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BLOOM OF ONLINE TEACHING IN THE ERA OF COVID 19 PANDEMIC: BOON OR BANE FOR MEDICAL EDUCATION

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Covid 19 pandemic has forced all educational institutes across the borders to close in order to mitigate the spread of the contagion.[1] The sudden, unprepared closure of a medical college had many ramifications. Apart from the screeching halt of knowledge transfer in classrooms, the students also lose out on medical laboratory practical, posting in hospital departments and wards, and community exposure. Assessments, both formative and summative took a backseat. Online mode has been the only viable option for medical colleges to continue the teaching activities.[2,3]There is a high probability that teaching may not remain the same in post-covid era as it was in pre-covid times. It is therefore relevant to examine the strengths and limitations of online mode of teaching and find out a future path.

Large group teaching: Lectures

Lectures or large group teaching primarily aimed at enhancing the knowledge domain of the students was one of the first to undergo online transition. Most of the colleges shifted to online delivery of lectures through a variety of digital platforms such as Zoom, GoToWebinar, Free Conference Call, Google Meet and others. This led to a paradigm change in the learning environment for both teachers and students. Teachers miss the familiar faces, the ability to monitor and the usual attention of the students. Even the students miss their peers as well the physical presence of a teacher during such classes as they were used to in pre-covid times.

Interactivity seems to be a big missing element in these classes. Unlike the resource intensive settings, online teaching is not embedded in regular teaching learning programme of most of the medical colleges in India. As a result, majority of the teachers, not been trained in online mode of teaching felt lost and without support in the beginning of this transition. Students' attendance, a mandatory prerequisite to appear for the MBBS professional exams by the Medical Council of India is a big concern for the students as because of internet connectivity sometimes they are left out of the class. Even the teachers are struggling to maintain attendance as often students log in using different email ids and devices.

***Suggested solutions*:** Training and supportive guidance to build the skills of teachers, availability of dedicated space, staffs, high bandwidth cables, subscription to the digital platform are needed to develop an enabling environment. A few practice

sessions will allay teachers' apprehension before they venture out to deliver scheduled online lectures. The recorded lectures can also be shared either through a dedicated college website page, or cloud storage links such as Google Drive, Dropbox, or OneDrive. Sharing of such recorded video makes it easy for the learners to learn at their own pace. An interesting observation, reported in regards to online teaching is students who because of cultural upbringing usually shy away from asking questions are now interacting with the teacher. [4]

The choice of a digital platform for an institute depends on the cost, user friendliness, and associated logistics required. In most of the digital platforms in-built interactive tools are available. Some of the popular ones are polls, feedback forms, chat boxes, and even direct conversations by unmuting the students. Social media messaging groups such as WhatsApp and Telegram are available for teacher-student and student-student interaction outside the online classroom. For attendance recording, some available options are taking screenshots, posting quiz type questions multiple times with quick submission, generating records of log-in email ids and names of students, even roll numbers. The use of Learning Management System (LMS) eg. Moodle may decrease many of these issues however student engagements during the sessions need to be taken care of. Multiple Communication channels of different modalities need to be developed to support student teacher and student- student interaction.

Small Group Teaching: Teaching of Medical Laboratory and Clinical Skills

The dissection halls, laboratories, hospital outpatient and inpatient departments serve as important venues for facilitating the development of the skills associated with psychomotor and affective domain. For the initial years of medical course, laboratory practical sessions are more and in later years, community exposure and clinical postings take precedence. Medical Laboratory and clinical posting, which serves as a temple of learning for the future physician, makes our medical colleges unique and vulnerable in the eye and aftermath of a pandemic. High infectivity, scarcity of personal protective equipment (PPE), non-availability of a cure as well as vaccine, the conversion of attached hospitals as pandemic specific health centres and involvement of many medical teachers as treating doctors impede medical education in laboratories and hospitals.[5] Teaching psychomotor and communication skills are more difficult through online mode, as compared to delivering lectures.

For live transmission of practical or clinical skill demonstrations not only a high internet bandwidth but also a well illuminated room, necessary equipment for audio video development and trained manpower are required. This makes the whole process resource intensive. To add to this, ensuring availability of laboratory material for lab teaching and patients for clinical skill demonstration is not easy during a crisis time. In traditional teaching, practical and clinical postings are in small groups. However, in online mode, not much difference is there between large and small group, if it is only video transmission, as the students are with their own personal device screens. The concept of small group is relevant when peer interactivity and teacher's feedback are desirable, an important dimension to consider while developing and blueprinting online teaching programme. The ethical issues in video recording or live transmission of a patient being examined or a

procedure being done are to be considered carefully before moving ahead with online clinical skill teaching.

