < 10% of the infected population reports to the hospital with ENT complaints [11]. These harbourers of the mild Covid-19 disease have the potential to spread the Covid-19 pandemic. They also pose a threat of spreading Covid-19 infection to doctors especially GP and Otorhinolaryngologists as they work close to nasal and oral cavities [12]. We also observed that a few moderate and severe Covid-19 patients had mild ENT symptoms such as sore throat and nasal congestion to begin with, but these

symptoms were ignored and subsequently these patients landed in a more severe form of the disease. It is our hypothesis that globally, doctors would have also experienced the above findings, however, due to paucity of literature to substantiate, the same cannot be validated.

We conducted a bilingual questionnaire-based survey among the patients who contracted mild Covid-19 disease. The data obtained were analyzed for the prevalence of ENT symptoms in mild Covid-19 disease at our hilly location. In our study, 207 (48.93%) of the mild Covid-19 patients reported ENT symptoms. The mean age of patients was 34.37 ± 8.19 years. Savtale et al. reported the mean age of presentation as 37.8 ± 12.5 years [13] whereas, a study by Elibol et al. found the mean age of presentation to be 36.3 ± 8.1 years [14].

We found that the most common symptom was dry cough (77.64%), followed by nasal discharge (70.80%), sore throat (65.21%), and nasal congestion (58.38%). Similarly, Srivastava et al. found that 66.46% of patients had a sore throat, followed by 54.14% of cases with nasal congestion [12]. The prevalence of loss of taste (1.76%) as an isolated symptom in their study was comparable with our finding (3.72%). A similar study by Savtale et al. reported dry cough in 83.33% and sore throat in 47.22% of patients [13]. A meta-analysis by Krajewska et al. found dry cough as the most frequent symptom among Chinese patients and nasal discharge as one of the most common symptoms in Australian patients [5, 15].

