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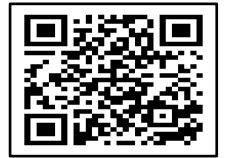
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From the Editorial Board

EDITORIAL BOARD, IHRJ

Dear Authors and Readers,

Greetings

The September issue of IHRJ yet marks another milestone in its glorious journey as it completes 4 and a half years as a journal of international repute. This 54th Issue is a proof of our commitment to publish quality research and make it available on various global platforms. We thank you all for your support. Our backend team has been working round the clock to provide technical assistance to the authors, if required and have always published the issue as per schedule.

We would also like to thank our peer reviewers who have taken out time from their precious schedule to review the manuscripts and provide valuable inputs to overall improve the functioning of the journal.

During the Indian second wave, a few of our team members, reviewers and authors got affected with

COVID-19. As a member of team IHRJ, we tried to extend our support in any manner possible. It our extreme pleasure to announce that no matter the conditions, our team was always able to publish the issues on time with no publication delay; and this editorial is to thank our tireless team members who have made this possible.

A shout out also goes out to our authors who had to bear with us on delayed communications (maximum reply time was 3 days) and delayed uploading on “ahead of print” section. Our priority remained to communicate to the authors regarding the completion of peer review and duly inform them regarding acceptance, rejection or modifications required in their manuscript.

It can now be safely said that most of our backend team members and publishing team have atleast taken one dose of the COVID-19 vaccine and as the world returns to normalcy, we wish the best of health on all those associated with IHRJ in one way or the other!!.

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Operationalizing Command Centre in COVID-19 Care Services in a Tertiary Care Teaching Hospital

SANIKA RATNAKAR KULKARNI¹, HENNA DHAR^{*1}

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COVID-19 was declared a public health emergency of international concern by WHO in March 2020. Hospitals were overburdened, health workers were drained and resources were depleting due to which people were desperately looking for hospital beds, medical oxygen and other necessities. For this purpose, a command centre was set up by the hospital administration department. The command centre targets for the enhancement of patient outcomes by coordination of care and centralized quality control. The main objectives of the command centre include internal communication between the departments concerned with COVID-19 care, appropriate resource allocation in the hospital for COVID-19 care and data compilation and dissemination of the real time data from COVID-19 war room to government organizations. The COVID-19 war room functions daily in a dedicated manner which helps in strategic planning and managing all the functions efficiently. The command centre though works dedicatedly, certain challenges are faced while carrying out the functions.

KEYWORDS: COVID-19, Strategic Planning, Hospital Administration, Tertiary Healthcare, Delivery of Healthcare

INTRODUCTION

COVID-19 was declared a public health emergency of international concern by WHO in March 2020. As of May 4, more than 20.2 million cases of COVID-19 had been reported, with an average of 378,000 cases a day, along with more than 222 000 deaths, which experts were of the opinion that are likely to be substantial underestimates.¹ Hospitals were overburdened, health workers were drained and resources were depleting due to which people were desperately looking for hospital beds, medical oxygen and other necessities.¹ To prepare for such a crisis, hospitals needed a plan of action to direct their supplies, space, and staff so that optimum care was catered to the patients.² For this purpose, a command centre was set up by the hospital administration department. The history of command centres also known as war rooms dates back to Second World War which was headed by Winston Churchill. It was a room to provide meeting places for the War Cabinet during air raids and also housed a military information centre base.³ The country needed a command centre where a designated group of persons think only about COVID-19, design strategies for the upcoming week. COVID-19 war room helps to monitor the available beds, connecting ambulance services and oxygen supply availability. All COVID-19 related information and statistics are collected and managed in one place. The command centre targets for the enhancement of patient outcomes by coordination of care and centralized quality control.

OBJECTIVES

- Internal communication between the departments concerned with COVID-19 care.
- Appropriate resource allocation in the hospital for COVID-19 care.
- Data compilation and dissemination of the real time data from COVID-19 war room to government organizations.

SETTING UP OF A WAR ROOM

It was set up by hospital administration department of JSS Hospital and is headed by Director of Hospital. It was established in the master health check up in the second floor of the hospital. The model of the war room is based on the war room in CMC, Vellore.

The war room has a large display which shows live bed status from hospitals across the state which gets updated every hour. It also displays pie charts showing number of oxygen beds, ICU beds, and ventilator beds which are updated throughout a day.

INFRASTRUCTURE

The room is equipped with:

- Computers having internet connectivity
- Multiple multiline telephones
- Whiteboard and markers
- Printer
- Bulletin Board



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- Hand Sanitizers
- Couch bed for night duty PG's
- Other stationary like paper, pen, etc

COVID-19 war room team comprises of Director, Deputy Director, Medical Superintendent, Deputy MS, Administrative Officer, Senior Residents of Hospital Administration department, PGs of Hospital Administration and Public Health.

ROLES AND RESPONSIBILITIES

The war room is supervised by the senior residents of department of hospital administration and it is managed by the department of health administration. Routine inspections and rounds are done by the Director of the hospital and Deputy Director of the hospital.

ROLE	RESPONSIBILITY
Director Of Hospital	Routine inspection and monitoring of activities in the COVID-19 war room
Deputy Director Of Hospital	Makes available the list of doctors on duty
Medical Superintendent	Verification of bed statistics and allocation of beds on the fifth floor of the hospital
Senior Residents Of Hospital Administration	Daily supervision of PG's, addressing queries of concerned departments, feedback, verification of bed statistics, communication with all wards
Medical Gas Pipeline Manager	Details of oxygen consumption and status of LMO, cylinders
Public Health PG's	Collection and updating real time data and bed statistics on the whiteboard, making reports of daily activities

Table 1: Roles and Responsibilities in the War Room

FUNCTIONS

The COVID-19 war room functions daily in a dedicated manner which helps in strategic planning and managing all the functions efficiently due to the data and information of the hospital being collected in one place. The daily functions of the COVID-19 war room

are data management, updating the real time data, managing communication between the wards, addressing queries, resource and stock availability and allocation. The data management includes daily COVID-19 bulletin updates, daily reporting on vaccination, number of tests being done, information on incoming patients, discharge planning, number of positive cases and their status, surveillance and identification of hotspots. It also includes framing of standard operating procedures, imparting training to the field functionaries, and dissemination of accurate information thus streamlining administrative tasks which ensures in smooth functioning in the hospital. Other functions are addressing the grievances of the patients and general public, guiding people regarding the preventive measures to be taken to contain the spread of the COVID-19 virus.

1. Strategic Planning: The main objective of COVID-19 command centre is to manage internal communication, resource allocation and management and appropriate data collection and dissemination. To fulfil these objectives, the strategic plan followed is to assign the task of obtaining data from the respective wards dedicated to COVID-19 care, admission and discharge desk, oxygen management team, patient record management team and logistics management. Verification and eventually displaying of the data is planned.

To implement the aforementioned tasks, special training is provided to the members of the nursing staff in assimilation of real time records and updating them in a timely manner to the command centre. The postgraduate students are also trained in data and logistic management and in communication skills.

Furthermore, to evaluate all the functioning, a daily report is prepared and sent to the hospital management. Supervision is done by the Superintendent, Administrative Officer and The Director of the hospital.

2. Data Management: The medical data is structured in spreadsheets and scanned paper documents and then displayed in respective places in hospital portals. The steps involved in data management are as follows:

a. Collection of data

i. Gathering data about number of normal, oxygenated and ventilated beds occupied and available in different