***Suggested solutions*:** The skills associated with medical laboratory posting and procedures can be taught using sharing of texts, images, video and audio clips.[6] Evidence exists in literature about creation of "dry digital labs" in online environments by creating pre-set stations having image of the specimen from a typical microscopic field and worksheets containing facts and questions to solve in order to learn.[7] Some reports are already available of attempting to teach a few clinical skills like history taking, steps of physical examination by written instruction as well as sharing of video demonstration.[4] Some digital platforms offer the option of dividing a large number of participants into virtual small groups known as breakout rooms. These can be used to encourage peer discussion if needed. In the absence of high-quality video recording facilities in an institute, either the institute can collaborate with an institute which can share such resources or help in their development. The last resort can be our smartphones and digital cameras which can be used to continue online teaching of practical sessions and clinical postings. Written permission from patients is important before subjecting them to video recordings or live transmissions. This should be done even in cases where the identity of the patient is hidden.

Assessment

Online assessment is an unexplored field in the landscape of Indian medical education. The current assessment is usually done by written examination known as theory and skill assessment for medical laboratory and clinical scenarios referred commonly as practical.[8] The major challenge in online assessment is the apprehension about integrity of the student. Plagiarism is a well identified problem, apart from other modes of dishonest practices difficult to monitor in online mode. The field of vision of the video transmitting camera as well as the dimensions it captures, is limited as opposed to the access of the teacher in a real setting. Teachers and students are not used to being recorded during examinations. As there is a high probability that the assessment process will be recorded when conducted online, there is a need to develop checklists for scoring the students and thus minimise subjective bias and other related issues. Non-availability of patients for conducting assessments is another issue. Reliable internet connectivity which is not the case everywhere in India is an essential prerequisite for conducting assessments.[1]

Suggested solutions: With the reasons cited above online assessment becomes a territory where medical educators are very apprehensive to venture in considering the stakes involved but if we can focus on the dictum " assessment for learning" we might be able to use it more efficiently.[9] The reliability of the online programme can be increased by making it a continuous process rather than a one day affair and by incorporating questions which measures thinking and analytical ability so that the concern for open book examination can be forgotten. Online assessment gives more flexibility to develop and use a variety of multimedia content material rather than just the paper-based ones. Plagiarism can be checked by certain online tools, e.g. Originality report generator on Google Classroom. Right now, the multiple-choice questions (MCQs) dominate the pattern of online examination but we also can see the appearance of

objective structured virtual examination (OSVE),[10,11] online presence of a standard patient for examination of certain skills. [12] Online viva voce examination can be conducted by using video calling apps such as Skype etc. MCQ s can be made interesting with the insertion of vignette, image, video and audio clips. [13] The automated marking in MCQs, paperless environment friendly nature, easier maintenance of records are some positive aspects. Formative assessment with continuous feedback is more important for learning rather than summative assessment. This is in line with competency based medical education launched in India last year by Medical Council of India.[14]

Unexplored areas for future research in online medical education

This pandemic related shutdown of medical colleges opened up opportunities towards making a shift to online medical education. Once we adopt online medical education, it will stay with us, in varying degrees. Blended learning i.e. a combination of online technology based learning and real-world exposure can evolve as the new normal in the post-covid world. There are certain unexplored areas in the field of online medical education which need to be carefully explored in the near future by medical educationists.

As a large number of students will be sharing their personal identification data, geolocation, academic progress, and skills including behavioural data, medical institutes need to be clear about data storage, data usage and data sharing policy. Data safety becomes a prime concern as misuse may lead to discrimination and social harm.

In India, the access of online learning resources at this moment, during lockdown is dependent on the device used by the student. It need to be ensured that the learning outcomes of the students are not dependent on their socio economic status and thus creating a digital divide amongst many other existing divisions of the society.

Accessibility status of online teaching by the students with disabilities needs to be understood and addressed. While there are both advantages and disadvantages with online learning for students with disabilities, a contextual evidence-based understanding is lacking.

Integrity in online assessment will be central to inculcate professionalism in the medical students. We need to devise an online assessment system which is fair, valid, reliable as well as ethical.