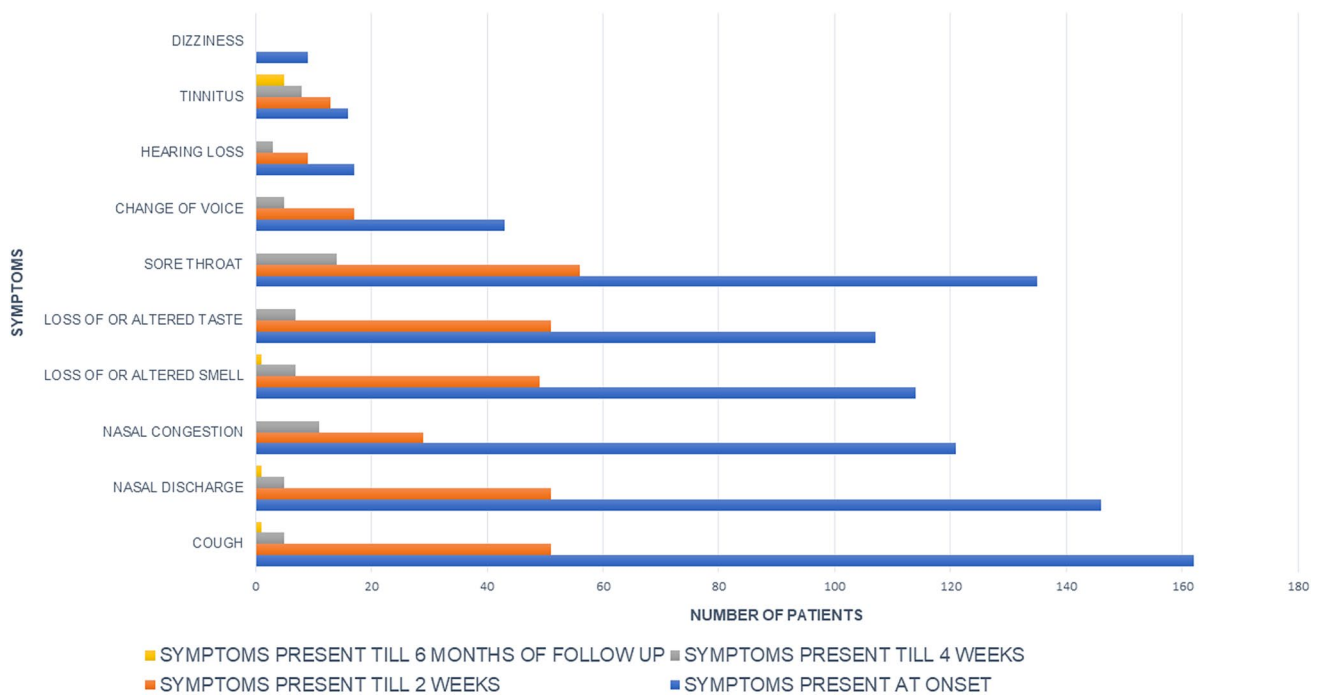


Fig. 3 Distribution of ENT symptoms and their duration in mild Covid-19 Disease

Our hospital is located at 2206 m (7238 ft) [10]. The majority of patients visiting this hospital come from surrounding areas of similar heights. Dry and cold air at this altitude may have contributed to a higher number of patients with nasal congestion due to dryness of nasal mucosa compared to other studies. Prevalence of dysgeusia and anosmia or hyposmia (47.20%) was comparable with a meta-analysis by Saniasiaya et al. (47.85%) [16]. We found that cases with isolated disturbances of taste or smell were less in number; however, their simultaneous occurrence was quite common, as mentioned before. The rationale for this unique occurrence can easily be explained as smell constitutes 75–95% of our sense of taste [17]. The pathogenesis of loss of taste or smell in Covid-19 infection is not yet clear. However, the higher expression of ACE-2 receptors in olfactory bulbs and their direct invasion by the SARS-CoV-2 virus through the nasal mucosa as a cause has been hypothesized [18, 19].

Change of voice was found in 22.3% of patients by Al-Ani et al. which was also similar to our findings (22.49%) [20]. Li et al. reported the higher expression of ACE-2 receptors in vocal cords [21]. Thus, it can be argued that the post-infection laryngeal inflammation and direct involvement of laryngeal nerves may be the reason for the voice change in mild Covid-19 patients.

We found that the prevalence of hearing loss, tinnitus, and dizziness (8.07%, 7.45%, and 4.34%, respectively) were comparable with a systemic review and meta-analysis by Jafari et al. (3.1%, 4.5%, and 12.2%, respectively) [22].

However, Savtale et al. have reported a much higher prevalence of hearing loss (54.44%) and tinnitus (66.66%) [13]. The sensorineural hearing loss (SNHL) and tinnitus may predominantly be due to the impact of SARS-COV-2 on stria vascularis, organ of Corti, and/or the spiral ganglion as these have higher expression of ACE-2 receptors [23]. Tinnitus may also have resulted from the mental or emotional burden of the pandemic [24]. Higher expression ACE-2 receptors in the vestibular nerve, hypercoagulopathy, and immune-mediated insult were implicated in causing dizziness [25].

As Covid-19 infection mainly spreads through aerosols, ENT symptoms will always be part of the spectrum of Covid-19. Thus, we devised a protocolized module (Fig. 4) to tackle the issues of delayed reporting among Covid-19 patients and the consequent spread of the Covid-19 pandemic. A team led by the Otorhinolaryngologist and consisting of administrators, general practitioners and nurses of our hospital conducted informative and educative webinars for community-wide education about early symptoms of Covid-19, including ENT symptoms and the need for early reporting to the health centre. This initiative was well advertised through social media and pamphlets for wider publicity. In addition, our team sensitized all the General Practitioners in the drainage area of our hospital regarding early identification, referral, and management of mild Covid-19 disease through webinars and offline seminars. Offline seminars were conducted only after the Covid-19 restrictions were relaxed. Furthermore, our team also visited nearby schools