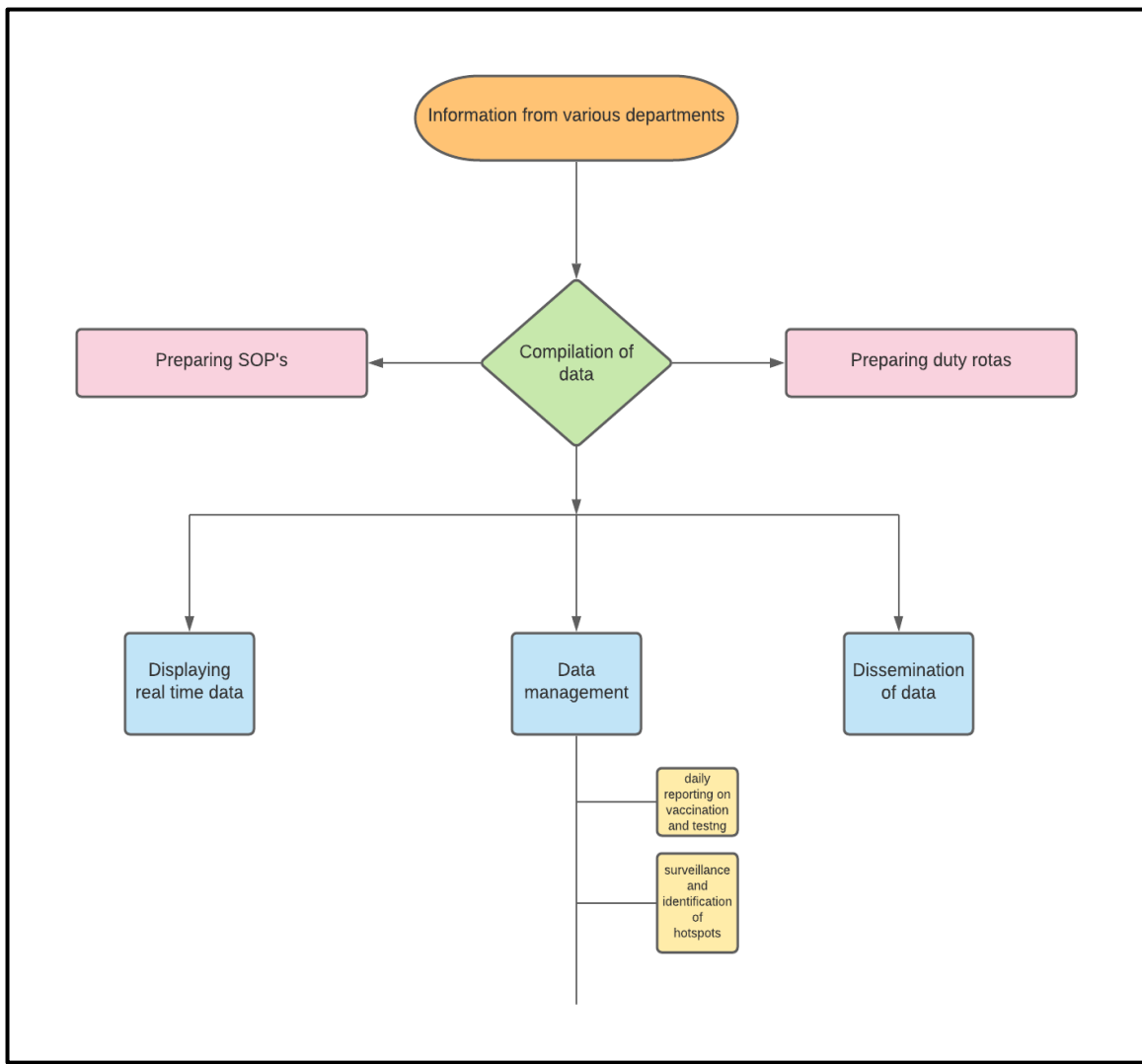


Figure 1. Representation of Compilation and Management of Data in War Room

wards dedicated to COVID-19 care.

- ii. Information is gathered about the number of patients reporting in flu clinic, number of people who undergo testing (RTPCR and RAT), number of COVID-19 positive patients among those who are tested.
- iii. The vaccination statistics are assembled from vaccination site.

b. Verification of data collected

- i. The data collected through various sources is double checked and verified with medical records department and nursing in charge of the respective departments.
- ii. If any discrepancy is noted, changes are made accordingly.

c. Dissemination of data

- i. The verified data is displayed on the white board inside the war room and outside the hospital.
- ii. This data is also sent to government authorities to display on their online portal.

3. Preparation of SOPs and Duty Rotas: Standard Operating Procedures are formulated to record COVID-19 positives, COVID-19 admissions and deaths due to COVID-19. Organising duty rotas for interns, PGs, and staff in the COVID-19 care areas are formed. Figure 1. depicts the representation of compilation and management of data in war room.

CHALLENGES

The command centre though works dedicatedly, certain challenges are faced while carrying out the functions. Some of the challenges that list out are miscommunication among concerned departments, data mismatch while compiling data, keeping stocks of COVID-19 care consumables available for use, making beds available on time and displaying real time data. The communication between concerned departments needs to improve, to make the data flow efficient and smooth, which will help in displaying accurate real time data. Cooperation between the concerned departments is crucial to avoid mismatching of data. If the data that is available is accurate, then it will be easier to allocate beds and it will be convenient to keep a check on the stocks of COVID-19 care consumables otherwise shortage might occur. Appropriate communication and continuous updating of data will help to overcome many of challenges.

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World Mental Health Day: Steer away from the Detrimental

MANSIMRANJIT KAUR UPPAL 

According to the World Health Organization (WHO), mental health is “a state of well-being in which the individual realizes his or her own abilities, can cope with the normal stresses of life, can work productively and fruitfully, and is able to make a contribution to his or her community.”¹ It is the state of emotional well-being by the virtue of which an individual is in harmony with himself and the society.

Various factors such as any mental disorders/conditions, childhood trauma, loss of a family member, financial troubles, drug abuse etc can undermine a person’s psychological balance and bring about a negative effect in the overall development of the individual.²

According to a study in which World Mental Health (WMH) surveys were conducted across 17 countries in 2007, more than 50% individuals are suffering from a mental disorder at a given point of their life.³

There is a pertinent association between physical and mental health. Patients who suffer from a chronic mental illness are at an increased risk of physical health disorders such as Diabetes Mellitus, Hypertension, Psychosomatic disorders. Similarly, chronic health diseases such as Coronary Artery Disease (CAD) or a malignancy can lead to long standing stress.⁴

Mental health and mental illness are two distinct terms which are often confused with each other. According to the CDC, mental illness refers to “conditions that affect a person’s thinking, feeling, mood, or behaviour” whereas mental health, as mentioned above, is an individual’s emotional and psychological state of well-being.⁵

Recently, COVID-19 has had a major negative impact on every individual’s emotional and psychological state. This deadly disease has proved to be detrimental for the

mental health for every person across the whole world. It has led to depression, anxiety and even suicides, especially in the phase of lockdown. 6 According to a pilot study in India in 2021, 151 COVID-19 related suicide reports were retrieved during various lockdown phases. Out of those, 95% of the individuals were under mental stress.⁷

For the World Mental Health Day (WHMD) 2021 on 10th October, WHO has initiated a campaign with the slogan “Mental health care for all: let’s make it a reality” keeping in mind the COVID-19 pandemic and improvements that can be made for healthcare workers (HCWs), students, frontline workers etc.⁸

It is of paramount importance that all individuals must put an effort towards creating a perfect environment for their mind. The well-known traditional methods such as connecting to near and dear ones, exercise, practicing empathy, mindfulness or meditation, avoiding use of drugs and alcohol can instil a sense of positivity in a person and enhance the mental well-being. After all, the established phrase “A sound mind in a sound body” can be put to use.

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Mucormycosis: An Epidemic Associated with Pandemic- A Systematic Review

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Different infections have been presenting danger to mankind every once in a while and in 2019 a serious respiratory illness (COVID-19) reported in Wuhan, Hubei province of China, became a threat to general wellbeing not only in China but all the nations throughout the world. COVID-19 disease which is caused by severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) is found to be associated with a wide range of opportunistic fungal and bacterial infections. Candidial and aspergillus infections leading to mucormycosis and orbital compartment syndrome have been reported to be the main co-infections in COVID-19 patients, which must be recognized and treated promptly to avoid any morbidity and mortality. Low oxygen environment, acidic medium, high glucose, decreased phagocytic activity and increased ferritin levels in addition to prolonged hospitalization with or without mechanical ventilators are considered as the main risk factors. Thus, the main aim of the article is to briefly survey and discuss about the types, causes, methods to prevent and treatment modalities of main co-morbidity of COVID 19 i.e. mucormycosis.

KEYWORDS: COVID-19, Fungal Infection, Mucormycosis, Sterioids

INTRODUCTION

Coronavirus, an outsized family of viruses, noted to cause diseases which range from simple cold to more severe diseases like severe SARS (2002 – 2004) and MERS (2012) (WHO, 2020). A much recent, Novel coronavirus (COVID-19) caused by similar family of viruses is an infectious disease primarily associated with symptoms ranging from mild to severe life-threatening conditions particularly pneumonia.¹ First ever case was recorded in Wuhan city of China during the ending month of 2019 and has been associated with myriad of fungal, bacterial and viral co-infections. While the pathophysiology is still under investigation, new indicative manifestations and complications of the same continue to be identified and described in medical literature.²

Since the beginning of this pandemic, a large number of studies have centered on quick diagnosis, advancement, and redirection of new treatment plans. In many cases, it was found that SARS-CoV-2 is something much more than a respiratory disorder. Significant degrees of endogenous substances delivered by this infection are capable of producing changes and disturbances influencing the target tissues. They even go past the hindrances of protection of the innate tissue immunity, reaching the systemic level through hematogenous transmission.³ This signalling animates immunity cells associated with

constant chronic inflammatory process that can promptly lead to fibrosis of lungs, loss of function, pulmonary degeneration, oxygenation impairment, culminating the delayed hypoxic state, anoxemia and hypoxemia and ultimately leading to death. Patients having metabolic diseases such as diabetes mellitus, autoimmune diseases, cardiopulmonary diseases, or patients undergoing chemotherapy, corticotherapy or radiotherapy have a higher danger of death.⁴

Apart from arrhythmias, thrombo-embolic complications, cardiac injury (acute), and strokes, secondary opportunistic infections including white fungus (candidiasis) and black fungus (mucormycosis) are much prevalent.