The pandemic is bleak, but we will keep hope. We will evolve and one of the areas which we will develop is online medical education. The maxim, ‘necessity is the mother of all invention’ rings true today more than ever. With newer challenges, newer technology available, we will usher in an era of a novel, robust, and resilient medical education.

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PANDEMIC CORONA VIRUS DISEASE (COVID-19) AND NON-PHARMACOLOGICAL INTERVENTIONS: AN IMPACT ASSESSMENT FROM INDIA

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ABSTRACT

Introduction: World Health Organization (WHO) declared Corona Virus Disease (COVID-19) as a public health emergency of international concern on 30 January 2020 and later confirmed it as a pandemic on 11 March 2020. In India first case of COVID-19 was detected on 31 January 2020 and as of 14 April 2020; 354 districts were affected and 10,363 confirmed cases were reported. India has adopted various non pharmacological interventions to control the spread of COVID-19 such as nationwide lockdown and social distancing. This study was undertaken to assess the impact of non-pharmacological interventions adopted by India to contain the spread of novel corona virus (SARS CoV-2) during the pandemic period.
Material and Methods: We analyzed the data of number of cases reported to WHO in three weeks prior to announcement of lockdown and three weeks during the lockdown period. Doubling time and rate of spread of COVID-19 cases was calculated to assess the impact of non-pharmacological interventions. Data was entered in MS excel and was analyzed using the software GraphPad Prism version 8.4.2.
Results: The rate of growth of cases was found to be less in the three-week period after lockdown as compared to three-week period before lockdown. The doubling time of cases in three weeks period before and after lockdown was found to be 4 days (95% CI: 3.64 - 4.48) and 5 days (95% CI: 4.65 – 5.29) respectively.
Conclusion: We conclude that non-pharmacological interventions are successful in controlling the spread of COVID-19 outbreak in India.
Key-words: Pandemic, Corona Virus, COVID-19, India

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INTRODUCTION

First case of corona virus disease (COVID -19) caused by novel corona virus currently known as severe acute respiratory syndrome corona virus 2 (SARS CoV-2), was reported from Wuhan, China in December 2019.[1]The disease has spread rapidly across the world and involved 213 countries till date.[2] World Health Organization (WHO) declared COVID-19 as a public health emergency of international concern on 30 January 2020 and later confirmed it as a pandemic on 11 March 2020. In India first cases of COVID-19 was detected on 31 January 2020 and as on 14 April 2020, 354 districts were affected and 10,363 confirmed cases were reported.[3] India has adopted various non-pharmacological interventions to control the spread of COVID-19. These interventions can be classified as: (a) immediate short term measures such as quarantine of travellers, suspension of visas to India, Janata curfew on 22 March 2020 for one day followed by complete nationwide lockdown on 24 March 2020 for next 21 days, and (b) Long term measures such as behaviour change communication focusing on hand hygiene, personal hygiene, respiratory etiquettes, promotes use of mask and social distancing.[4] In addition to the above stated measures, India is focusing on identification of infected individuals by testing symptomatic cases and high risk contacts of a confirmed case of COVID-19. The infected individuals are being isolated and managed in dedicated isolation wards for COVID-19 in the hospitals. The possible exposed individuals are quarantined in identified quarantine facilities and at home. During an epidemic or pandemic the number of cases of the disease increase at a very fast rate and it has potential to spread to other geographical areas in a short span of time. Doubling time is the time period

required for number of cases of a disease to double in the epidemic period. It is the measure of rate of spread of the disease and also helps in evaluating the impact of control measures being adopted to contain the spread of outbreak. Hence present study was conducted with an aim to evaluate the impact of non-pharmacological interventions adopted by India to contain the spread of novel corona virus during the pandemic period.

MATERIAL AND METHODS

Source of data:

Data regarding total number of confirmed cases of COVID-19 in India was obtained from WHO daily situation reports of COVID-19 which are publicly available on WHO website. For the purpose of the study we included the data from 04 March 2020 to 14 April 2020. The government of India had announced a nationwide lockdown for three weeks starting at midnight on 24 March 2020 to slow the spread of COVID-19 outbreak.[4]We analyzed the data of number of cases reported to WHO in three weeks prior to announcement of lockdown and three weeks during the lockdown period.