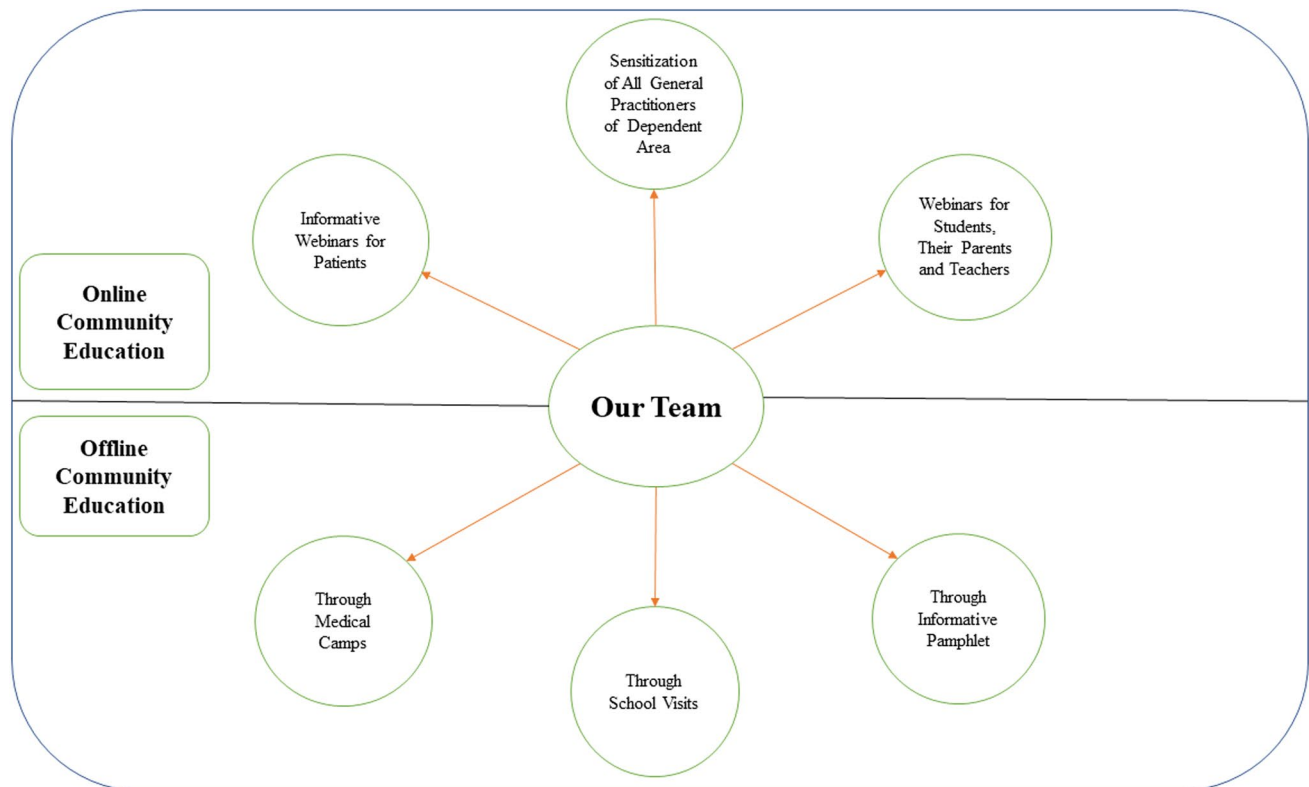


Fig. 4 Our module and its components

to educate the students, their parents, and teachers regarding the importance of early detection of COVID infection, strict adherence to Covid-19 appropriate behaviour for tackling any future wave of Covid-19, and the need for timely reporting to the Flu Clinic if any ENT symptom appears.

The limitation of our study was that it was a single-centre survey. A multicentric study would undoubtedly authenticate our module and the prevalence of ENT symptoms in Covid-19 patients. This should include special objective tests for nasal problems, disturbances of smell and taste, aural, and laryngeal issues to verify the findings and formulate the strategy to curb future waves.

Conclusion

Although, we have survived recurrent Covid-19 waves, the possibility of future waves cannot be ruled out. As the number of Covid-19 patients decreases, Covid-19 restrictions gradually relax, and life returns to the pre-Covid era, we need to analyze lessons learnt from the previous waves and prepare ourselves for any future onslaught. Since it has been proven that ENT symptoms are quite common among patients with early, mild Covid-19 disease, a high index of suspicion of Covid-19 disease in patients with ENT

symptoms must be practiced. We recommend that our questionnaire may become the basis of developing a standardized universal questionnaire for profiling ENT symptoms in early Covid-19. We also propose our protocol-based module of widespread community education and sensitization of General Practitioners regarding the importance of ENT symptoms will play a pivotal role in the early identification of mild Covid-19 disease, which may eventually aid in containing any future waves.

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Declarations

Competing interests None.

Ethical Standards The authors assert that all the procedures contributing to the present work comply with the ethical standards of the relevant national and institutional guidelines on human experimentation and with the Helsinki Declaration of 1975, as revised in 2008.

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