MUCORMYCOSIS

Zycomycosis or Phycomycosis was first described by Paltauf in 1885 and later changed to Mucormycosis by Baker (American pathologist) in 1957 due to severe form of infection caused by Rhizopus. Fungi which belong to the order Mucorales are distributed into six families and all are responsible for cutaneous and deep infections.⁵ Head of the fungal pathogenesis group at the institute for medical research, Julie Djordjevic described it as a "NATURE'S DECAYER".⁶

The Rhizopus Oryzae type is responsible for nearly



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60% of mucormycosis cases in humans and 90% of the Rhino-orbital-cerebral form. It is usually uncommon but can occur as an opportunistic severe fungal infection in people who have altered immune system and affects the sinuses, lungs and brain leading to life threatening conditions in cancer patients, diabetic patients, or people suffering from HIV or AIDS. These pathogens are commonly present in soil along with association with decaying organic matter, such as rotten wood, compost piles, or leaves. It is commonly transmitted through inhalation of these fungal spores.⁷

PATHOGENESIS

Both mononuclear and polymorphonuclear phagocytes of ordinary hosts kill Mucorales by the creation of metabolites and the cationic peptides defensins. Clinical proof exhibits that these phagocytes are the significant host defense system against mucormycosis. For instance, neutropenic and phagocytic dysfunctional patients are at expanded danger of creating mucormycosis. The capacity of phagocytes to engulf these fungi by their oxidative and nonoxidative components is disabled by hyperglycemia (diabetes mellitus) and acidosis. Furthermore, corticosteroid treatment influences the capacity of broncho alveolar phagocytes to prevent germination of the spores in vitro or after in vivo contamination initiated by intranasal inoculation. The specific components by which ketoacidosis, diabetes, or steroids impede the capacity of these phagocytes stay obscure.⁵

CLINICAL PRESENTATION

The clinical sign of this disease (mucormycosis) is vascular invasion leading to tissue necrosis and thrombosis. Mucormycosis practically consistently happens in people with defects in host defense mechanism and/or potentially with increased available serum iron, albeit uncommon cases have been accounted for in evidently normal hosts. This disease is determinedly progressive and results in death except if treatment with a careful surgical debridement and antifungal drugs is started instantly.⁸

According to the clinical presentation and the involvement of a specific anatomic site, mucormycosis has been divided into at least six clinical classifications: (1)pulmonary, (2)disseminated, (3)cutaneous, (4)gastrointestinal, (5)rhinocerebral, and (6)miscellaneous (table 1).

PREDISPOSING CONDITION	PREDOMINANT SITE
Neutropenia	Pulmonary And Disseminated
Diabetic Ketoacidosis	Rhinocerebral
Deferoxamine	Disseminated
Corticosteroids	Pulmonary, Disseminated, Or Rhinocerebral
Malnutrition	Gastrointestinal
Trauma, Catheter/Injection Site, Skin Maceration	Cutaneous/Subcutaneous

Table 1. Relationship between predisposing conditions and site of infection⁵

SYMPTOMS

Sinusitis along with clogging of the nasal tract with blackish or bloody mucus emission from the nose is the main indication of mucormycosis. Blackish discoloration on the bridge of the nose, along with pain on one side of the face, cheekbone and lack of sensation and bulging of the involved area are observed. Abnormal clotting of blood tissue thrombosis, damage or injury to the skin and/or necrosis of the dermal cells are also seen. Impairment of respiratory functions, pain in chest, excessive build-up of fluid in lungs and haemoptysis are also observed.⁹

Blood clots with blocked vessels, blindness and nerve damage prove mucormycosis is deadly if not treated. Due to its rare nature, the exact mortality is unknown but an overall estimate is roughly around 45%. The likelihood of patient's death depends on the body part affected.¹⁰

DIAGNOSIS

The exact time for the presentation of this disease in covid patient is usually around third week of onset of its symptoms. Physical examination, swab test, followed by tissue biopsy and radiographic imaging (CT or MRI) are used to detect the extent of it.

Specific investigations include 1. Non-contrast

computed tomography scan of the sinuses particularly paranasal sinuses (NCCT PNS) to detect the bony erosion; 2. High resolution computed tomography chest (HRCT chest) and CT Angiography and 3. MRI of the brain for better delineation of CNS involvement.

Diagnosis includes 1. KOH staining and microscopy, followed by histopathology of the debrided tissues and culture; 2. Matrix-assisted laser desorption/ionization-time of flight (MALDI-TOF) mass spectrometry if available and 3. Presence of ribbon like aseptate hyphae (5-15 μ), branching at right angles.¹¹

PREVENTION AND TREATMENT

Ensuring proper oral hygiene, wearing face shields and masks, maintaining hand hygiene, regular changing of masks and avoiding unnecessary visits to crowded and dirty or polluted environments are main prevention goals in preventing any co-morbidity related to covid.

For prevention of mucormycosis, it is important to control hyperglycemia, discontinue any immunomodulating drug and reduce the use of steroids. Maintaining the adequate systemic hydration, normal saline (IV) infusion followed by amphotericin B and anti-fungal therapy for atleast 4-6 weeks is required. In case of diabetic and covid patients, it is very much important to control hyperglycemia and regularly monitor blood glucose levels during and after Covid treatment. Steroid use must be judicious with correct dosage, timing and duration.⁶

The major treatment part includes antifungals but depending upon the severity, surgery is the end treatment. Mucormycosis can cause damage to upper jaw and even eye. Loss of functions including facial aesthetics, chewing, swallowing and loss of self-esteem can lead to the detrimental effect on the patients mental health. Hence management of covid patients with mucormycosis approach involving team of professionals such as microbiologist, internal medicine specialist, ENT specialist, ophthalmologist, dental surgeon (oral and maxillofacial surgeon for reconstruction) and others.²

METHOD

A systematic search of literature was done in the electronic database of SCOPUS, PUBMED, COCHRANE and EMBASE, using keywords SARS CoV-2, COVID 19 and MUCORMYCOSIS. Details of articles that reported confirmed and suspected patients with

mucormycosis, so far till June 2021 were retrieved. Characteristic of the subjects were analysed on various endpoints and outcomes (table 2).

DISCUSSION

Though been an extremely rare case (mucormycosis) in healthy individual, severe immunocompromised patients predispose it. Uncontrolled diabetes mellitus with or without diabetic ketoacidosis, organ transplantation, hematological and various other malignancies, corticosteroid therapy, prolonged neutropenia, iron overload, voriconazole prophylaxis for transplantation patients, AIDS, and malnutrition are main predisposing factors. Nose, sinuses, CNS, orbit, lungs, GIT, skin, joints, jaw bone are the areas involved, though rhino-orbital-cerebral (ROC) form is more common among all. ROC form is frequently observed in association with uncontrolled diabetes and diabetic ketoacidosis, whereas pulmonary involvement is often seen in patients suffering from neutropenia, and hematological malignancies while GIT involvement is seen in malnourished individuals.²⁶

Eosinophilic necrosis, thrombosis, and giant cell invasion of the underlying area is the main pathological symptom of mucormycosis. Its gold standard criteria for clinical diagnosis was given by Smith and Krichner in 1950 which included: black and necrotic turbinate, easily misdiagnosed for crusted, dried blood. Blood tinged nasal discharge with facial pain, soft peri-orbital swelling, ptosis and proptosis of the eye with a multiple number of cranial nerve palsies.²⁷

Prakash et al.²⁸ (2019) and Patel et al.²⁹ (2020) have found that rhino-orbital-cerebral was the utmost presentation which was followed by pulmonary and cutaneous type in patients with uncontrolled hyperglycaemia. Systematic review by John et al reported 41 cases in people with COVID-19 and diabetes was found in 93% of the cases and 88% were on steroid therapy. These findings were consistent with that of Awadesh et al, where they found that 80% of the mucormycosis cases were hyperglycemic and 76.3% received corticosteroids.³⁰ No studies are available that compared patients of mucormycosis with/without confounding factors.

LIMITATION

Various limitations were seemed to be found while conducting this systematic review, using case reports

AUTHOR	YEAR	PLACE OF REPORT	N	CO-MORBIDITIES	CONFIRMED/SUSPECTED CASES	LOCATION	OUTCOME
Mehta et al ¹²	Sep,2020	Mumbai	1	Diabetes	Confirmed	Nasal, Orbit	Death
Hanley et al ¹³	Oct,2020	UK	1	Nil	Confirm, Autopsy	Lung	Death
Placik et al ¹⁴	Nov,2020	USA	1	Nil	Confirmed	Lung	Death
Monte Junior et al ¹⁵	Nov,2020	Brazil	1	Nil	Confirmed	GIT	Death
Zurl et al ¹⁶	Jan,2021	Austria	2	Leukemia	Confirmed	Bone	Death
Sarkar et al ¹⁷	Apr,2021	Puducherry	10	Diabetes	Confirmed:6 Suspected:4	Nasal, Orbit, CNS	Death:4 Improved:2 Unchanged:4
Sharma et al ¹⁸	Apr 2021	Jaipur	23	Diabetes	Confirmed	Nasal, Orbit, CNS	Death: 0 Lost To Follow Up:2 Alive:21
Veisi et al ¹⁹	Apr, 2021	Iran	2	Diabetes	Confirmed	Nasal, Orbit, CNS	Death:1 Recovered:1
Garg et al ²⁰	May,2021	Chandigarh	1	Diabetes	Confirmed	Lung	Improved
Mishra et al ²¹	May,2021	Bangalore	10	Diabetes	Confirmed	Nasal, Orbit, Bone	Death:4 Improved:2 Unchanged:4
Satish et al ²²	May,2021	Bangalore	11	Diabetes:10 Leukemia:1	Confirmed	Nasal, Orbit	Death:2 No Medical Advice:5 Improved:4
Johnson et al ²³	Jun,2021	USA	1	Diabetes	Confirmed	Lung	Improved
Sen et al ²⁴	2021	Mumbai	6	Diabetes	Confirmed:5 Suspected:1	Nasal, Orbit, CNS	Improved
Wetherman et al ²	2021	USA	1	Nil	Confirmed	Nasal, Orbit	Improved
Sargin et al ²⁵	2021	Turkey	1	Diabetes	Confirmed	Nasal, Orbit, CNS	Death

Table 2. Characteristic of the subjects reported by various authors analysed on the basis of various endpoints and outcomes

and series which are subjected to publication biases with considerable diversity of the reported cases. The active and recovered SARS CoV-2 cases and its correlation to the onset of mucormycosis is difficult due to the less sensitivity of confirmatory reverse transcriptase polymerase chain reaction. Lack of denominator value, does not allow the real estimation of the incidence of mucormycosis.