Doubling time and rate of spread of COVID-19 cases:

Doubling time (T_d) was calculated using the formula, $T_d = (t_1 - t_0) / \log_2(N_1/N_0)$ where N_1 and N_0 are the number of cases at time t_1 and t_0 respectively. In the above formula t_0 is the initial date and t_1 is the end date of the studied time interval.[5]

The exponential growth curve of total number of cases of COVID-19 in India was created for two time periods – (a) before lockdown (04 March 2020 to 24 March 2020) and (b) after lockdown (25 march 2020 to 14 April 2020)

Data analysis:

Data was entered in MS excel and was analyzed using the software GraphPad Prism version 8.4.2.

RESULTS

The number of cases of COVID-19 reported from India from 04 March 2020 to 14 April 2020 was analyzed in two time periods (before and after lockdown) as shown in figure 1. The number of cases showed an exponential increase over time. The rate of growth of cases was found to be less in the three-week period after lockdown as compared to three-week period before lockdown.

Figure 2 shows comparison of doubling time of reported cases of COVID-19 in India before and after the lockdown on weekly basis. We found doubling time of 4 days (95% CI: 3.64 - 4.48) in three-week period prior to lock down and on further analysis according to week it was found to be 4.5 days in first week, 5 days in second week and 3.5 days in third week. After lockdown doubling time of cases increased to 6 days in first week followed by decline to 4 days in second week and again increased to 6 days in third week. In the entire three-week period after the nationwide lockdown doubling time was found to be 5 days (95% CI: 4.65 – 5.29).

DISCUSSION

COVID-19 is a major public health emergency in India in the current scenario. Major non-pharmacological interventions were initiated by the government to control this outbreak including nationwide lockdown.

After analysis it was found that rate of increase of cases has decreased after the implementation of non-pharmacological intervention in India. Similar results were observed from other countries where lockdown was implemented in response to COVID-19 Pandemic like China.[6,7] Doubling time of cases of COVID-19 in India was found to increase from 4 days to 5 days following the implementation of lockdown. But the increase in the doubling time was found to be less compared to China where the increase was two times after lockdown.[6] This difference observed in doubling time could be due to variation in implementation of the containment measures and their feasibility in various settings as well as the variation in transmission rate of disease. Transmission rate of disease in a country is determined by the following factors- (a) expected number of susceptible persons coming in contact with confirmed cases during the infectious period which is influenced by population density in various settings of contact, (b) probability of transmission of disease per contact which is influenced by personal hygiene practices for prevention of COVID-19 such as hand hygiene and respiratory etiquette, and (c) environmental factors such as survival of the infectious agent on the surfaces and fomites.

On further analysis of doubling time it was found that in the first week following lockdown the doubling time was 6 days and in the second week it decreased to 4 days. This could be due to the probable effect of religious congregation at Nizamuddin, New Delhi and some challenges faced in implementation in physical distancing. Further it was observed that doubling time increased to 6 days in third week which could be explained by following strict containment measures in the identified areas with active transmission.

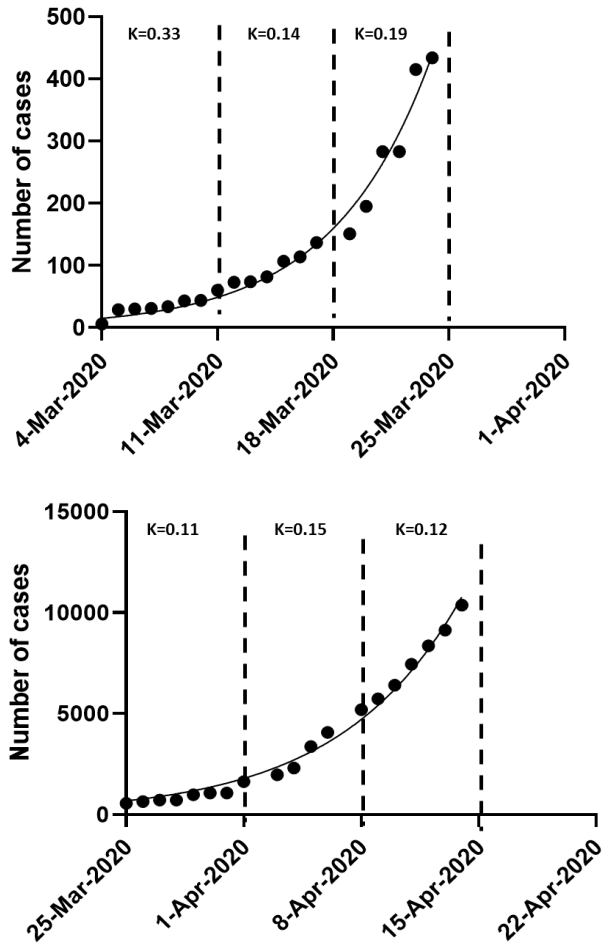

Fig 1 Cumulative number of cases of COVID-19 (A) Before lockdown and (B) After lockdown in India. In the figure, K is the growth rate constant

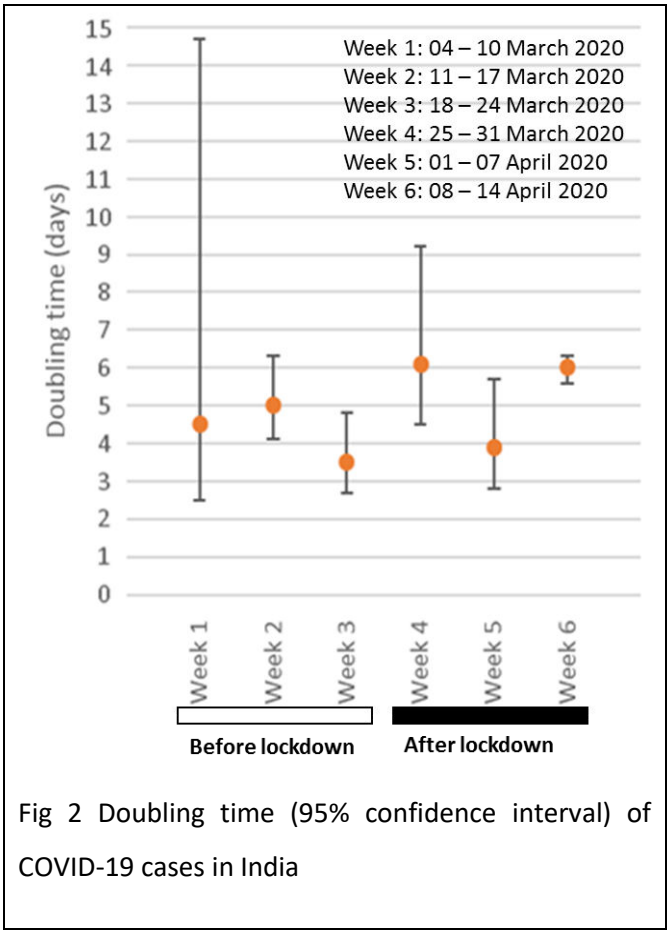

Fig 2 Doubling time (95% confidence interval) of COVID-19 cases in India

LIMITATION:

(1) Our study cannot differentiate which of the non-pharmacological measures was most successful as we assessed the effect of all measures taken for the control of the outbreak. (2) The countries where the virus is spreading with a much faster rate are climatically different from India and there could have been effect of environmental factors like temperature and humidity on the spread of the virus. The role of environmental factors in spread of the virus was not the part of present study.

CONCLUSION:

Non-pharmacological interventions are successful in controlling the rate of spread of COVID-19 outbreak in India in short term but inadequate implementation can lead to resurgence of cases. On the basis of present study, it can be recommended that for the control of COVID-19 in India surveillance system should be strengthened to identify areas with active transmission of COVID-19 (hotspots) and strict implementation of lockdown and other measures can help to prevent the spread of virus.

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ASYMPTOMATIC COVID-19: AN ADDITIONAL CHALLENGE

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ABSTRACT

The SARS-Cov-2 is a novel coronavirus that was first identified in Wuhan, China at the end of the year 2019. As on June 09, 2020, there were 6,992,010 confirmed cases of COVID-19, including 403,128 deaths. COVID-19 has a diverse clinical presentation, ranging from mild respiratory infection to Acute Respiratory Distress Syndrome (ARDS). Studies have found that asymptomatic patients can play a vital role in spreading the virus.

We conducted a literature search during the months of May and June, 2020 for case reports and case series of asymptomatic patients, using three primary databases, WHO and Pub Med. Preferred Reporting Items for Systematic Reviews and Meta-Analysis (PRISMA) guidelines were used. 15 articles were included in the final review.

Our results show that about 7.1% of patients were asymptomatic. These patients can be potential sources of infection. Hence, screening of all the patients for COVID-19 infection even in absence of symptoms is important to identify these patients and isolate them.