CONCLUSION

COVID-19 is found to be associated with significant incidence of opportunistic bacterial and fungal infections due to immune dysfunction. Additional due to steroid therapy, broad spectrum antibiotics, monoclonal antibodies lead to exaggeration of pre-existing fungal diseases. While still, there is no major outbreak, physicians should be aware of the possibility

of invasive opportunistic infections in patients with SARS CoV-2 and pre-existing risk factors. Use of therapeutic agents should be monitored to achieve the effect at the minimal dose and for the momentary duration for maximum efficacy. Thus, it becomes very much essential to make the judicious use of drugs and reducing major outbreak with decreased mortality.

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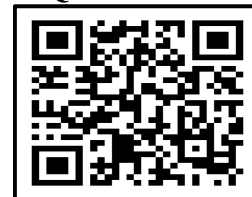
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Hiccups Associated with Steroid Injection: A Case Report

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Hiccups fall under rare adverse events that occur after an epidural steroid injection. A few studies in medical literature have reported on the physiological and pharmacological aspects of the same and some case reports have also been published. We hereby report a case of a 37-year-old woman who presented with hiccups after epidural steroid injection. She was successfully treated with chlorpromazine and omeprazole.

KEYWORDS: Hiccups, Steroid, Adverse Event, Dexamethasone

INTRODUCTION

Steroid based analgesia is a common procedure in pain units across the world. It is a technique with a low rate of complications, with the most common being vasovagal reactions, increased localized pain and adverse effects of corticosteroids on the central nervous system.¹ A possible complication of this treatment may be the hiccups, which is classified according to the duration since the onset of the symptoms. It is transient if it lasts less than 48 hours, persistent between 48 hours and one month, and untreatable if it persists more than one month.² This sign has multiple etiologies: toxic-metabolic, central nervous system diseases, or processes that involve involvement of the vagus or phrenic nerve.³ The occurrence of persistent hiccups has been described in the literature as an adverse effect following administration of corticosteroids. A few episodes of persistent hiccups due to steroids administered by epidural injection have been described.⁴⁻⁷

CASE REPORT

A 37-year-old female with persistent hiccups since a week presented to our clinic. The hiccups started after an epidural injection of dexamethasone. The relevant medical history included ventricular septal defect, spinal stenosis, diabetes mellitus and two miscarriages. The patient came to us with a clinical picture of hiccups, which caused her to suffer from lack of sleep and severe mental disturbance. The hiccups started few hours after an epidural injection administered to relieve symptoms of spinal stenosis. The presence of constitutional syndrome, toxic habits, changes in her usual medication, recent surgical interventions or

symptomatology that may be associated with cardiac, gastrointestinal or central nervous system pathology were ruled out. The patient did not receive any other treatment that could be justified as the causative agent of the hiccups. There were no changes in the chest X-ray with regard to previous studies. Laboratory tests were unaltered and inflammatory markers were in the normal ranges. She had previously been treated by her primary care physician with gabapentin and haloperidol, with no relief. At our clinic, symptomatic treatment was done with intravenous chlorpromazine and omeprazole fully remitting the condition 45 minutes after administration. She did not show up again but reported no second occurrence of hiccups over a telephonic conversation.

DISCUSSION

In the medical literature, persistent hiccups have primarily been associated with oral dexamethasone treatment as an antiemetic at high doses. In this subgroup, the reported incidence is as high as 13%.⁸ An incidence of persistent hiccups of 2% has been reported in the general population following epidural dexamethasone.⁹ There is no publication to capture the incidence of persistent hiccups following administration of other steroids by epidural injection. The occurrence of this adverse effect has been associated with male gender, obesity, young age, use of alkylating agents, elevated body temperature, and elevated hemoglobin, serum creatinine, uric acid or albumin.¹⁰ The association of local anesthetics with the hiccups is controversial. There is only one report to date that states the use of a local anesthetic, specifically



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bupivacaine, as a cause of hiccups.¹¹ In addition, paradoxically, local anesthetics are one of the treatments that have been used successfully for the treatment of refractory persistent hiccups¹², and therefore with their existing another more likely cause such as the administration of epidural steroid as described in multiple reports of refractory hiccups secondary to corticosteroid therapy⁵, it is reasonable to keep this in mind as an alternative hypothesis. Because of this, the episode has been recorded as an adverse effect of epidurally administered dexamethasone due to the temporal sequence from the puncture, the cessation of the clinical picture after symptomatic treatment without subsequent recurrences, the absence of alternative more likely explanations and the fact that the existing literature supports this etiological diagnosis.^{4-7,9} The hiccup reflex arc is composed of the vagus nerve, the phrenic nerve, and the T6-T12 thoracic sympathetic chain as an afferent pathway and the phrenic nerve as an efferent pathway.

The activation of the reflex arc results in an involuntary inspiration concurrent with the sudden closure of the glottis, resulting in the characteristic sound that gives the hiccups their name.^{13,14} The pathophysiology of hiccups associated with epidural corticosteroid injection has not yet been established. The competitive binding of steroids to the afferent pathway of the reflex arc has been proposed as an etiological mechanism, which would explain the higher incidence of hiccups at high doses of corticosteroids¹⁵, as well as a possible decrease of the threshold in action potential by this drug¹⁴ or by compression of the dural sac by the epidural injection.¹⁶ In addition, it has been theorized that patients on dexamethasone have a higher incidence of hiccups compared with other steroids due to supposedly better penetration across the blood-brain barrier.⁸ In fact, in oncological patients, switching from dexamethasone to another corticosteroid such as methylprednisolone or prednisone is recommended as the treatment of choice, since this sign usually disappears without the need to decrease the dose or change the steroid dosage.¹³ There is insufficient evidence to establish clear recommendations on the treatment of persistent hiccups. According to a systematic review¹⁷, if no specific treatable cause of the condition is identified or the hiccups are refractory to that specific treatment, it is advisable to initiate proton pump inhibitors, especially if symptomatology is consistent with gastroesophageal reflux disease. For vagal maneuvers, although suggested as an initial treatment of hiccups

together with proton pump inhibitors, there is no evidence to support their use today.¹⁸ Baclofen and pregabalin or gabapentin are the symptomatic treatment proposed in the literature as first line in cases with a lack of response to proton pump inhibitors. In the event of refractoriness to these drugs, metoclopramide, and finally chlorpromazine would be used. In the case of the patient described, chlorpromazine was administered. Omeprazole was empirically prescribed for the possibility of gastroesophageal reflux disease, despite the lack of typical symptomatology.

CONCLUSION

Refractory hiccups are an exceptional adverse effect following administration of dexamethasone by epidural injection. These may result in mental disturbance and impact quality of life. Physicians should consider hiccups as an adverse effect of epidural steroid injection, because it has been repeatedly described in the literature and is potentially underestimated in routine clinical practice.

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Diversified Impact of COVID-19 Pandemic on the Overall Health and Well-Being of Children: A Survey Based Case Study

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BACKGROUND: COVID-19 pandemic led to the closure of non-essential services including educational institutions and recreational facilities all around the world. The pandemic has affected children at different levels including their mental well-being.

AIM: The objective of this study was to assess the overall impact of the pandemic on the well-being of children in terms of their demographic details, physical activity pattern, sanitary practices, mental health and nutritional practices. 300 children aged between 4-18 years were surveyed through an online survey developed as a Google form.

MATERIAL AND METHODS: Parents or guardians were asked to fill the questionnaire. The questionnaire was approved by Medical doctors for the sake of accuracy and authenticity.

RESULTS: The annual household income of majority of the respondents was between 1-5 lakhs, and they belonged to urban and nuclear households. Although modern amenities were available for the children at home, yet majority of them did not have a separate room and a personal smart phone. 89.4% (n=268) children used internet for 1-5 hours every day. 82.4% (=247) of them were also enrolled in other online courses as well. Lesser time was devoted on physical activity during the pandemic. Negative psychological symptoms like lack in concentration and anxiety, etc. were reported.