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INTRODUCTION

The SARS-Cov-2 is a novel coronavirus that was first identified in Wuhan, China at the end of the year 2019. This virus has shown to cause a respiratory illness and has grown to be a global pandemic as declared by the World Health Organization in March 2020 [(1)]. As on June 09, 2020, there were 6,992,010 confirmed cases of COVID-19, including 403,128 deaths [(1)].

SARS-CoV-2 is an RNA virus and is believed to mainly affect the respiratory tract. However, complications related to systems other than the respiratory system have also been seen. It is also worth noting that COVID-19 has a diverse clinical presentation, ranging from asymptomatic infection to Acute Respiratory Distress Syndrome. The WHO estimates that serious illness may occur in as many as 13.8% of cases and 6.1% are critical [(1)].

Although, there have been instances where people with no apparent symptoms were found positive for COVID-19 infection with RT-PCR testing or with incidental evidence of pneumonia that were noted while performing computed tomography scan of the chest for identifying other underlying diseases.

Studies have found patients that present with no signs and symptoms to be infectious [(2,3)]. A liberal strategy for universal testing, contact tracing and subsequent self-isolation of individuals who test positive for SARS-CoV-2, and precautionary self-isolation of close contacts, is critical [(4)]. Reservations about the 14 day quarantine period have been reported by Mao et al as this period was based only on observations [(3)].

While research is focusing on the epidemiology, transmission, vaccine-development, and therapeutics for COVID-19, there remain gaps in our understanding of the natural history of this disease. In this review of the current and latest literature, we have compared the number of

asymptomatic and symptomatic patients. We also lay emphasis on the importance of contact tracing as asymptomatic patients can be a source of potential transmission.

MATERIAL AND METHODS

A literature review has been done on the asymptomatic cases of COVID-19.

Search method and Strategy

We conducted a literature search from 7 May, 2020 to 4 June, 2020 for case reports and case series of asymptomatic patients. Primary databases that were used for the search are WHO and Pub Med. The search strategy used the keywords: coronavirus, COVID-19, asymptomatic, carriers and its combinations. All steps of searches were done based on the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) checklist [5]. (See Figures 1 and 2)

Data Screening and eligibility

The final review articles fulfilled the following criteria:

1. Reported asymptomatic patients and how they were identified.
2. Included patient data regardless of age, gender or location.
3. Full text, peer-reviewed articles.
4. In English language

The exclusion criteria were as follows:

1. Full texts not available
2. No patient data, laboratory studies, studies done on animal subjects/models
3. Studies pertaining to SARS CoV-1 and MERS

In doing so, we had 15 articles [6–20] for the final review (Table 1). Each paper was reviewed by both the reviewers independently, and disagreements were discussed and resolved via a consensus.

Data collection and Analysis

Data was collected in the following categories when available:

1. Study design
2. Study country
3. Patient demographics
4. Number of asymptomatic cases
5. Number of symptomatic cases
6. Identification of asymptomatic cases
7. Laboratory and radiological findings
8. Treatment

Our review included studies from various countries from across the globe. The studies used have been listed in Table 1.

We tabulated the data using Microsoft Excel. Referencing was done according to guidelines using Endnote.

This study did not require ethical approval as data was obtained from already available databases, and patients were not directly involved.

Risk of Bias Assessment

Both the authors independently assessed the risk of bias of each study included. The following judgments were used: low risk, high risk, or unclear (either lack of information or uncertainty over the potential for bias). Authors resolved disagreements by a consensus.

Assessment of studies was done using NIH Quality Assessment Tool for Case Series Studies [21]. (See Table 2).

An asymptomatic case has been defined as a laboratory-confirmed COVID-19 infection case who is afebrile and well [22].

RESULTS

The final analysis includes five case reports and ten case series. The study reports a total of 1,215 COVID positive patients with 614 males (50.53%) and 601 females (49.47%). The male: female ratio is 1.02: 1. The complete age range was included (Table 3).

The total number of asymptomatic patients was 86 i.e. 7.1% of patients were found to be asymptomatic. While the total number of symptomatic patients was 1,129, the ratio of asymptomatic to symptomatic patients was evaluated to be 0.08:1 (Table 4).

Our results show that COVID-19 infection does not always present with symptoms and a significant number of asymptomatic patients prevail. These patients can be potential sources of infection. Hence, identification of such patients becomes of prime importance as it may potentiate the spread of virus among the people.