CONCLUSION: The paper addresses the changes impacting children's lives at different levels related to their health and well-being. The results must be corroborated with studies reported in literature and may be used for formulating strategies to make children adapt the situation without any negative impact on their personality.

KEYWORDS: COVID-19, Children, Education, Nutrition, Psychological

INTRODUCTION

With the first reporting of several pneumonia cases on 31st December, 2019 in the Hubei province of China, the novel coronavirus SARS-CoV-2 pandemic gripped the whole world in a matter of months.¹ Nations affected by the viral disease, implemented stringent lockdown measures leading to the closure of all non-essential services. Measuring children's response to the pandemic is very important as parents and children spend the entire day together in closed confines which may affect the mental well-being adversely and often it goes unnoticed by the parents. To date, no specific evidence-informed guidelines regarding effective strategies have been devised, that adults could use to support children's socio-emotional well-being during the pandemic. Adverse experiences in childhood may have long term psychological consequences and impact.² There is no concrete strategy adopted by the educational institutions, to offer counselling on mental well-being of children.³ During the pandemic, the eating and physical activity pattern has also been impacted.⁴ Dietary habits are seldom influenced by psychological factors, and may have long-term health effects.⁵ This study was done as a survey with children

to assess the multi-level impact of COVID-19 pandemic on their life. Diversified impact on their physical activity pattern, mental and psychological behaviour and dietary habits was probed through a questionnaire survey.

MATERIAL AND METHODS

The study was conducted between 1st November-15th December, 2020, through an online questionnaire-based survey which was drafted as a Google form titled "COVID-19 in context with the overall health of Children" consisting of 67 questions. The study was conducted according to the recommendations of the Helsinki Declaration. The questionnaire was compiled under the guidance of medical doctors and expert psychiatrists. A questionnaire survey offers a practical and inexpensive way to gather data from the target group. In addition to this the data accumulated by the questionnaire can be easily interpreted and analyzed. The study area was Northern India, but the questionnaire was posted on different social media platforms and shared publicly to facilitate snowball sampling. Total 300 responses were accepted as they



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fulfilled the inclusion criterion, which was based on the age of children (4-18 years). The exclusion criterion was kept less stringent to attain maximum responses and for that very few questions in the questionnaire were made compulsory. Because of this, different responses were received for separate questions and percentage was calculated accordingly. Voluntary answering was sought so as to keep the interest of the respondents intact. Clear instructions were given in the form to the participants related to the purpose of the study and it was agreed that their personal details would be kept confidential and only be used for research purpose. The Google form was designed in five separate sections viz. 1. Demographic details, 2. Change in activity pattern before and during the COVID-19 pandemic, 3. Physical features- Sanitary practices and health history, 4. Mental health of the child before and during the pandemic and, 5. Nutritional aspects related to the health of child before and during the pandemic. All the tabulation, interpretation and analysis of the data were done in Microsoft Excel 2019 (16.0.6742.2048).

RESULTS AND DISCUSSION

Demographic details: The survey focused on children aged between 4-18 years. Important changes like sphincter control, emotional self-regulation etc. have been observed once a child reaches 4 years of age. On the other hand, after the age of 10, pre-adolescence phase starts which initiates a series of physical and emotional changes leading to physical and emotional changes reorganizing the emotional experience of children and their relationships with others in their surroundings and how they respond to stress.⁶ 55.6 % (n=167) children were male. 91.6% (n=275) of them belonged to urban household, having 1-5 members in the family. 71.6% (n=215) of them had two siblings. The educational background was also included as it is one of the most important factors influencing the life style and daily choices and practices. 46.4% (n=139) parents had post graduate level of education and 5.2% (n=16) had a doctoral degree. 64.6% (n=194) mothers of the surveyed children were homemakers. Mostly up to five rooms were there in the house as reported by 67.6% (n=203) respondents. However, mostly children did not have a separate room. Modern amenities like smart phone (71.8%), Smart T.V. (43.5%) and laptop (41.8%) etc. were available at home to be accessed by the child, however personal smart phone was not allowed for the child as reported by 90.4% (n=271) of the respondents. 84.3% (n=145) children used the internet frequently for educational and other purposes. 40.9% of them used internet as a medium for entertainment (figure 1). The

use of smart phones or social media among children was not encouraged earlier by the parents, and in the wake of the pandemic situation, these have become the only way of entertainment, education and information.⁷ Cartoon shows (77.9%), movie and music channels (33.8%) and family shows (24%) were the most watched content. WhatsApp was the most common social media platform accessed by the children as reported by 35.6% respondents. The internet surfing was done under the supervision of their parents as reported by 72.4% (n=217) of the respondents, which was appreciable as parents must keep a tab on the judicious use of electronic media and devices and must be aware of the content their child is exposed to.⁸ There may be some disparity owing to differential household income, access to technology, and other factors like area of the household, and neighbourhood conditions.⁹ Recreational facilities like cycle and music system were also available at home. 75.4% (n=226) children also indulged in indoor games. Parents must try to involve their children in indoor games which are enjoyable and educational at the same time.¹⁰ A healthy atmosphere at home can be created by initiating emotional and amiable interaction between the children and their parents which may serve as a stress buster. The demographic details are given in Table 1. The Internet exposure details are given in Table 2. Family and household details are given in Table 3 and details regarding amenities accessed by the child are given in table 4.

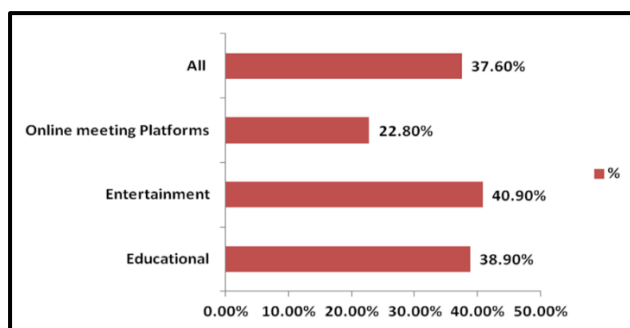


Figure 1. Usage of internet for different purposes

Changes in activity pattern before and during the COVID-19 pandemic: Questions pertaining to the changes and variation in the activity pattern were included to know whether there were any significant changes in the day-to-day routine of the children. Variation in the hours of sleep was observed during the COVID-19 pandemic scenario. Healthy behaviours are usually obtained during the structured days including

Age of Children		
Age	%	Respondents
4 - 10 Years	29.4	88
11 - 15 Years	63.6	191
15-18 Years	7	21
Sex of Children		
Sex	%	Respondents
Male	55.6	167
Female	44.4	133
Country of Residence		
Country	%	Respondents
India	89.4	268
Others	10.6	32
Nature of Family		
Nature	%	Respondents
Rural	8.4	15
Urban	91.6	275
Nuclear	59	177
Joint	41	123

Table 1. Demographic Details

school opening days as compared to unstructured days which include weekends or vacations.¹¹ Majority (n=279) of children, spent 1-2 hours in physical activity during the pandemic, although due to the closure of schools they had more time to indulge in physical activity. Insufficient physical activity during childhood may lead to serious health outcomes in adulthood as obesity, type II diabetes, and metabolic syndrome.¹² The frequency of the time spent with friends in person decreased significantly during the pandemic, whereas the use of virtual platforms for interaction increased, as 25.3% (n=76) children devoted more than 5 hours every week on virtual interaction. One to three hours were spent on watching television as reported by 81.6% (n=245) respondents, whereas 18.4% (n=56) children devoted more than three hours in watching television or surfing OTT platforms for entertainment. The increase in recreational screen time is in tandem with the studies reported from Spain¹³ and China.¹⁴ According to a study conducted in Germany, the non-recreational screen time including social media usage increased from 215 to 338 minutes daily during the strict lockdown implementation.¹⁵ Overall as compared to the time devoted for physical activity, more time was spent on screen time, which is very alarming. The variation in physical activity pattern is given in Table 5.

Physical characteristics, Sanitary and health practices: Average height and weight of the

Does the child surf internet		
Response	%	Respondents
Yes	84.3	253
No	15.7	47
Number of hours spent on internet surfing		
Number of Hours	%	Respondents
1 – 6	90	270
More Than 6	10	30
Is child active on Social Media		
Response	%	%
Yes	24.4	73
No	75.6	227
Time Spent on online school classes		
Number of Hours	%	Respondents
1 – 5	89.4	268
More Than 5	10.6	32
Additional courses taken online		
Response	%	Respondents
Yes	82.4	247
No	17.6	53
How are online Classes attended		
Response	%	Respondents
Under The Supervision Of Parents	72.4	217
The Child Attends It Alone	27.6	83

Table 2. Internet Exposure among the Children

participating children was found to be between 120-160 cm & 20-60 kg respectively. However, few of them were found to be underweight weighing as less as 13 kg, and some of them were overweight having maximum weight of 84 kg. Bathing frequency increased during the pandemic. Similarly, as compared to pre-pandemic situation, 38.3% (n=115) children sanitized their hands 6-10 times, and 19.4% (n=58) sanitized their hands more than 10 times a day. Loss of appetite (6.8%), muscle or body ache (6.7%), fatigue or excessive sleepiness (8.6%) were some of the symptoms which were more frequently reported during the pandemic. 87.6% (n=263) of the children were found to be non-allergic, however those who were cited dust, pollen, pollution, washing powder and Aloe barbadensis as the common sources of allergens. The details of the sanitary and hygiene practices are given in Table 6.