DISCUSSION

Said to be the third epidemic in the 21st century, the current outbreak of SARS-CoV2 (COVID-19) caused by coronavirus, after SARS and MERS, has affected millions of people across the continents. COVID-19 infection has shown to have variable presentation ranging from mild respiratory symptoms to severe pneumonia and may lead to multi-organ failure and death [23]. Main symptoms include fever, cough, sore throat, diarrhea, fatigue and myalgia. Imaging studies have revealed ground glass opacities in one or both lungs to be the most common finding.

However, a number of positive patients with either no such symptoms or with atypical findings have also been reported by a few studies. Alkeridy Walid A. et al. suspect that new onset delirium and an episode of fall in an otherwise asymptomatic patient may be considered as an atypical presentation of COVID-19 infection [13]. While latest reports have also noted cutaneous lesions like purpuric macula-papular lesions on the fingers, toes and heels, chilblain-like lesions and swelling with edema and erythema to be the only presenting symptoms in a few positive cases [24]. Although, very little is known about the atypical presenting symptoms and requires further clinical research.

With that said, these variations in presentation and lack of symptoms have made it more challenging for the health care professionals to recognize the positive individuals. Our review focuses on accumulation of recently published data on patients who lack the common symptoms as they may play a vital role in transmission of the virus and pose difficulties in confining its further spread.

From the 1,215 patients reviewed in our study, 86 cases (7.1%) were found to be asymptomatic, ratio of asymptomatic to symptomatic patients being 0.08: 1 (Table 4). In the cases reported by Domenico Albano et al. and Castanheira Joana et al., ground glass opacities in the lungs were noted as incidental finding while performing imaging studies in view of other underlying diseases, which led the physicians to suspect the presence of virus-induced pneumonia but with no apparent respiratory symptoms [16, 17]. This raised the need for screening all the patients for COVID-19 infection before undergoing any procedure and surgeries to ensure the safety of the patients, physicians and other health workers. A known COVID-19 status will help the medical staff in considering appropriate protective equipment so as to prevent the infection.

The fact that asymptomatic patients may be a nidus for the spread of the virus cannot be ignored. This was well illustrated in a study by Yang Li et al., wherein four out of the eight cases that were reported in the study did not have any close contact with the laboratory-confirmed COVID-19 patients nor did they have a travel history to or from Wuhan [6]. Having said this, the suspicion of these patients being in contact with asymptomatic individuals arises, mandating the requirement of universal contact tracing.

However, our study has a few limitations. The presented clinical data is accumulated from a small number of case reports and case series available, most of which are studies published in China. Thus, there is a need for more patient data and research from countries that have faced the struggle of identifying and managing the surge of positive cases. A precise number and percentage of asymptomatic patients that may prevail among the people may be derived by considering a large sample size that correctly represents the global population.

CONCLUSION

Our results show that COVID-19 infection does not always present with symptoms and may even lack the evidence of COVID-19-induced pneumonia on imaging studies, making an easy escape for asymptomatic patients from being recognized. These patients can be potential sources of infection. To ensure the safety of the people, physicians and health care workers, screening of all patients, even those with no symptoms is important so as to correctly identify and isolate the positive patients. Universal contact tracing, better protocols and laboratory standards, adequate sampling and high quality RT-PCR kits may help in recognizing the cases earlier. Further research on the natural history of the disease is needed.

Figure 1 : Preferred Reporting Items for Systematic Reviews and Meta-Analysis (PRISMA) flow chart