Mental health of the children: Children are as much at the risk for negative psychological impact as adults during a crisis. Children as young as two-year-old are aware of the changes taking place in their

Mothers – Working Or Homemakers		
Response	%	Respondents
Working	35.4	106
Homemaker	64.6	194
Total Annual Income		
Annual Income	%	Respondents
Less than 1 Lakh	7	21
1 – 5 Lakhs	49	147
5 – 9 Lakhs	22.4	67
10 Lakhs or Above	21.6	65
Parent's Education		
Educational Level	%	Respondents
High School - Intermediate	3.4	10
Graduate	45	135
Post Graduate	46.4	139
Doctorate	5.2	16
Total Members In The Family		
Number of Members	%	Respondents
1-5	55.6	167
More Than 5	44.4	133
Number of Siblings		
Number of Siblings	%	Respondents
None	28.4	85
1 - 2	71.6	215

Table 3. Family and Household Details of the Children

surroundings,¹⁶ therefore questions pertaining to behavioural changes, temperamental traits and peculiarities were added in the questionnaire. Multiple option selection was kept in the section for thorough assessment. The prominent behavioural changes during the pandemic were difficulty in concentration, anger management and getting worried (Table 7). Children are fearful about self infection and anxious for the safety of their family members.¹⁷ They also feel isolated due to the closure of their schools, recreational facilities and restriction to meet their friends.¹⁷ The noteworthy temperamental changes taking place during the pandemic were lethargy, as reported by 8.5% respondents. Although the social-distancing measures were essential to curb the infection, they might have hampered the physical fitness level of the children.¹⁸ It has also been argued that the closure of schools and low physical activity and sedentary time

Number of Rooms in home		
Number of Rooms	%	Respondents
1-5	67.6	203
More Than 5	32.4	97
Does the Child Have A Separate Room		
Response	%	Respondents
Yes	31	93
No	69	207
Recreational Facilities Available At Home For The Child (Multiple choice question)		
Facilities Available	%	Respondents
Cycle	91.6	275
Music System	41	123
Gaming Stations	19.6	59
Does The Child Indulge In Indoor Games		
Response	%	Respondents
Yes	75.4	226
No	24.6	74
Indulgence in type of Indoor Games		
Response	%	Respondents
Ludo, Carom, Chess	92.4	277
Others	7.6	23
Does The Child Owns Personal Smartphone		
Response	%	Respondents
Yes	9.6	29
No	90.4	271

Table 4. Modern Amenities accessed by the Child

may lead to increased risk of obesity.¹⁸ Sadness (6.5%), quarrelsome nature (6.3%), and self-centred tendency (4.05%) were some other symptoms observed in the children showing their poor mental health (Figure 2). It was also found that children became more reserved and isolated. The self-confidence level was also found to be low. Tendency to isolate is not considered as a good sign because social interactions are necessary to inculcate cultural values and social norms.¹⁹ Mood swings reported by 60.4% (n=55) respondents, homesickness (34.1%), stubbornness (31.9%) and anxiety (16.5%) were the prominent temperamental peculiarities observed during the pandemic (Figure 3). The symptoms were in line with the previous studies conducted in Italy and Spain²⁰ to assess the emotional impact of quarantine on children. 85% of the parents

Hours of sleep	Before COVID -19		During COVID- 19	
	%	Respondents	%	Respondents
8 -10 hours	96.4	289	83	249
More than 10 hours	3.6	11	17	51
Time spent on physical activity per day (outdoor games)				
Hours of physical activity	Before COVID-19		During COVID-19	
	%	Respondents	%	Respondents
1 – 4 hours	93	279	93.7	281
More than 4 hours	7	21	6.3	19
Frequency of spending time with friends in person				
Number of times per month	Before COVID-19		During COVID-19	
	%	Respondents	%	Respondents
1 – 7	87.3	262	73.4	220
More than 7 times	9	27	1	3
Not frequently	3.6	11	25.6	77
Frequency of spending time with friends on virtual platforms				
Number of hours spent per week	Before COVID-19		During COVID-19	
	%	Respondents	%	Respondents
Less than 5 hours	95.6	287	63.6	191
5 Hours	3.33	10	25.3	76
More than 5 hours	1	3	11.1	33
Time spent watching T.V./OTT per day				
Number of hours	% Respondents		% Respondents	
1 -3 hours	81.6		245	
More than 3 hours	18.4		55	

Table 5. Change In Activity Pattern Before and During the COVID-19 Pandemic

reported worsening of the emotional and behavioural symptoms in children. Studies conducted with children from Asia have shown greater prevalence of psychological issues as compared to developed

countries in the initial stages of the pandemic. Children when kept in dark about the happenings in the community tend to be more worried and angrier, and throw tantrums, hence it must be the duty of their

Number of times the child takes bath				
Frequency of Taking Bath	Before COVID-19		During COVID-19	
	%	Respondents	%	Respondents
1 time	71.6	215	70	210
2 times	19	57	28.4	85
More than 2 times	9.4	28	1.6	5
Number of times the child washes or sanitizes hands				
Frequency of Washing or Sanitizing hands	Before COVID-19		During COVID-19	
	%	Respondents	%	Respondents
1 – 5 Times	89.4	268	42.3	127
6 – 10 Times	8.4	25	38.3	115
More than 10 Times	2.2	7	19.4	58
If child is allergic to something				
Response	%		Respondents	
Yes	12.4		19	
No	87.6		263	
Did the child come in contact with someone who tested Positive for COVID-19				
Response	%		Respondents	
Yes	4		12	
No	96		288	

Table 6. Sanitary and Hygiene practices of the Children

Behavioural Changes	Before COVID-19 Multiple choices allowed		During COVID-19 Multiple choices allowed	
	%	Respondents	%	Respondents
Change in concentration and Attention	11.8	17	20.3	72
Gets Worried	8.3	12	10.7	38
Gets Angry	10.4	15	14.9	53
Tries to Avoid	5.5	8	8.47	30
Remains Isolated	6.9	10	9.03	32
Gets Distracted	13.2	19	10.4	37
Seems to have lesser fun	9.7	14	16.1	57
Is emotionally balanced	33.5	48	9.8	35
Any Death in Family/ Locality Due To COVID-19				
Response	% Respondents		Respondents	
Yes	2.4		7	
No	97.6		293	

Table 7. Behavioural Changes Observed in Children

parents to acknowledge and validate their feelings and make them understand the scenario and importance of social-distancing and safety measures. Previous studies undertaken during past pandemics like SARS and MERS

have shown that quarantined children showed symptoms of anxiety, depression, irritability, mood swings and sleep disturbances etc.²¹ They may also be worried due to interrupted academic schedules and future uncertainty. Public health authorities and clinicians must have an accurate estimate of the behavioural peculiarities and psychopathologies in children.

Nutritional Aspects: Young children have constituted a very meagre percentage of COVID-19 infections, as kids' immune system is better equipped to combat the infection than adults. However some studies contradict the same. A study with COVID-19 infection including 65 children found that the adults had a stronger T-cell response to the virus spike protein than the children and young adults.²² The lockdown has impacted the daily life at different levels, including nutrition, dietary habits and variation have emphasized on the crucial role of physical activity and nutrition in the prevention of non-transmissible chronic diseases. Data has also been published related to the dietary recommendation and nutrition to curb the infection as diet and its quality is related to the overall health of a human being. During the pandemic, 32.4 % (n=97) of the children took more than three meals per day as compared to 9.7 % (n=29) before the pandemic (Table 8). The home-made junk food was most preferred as reported by 76.1% (n=121) respondents. The intake of junk food increased considerably during the lockdown as reported by 88% of the respondents (Figure 4). Food choices are seldom influenced by psychological factors, and may be probed to know their long-term health effects.⁵ Food cravings may be triggered by mental health issues like stress, social isolation or lack of physical activity.⁵ Changes in eating pattern or psychological issues faced during the

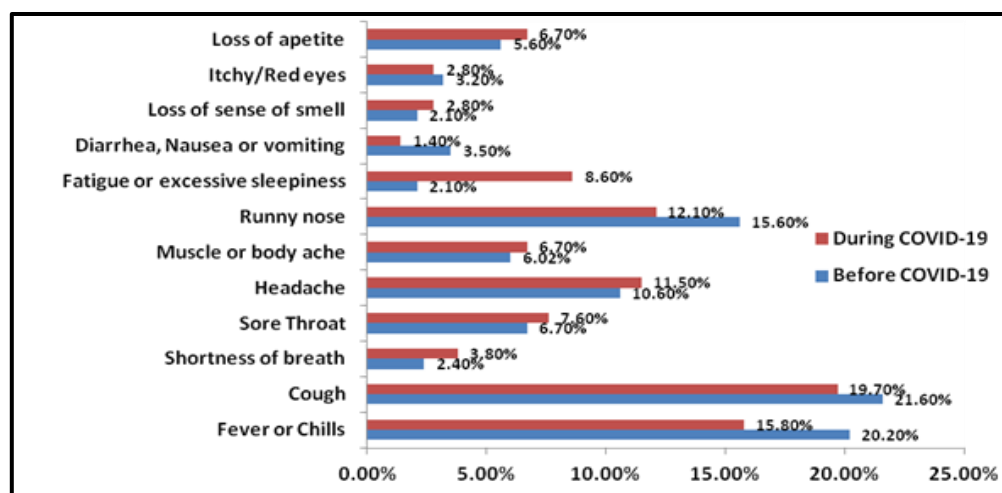


Figure 2. Occurrence of Different Symptoms in Children

Number of Meals Taken				
Number of Meals	Before COVID-19		During COVID-19	
	%	Respondents	%	Respondents
3 Meals Per Day	90.3	271	67.6	203
More Than 3 Meals Per Day	9.7	29	32.4	97
Fruit Intake Of The Child				
Fruit Intake	Before COVID-19		During COVID-19	
	%	Respondents	%	Respondents
More	59.6	179	91.6	275
Less	40.4	121	8.4	25
Inclusion of Vitamin C In the Diet of Child				
Vitamin C Inclusion	Before COVID-19		During COVID-19	
	%	Respondents	%	Respondents
Yes	70.6	212	94.3	283
No	29.4	88	5.7	17
Intake of Any Vitamin Supplements By The Child				
Vitamin Intake	Before COVID-19		During COVID-19	
	%	Respondents	%	Respondents
Yes	25.7	77	59.3	178
No	74.3	223	40.7	122
Any Other Preventive Measures Taken During The Pandemic				
Response	%		Respondents	
Yes	79.3		238	
No	20.7		62	

Table 8. Nutritional Aspects Related to the Health of the Child Before and During the Pandemic

pandemic time could have a negative impact on children's self esteem and self efficacy²³, which in turn has the potential to weaken the immune system. Although children did not prefer to have fruits, still as reported by 91.6 % (n=275) respondents, the fruit intake increased during the pandemic. Vitamin C was also included in diet in 94.3% (n=283) children. Enhancing immunity is an important way to prevent and manage viral infections. Nutritional status influences immune homeostasis, while malnutrition weakens the immune response to pathogens.²⁴ Vitamins and trace elements are relatively essential for the upholding of immune system. Therefore intake of vitamins and trace elements may improve immunity against COVID-19. The common sources of Vitamin C were lemon, orange, tomatoes, and kiwi etc. However, some respondents revealed to have included dietary supplements as a source of Vitamin C.

Majority of the respondents acknowledged that no side effects were found to be associated with the consumption of these supplements, in some cases however, indigestion was the common symptom reported as a side effect. Rs. 5000-7000 were allocated for the monthly budget spent on nutrition and precautionary measures, however Rs. 15,000 was the maximum amount spent per month.

Limitations of the study: The survey only included those who attempted and submitted the questionnaire. Those who saw and chose not to participate could not be determined. However it may be said that those who were interested in physical activity and their health and hygiene took part in the online survey. However, previous studies have suggested that the quality of responses may be reduced in online surveys. Since the

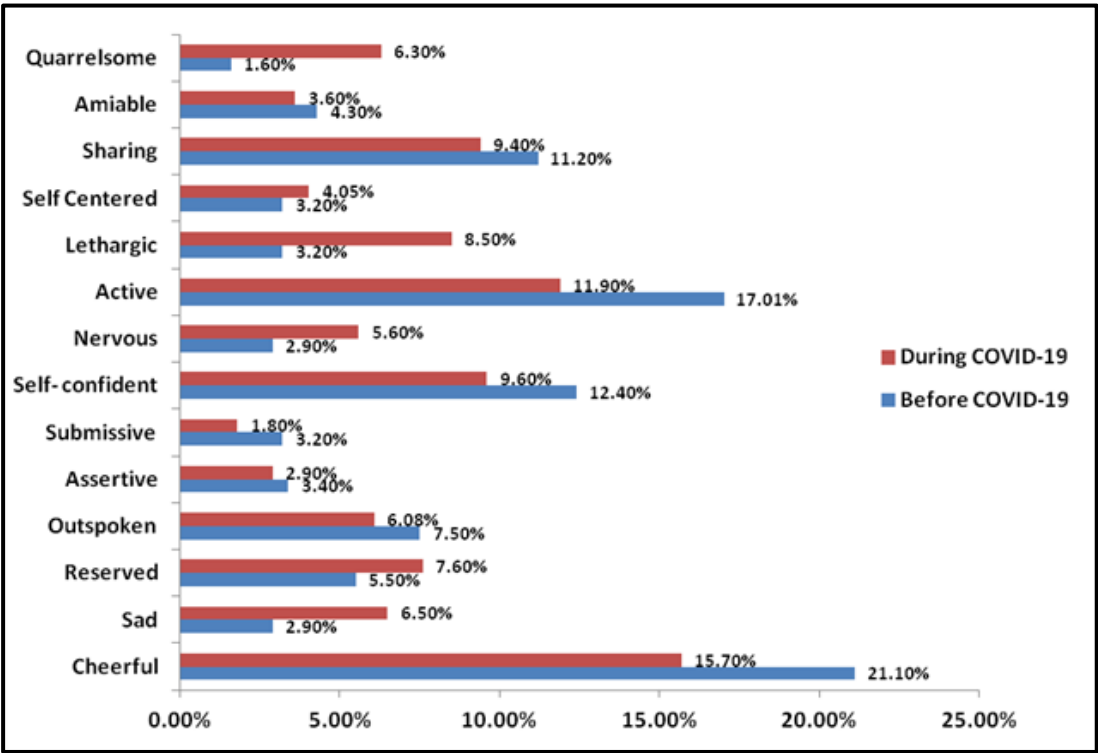


Figure 3. Behavioural Changes Observed in Children

results of these surveys are direct, the results should be carefully interpreted considering all the limitations. The mere questionnaire findings do not guarantee the authenticity of the results and the findings must be verified by a suitable scientific method. Experimental observation and empirical evidences must also be collected along with repeated assessment. There are several other drawbacks associated with the online survey which must be taken into consideration before the interpretation of the results. There is a high probability that the respondent filled one questionnaire

for all the children in home in a generalized way. Several surrounding factors like noise, unavoidable interruptions and presence of family members may have influenced the concentration of the respondent while answering the questions. Access to internet and the link for the questionnaire was another factor of importance.

CONCLUSION

The comprehensive online survey was done to assess the overall impact of the pandemic and the imposed lockdown on the well-being of children. The thorough assessment was made on different aspects including demographic details, activity pattern, mental health and nutritional variation and food preferences. Majority of the children belonged to urban nuclear households having access to modern amenities like smart phone, internet, Wi-Fi connection and smart T.V. Children were found to surf internet frequently, but under the observation of their parents. Negative psychological traits like difficulty in concentration, stubbornness, mood swings, and anxiety were some of the common symptoms observed in the children. There was a significant variation in the sleep pattern. Improved sanitary practices were also observed as majority of the surveyed children washed or sanitized their hands 6-10

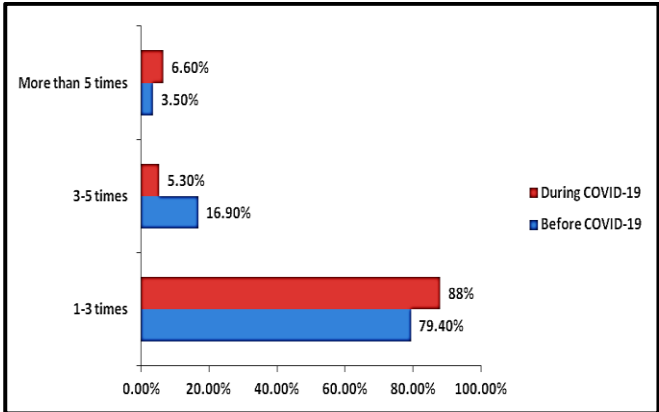


Figure 4. Frequency of intake of Junk Food in Children

times a day. Consumption of home made junk food enhanced by a significant percentage which may be also linked to the negative psychological impact.

RECOMMENDATION

The study has highlighted the fact that the children and their adaptive behaviour have been affected by the change in the scenario owing to the pandemic. There is an urgent need for health authorities and government in collaboration and coordination with educational institutions to provide adequate psychological interventions along with educational and recreational measures. For a thorough assessment of the mental health and its associated impact on the dietary habits of the children, paediatricians, psychiatrists and psychologists must work together to reach out to the needful. Not only this, response of parents to the pandemic must also be assessed as it is a crucial and decisive factor to know their approach towards their children.

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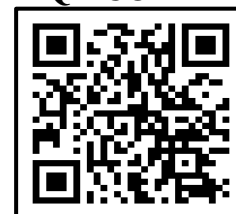
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Relationship of Personal Hygiene and BMI with OHI-S Scores among Primary School Children in a District in North India

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INTRODUCTION: Malnutrition, among children can lead to various morbidities, and some of its consequences can be fatal.

AIM: To assess Hygiene with Nutrition & Morbidity among school children in district Ambala, Haryana, India

MATERIALS AND METHOD: Data was collected through a health check-up program for primary school children studying in class I and class III (aged only between 6-9 years) using a pre-tested and pre-designed questionnaire, weighing scale, measuring tape and dental screening instruments. The investigators were duly standardized and concerned instruments were duly calibrated. No names and personal information was collected and before the student was sent for examination, his I-card was removed. Data cleaned and analyzed using SPSS version 22.0. Shapiro wilk-test for data normalcy revealed a parametric distribution of the data and hence, the student's t-test and multiple logistic regression were applied.

RESULTS: The study included 216 males and 106 females, and the maximum unfavourable score (unclean hands, feet and skin) was observed in 40.1% of the children. Difference between favourable and unfavourable scores with OHI-S ≤ 2 was found to be 65.3% ($p=0.02$) and maximum students (68.9%), reported having a good favourable OHI-S score ($p=0.01$). It was observed that maximum males (43.1%) and females (48.1%) belonged to the "Normal" category of BMI, while lesser females (6.7%) were overweight in comparison to their male counterparts. Multivariate logistic regression revealed that OHI-S scores were significantly associated with BMI status ($p=0.05$) of the children, indicating that children with higher BMI scores have a tendency to have "fair" and "poor" OHI-S scores.

CONCLUSION: Based on the results, appropriate measures can be undertaken to ensure that schools as well as healthcare professionals undertake more stringent measures to educate parents, children as well as teachers regarding the relationship between poor oral health and increased BMI values.

KEYWORDS: Oral Hygiene, Body Mass Index (BMI), Malnutrition

INTRODUCTION

Undernutrition, has been described as a type of malnutrition directly related to inadequate dietary intake and infectious diseases and is influenced by three broad factors: food, health, and care.¹ Among children, it is of concern as it can lead to various morbidities, and some of its consequences can be fatal.

The importance of school health has been acknowledged across countries since the beginning of 20th century. As a matter of fact, health has been considered as one of the key factors determining the enrolment, performance and continuation of children in school.² The 6.3 lakh (both primary and upper primary) schools of India serve as an important pedestal where education regarding important aspects of health (including) hygiene, environment and sanitation, as well as social customs, is being imbibed by the students. After parents, is the teacher, considered as the "guru", who acts as the guardian of the child in the "temple of learning" called school and play a significant role in the processes of disease prevention and specific protection among a community.^{3,4}

An early identification of illnesses among children through periodic general and oral health screenings can prevent morbidities in them.⁵ Therefore, coordinated and regular activities pertaining to health and hygiene at school are needed, for better and health promoting school environment. It focuses mainly on nutritional disorders and personal hygiene which are important problems in India. School health programmes in India usually include general health, assessment of anaemia/nutritional status, visual acuity, hearing problems, dental check-up, common skin conditions, heart defects, physical disabilities, learning disorders, behavior problems, etc.

Due to the fact that both malnutrition and hygiene plays an important role in the development of good health, the present study was conducted to assess Hygiene with Nutrition & Morbidity among school children in district Ambala, Haryana, India.

MATERIALS AND METHODS

After obtaining prior ethical clearance and permission from concerned authorities, a health check-up



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program for primary school children in government and semi-government schools studying in class I and class III (aged only between 6-9 years) was organized from October 2019 to February 2020. Data was collected using a pre-tested and pre-designed questionnaire (Cronbach alpha :0.77), weighing scale and measuring tape. The investigators were duly standardized and concerned instruments were duly calibrated.

General and systemic examinations of the students were conducted by the medical team, while dental examinations (OHI-S Index) were carried out by dental team. Data was entered into a pre-validated proforma by a standardized assistant who recorded the data as per the oral instructions of the investigators, thus preventing their distraction. No names and personal information were collected and before the student was sent for examination, his I-card was removed and investigators were strictly instructed not to ask the students for personal particulars, which was monitored by a member of the investigator team. Data thus collected was confidential, where it was cleaned and analyzed using suitable statistical tests with the help SPSS version 22.0. Shapiro wilk-test for data normalcy revealed a parametric distribution of the data and hence, the student's t-test and multiple logistic regression were applied.

RESULTS

The total students enrolled in the study were 322, out of which, there were 216 males and 106 females. The general hygiene status of the students is depicted in

table 1 and it was revealed that more students had favourable hygiene scores as compared to unfavourable hygiene scores. The maximum unfavourable score, 40.1% was observed when the children had unclean hands, feet and skin. Most children reported having clean and combed hair (78.3%, $p=0.05$), followed by having clean uniforms (70.5%). The difference between favourable and unfavourable scores with OHI-S ≤ 2 was found to be 65.3%, and the difference was found to be statistically significant.

Gender-wise distribution of BMI among the students is depicted in table 2 and the results indicated that maximum males (43.1%) and females (48.1%) belonged to the "Normal" category while lesser females (6.7%) were overweight in comparison to their male counterparts.

Table 3. depicts the OHI-S scores of the students. Maximum students reported having a good favourable score (68.9%), and the difference between the scores was found to be statistically significant ($p=0.01$). Unfortunately, 33.9% children belonging to the unfavourable hygiene group exhibited having a poor oral hygiene.

The analysis of the multivariate logistical regression is depicted in table 4. Its was observed that OHI-S scores were significantly associated with BMI status ($p=0.05$) of the children, indicating that children with higher BMI scores have a tendency to have "fair" and "poor" OHI-S scores.

State of Personal Hygiene	Unfavourable Score			Favourable Score			P
	Males	Females	Total	Males	Females	Total	
Combed and Clean hair	16(7.4)	23(21.7)	39(12.1)	200(92.6)	83(78.3)	283 (87.9)	0.05
Clean & Trimmed Nails	59(27.3)	38(15.4)	97 (30.1)	157(72.7)	68(84.6)	225 (69.9)	NS
Clean Uniform	72(33.3)	23(21.7)	95(29.5)	144(66.7)	83(78.3)	227 (70.5)	NS
Clean Hands, feet and skin	100(46.3)	29(27.4)	129(40.1)	116(53.7)	77(72.6)	193 (59.9)	NS
Clean/Oral Cavity (OHI-S Score <2)	106(49.1)	6(5.7)	112(34.7)	110(50.9)	100(94.3)	210 (65.3)	0.02

Table 1. Demographic Profiles, Favourable and Unfavourable Scores among the School Children

DISCUSSION

The results of the present study indicate a significant association between BMI ($p=0.05$) and OHI-S scores of the children, and hence further strengthening data to the literature that oral health is indeed a gateway to one's general health.⁶

Nutritional Status	Males	Females
Underweight (BMI<5th percentile)	11(5.1)	17(16.0)
Normal (BMI 5th - 84th percentile)	93(43.1)	51(48.1)
At Risk (BMI 85th - 95th percentile)	87 (40.3)	31(29.2)
Over Weight (BMI>95th percentile)	25(11.5)	7(6.7)

Table 2. Gender-wise distribution of BMI among the students

The results highlighted that most students had favourable hygiene scores as compared to unfavourable hygiene scores, and is in agreement to Deb S et al.⁴ Most children reported having clean and combed hair (78.3%, $p=0.05$) and these results are in contraindication to Dongre AR et al.⁷, who reported the same only in 27.6% of the children. The difference between favourable and unfavourable scores with OHI-S ≤ 2 was found to be 65.3%, and the difference was found to be statistically significant; thus indicating the need for incorporating oral health programmes among school children.

Total Score Obtained (OHI-S Index)	Unfavourable Score	Favourable Score	p value
Good	101(31.3)	222(68.9)	0.01
Fair	112(34.8)	67(20.8)	
Poor	99(33.9)	33(10.3)	

Table 3. OHI-S scores of the students

Upon examination of BMI, it was observed that maximum males (43.1%) and females (48.1%) belonged to the "Normal" category while lesser females (6.7%) were overweight in comparison to their male counterparts. This is stark contrast to Halder S et al.⁸, who reported normal scores in 10% males and 26% females. These differences can be related to the

Variable	BMI Status	General Hygiene Status
OHI-S Score	0.05*	0.06 (NS)

Table 4. Multivariate Logistical Regression between OHI-S, Nutritional Status and BMI

location of the schools, ease of access to junk food by the children and parental attitudes towards their child's nutrition.⁹

The results of the present study indicated that OHI-S scores were significantly associated with BMI status ($p=0.05$) of the children which was an indication that children with higher BMI scores have a tendency to have "fair" and "poor" OHI-S scores and is in agreement to Haldar S et al.⁸, et al. who results indicated that BMI is positively associated with the deft, DMFT, and OHI-S. In contrast, Rachmawati E et al.¹⁰ reported no clear relationship between oral hygiene index simplified with body mass index among children aged 6-8 years old in Bandung city, Indonesia.

The study is prone to the limitation of subjective bias in identifying favourable and unfavourable scores among the children, however, which was handled by standardizing all of the investigators. Also, no personal data of the children was collected and hence the confidentiality of the data was assured.

CONCLUSION

Based on the results of the present study, the results can be generalized for other school going children and appropriate measures can be undertaken to ensure that schools as well as healthcare professionals undertake more stringent measures to educate parents, children as well as teachers regarding the relationship between poor oral health and increased BMI values. All rural schools must mandatorily conduct dental and medical examinations of the children on a regular basis and any discrepancies must be raised by the teachers to the parents during the next parent-teacher conference.

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