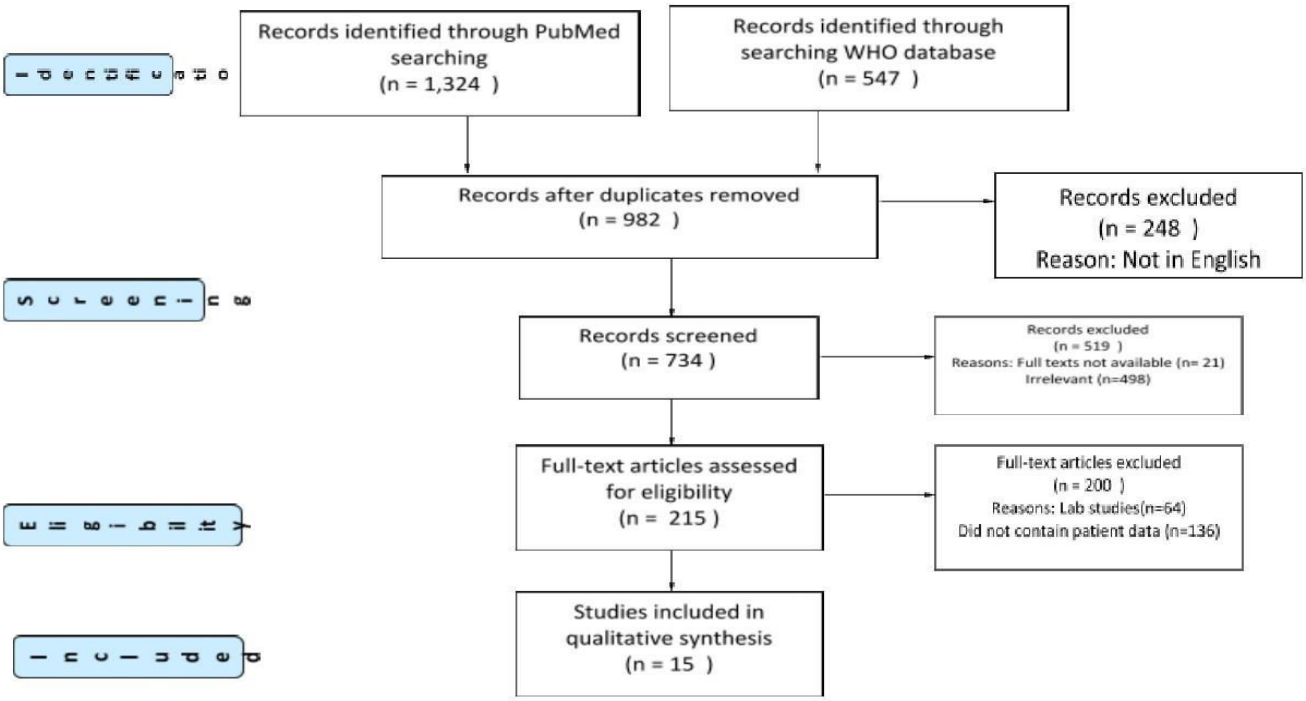

FIGURE 2: PRISMA Checklist

Section/topic	#	Checklist item	Reported on page #
TITLE			
Title	1	Identify the report as a systematic review, meta-analysis, or both.	1
ABSTRACT			
Structured summary	2	Provide a structured summary including, as applicable: background; objectives; data sources; study eligibility criteria, participants, and interventions; study appraisal and synthesis methods; results; limitations; conclusions and implications of key findings; systematic review registration number.	1
INTRODUCTION			
Rationale	3	Describe the rationale for the review in the context of what is already known.	1
Objectives	4	Provide an explicit statement of questions being addressed with reference to participants, interventions, comparisons, outcomes, and study design (PICOS).	1
METHODS			
Protocol and registration	5	Indicate if a review protocol exists, if and where it can be accessed (e.g., Web address), and, if available, provide registration information including registration number.	2
Eligibility criteria	6	Specify study characteristics (e.g., PICOS, length of follow-up) and report characteristics (e.g., years considered, language, publication status) used as criteria for eligibility, giving rationale.	2
Information sources	7	Describe all information sources (e.g., databases with dates of coverage, contact with study authors to identify additional studies) in the search and date last searched.	2
Search	8	Present full electronic search strategy for at least one database, including any limits used, such that it could be repeated.	2
Study selection	9	State the process for selecting studies (i.e., screening, eligibility, included in systematic review, and, if applicable, included in the meta-analysis).	2
Data collection process	10	Describe method of data extraction from reports (e.g., piloted forms, independently, in duplicate) and any processes for obtaining and confirming data from investigators.	2
Data items	11	List and define all variables for which data were sought (e.g., PICOS, funding sources) and any assumptions and simplifications made.	-
Risk of bias in individual studies	12	Describe methods used for assessing risk of bias of individual studies (including specification of whether this was done at the study or outcome level), and how this information is to be used in any data synthesis.	2-3
Summary measures	13	State the principle summary measures (e.g., risk ratio, difference in means).	3
Synthesis of results	14	Describe the methods of handling data and combining results of studies, if done, including measures of consistency (e.g., I^2) for each meta-analysis.	3

Section/topic	#	Checklist item	Reported on page #
Risk of bias across studies	15	Specify any assessment of risk of bias that may affect the cumulative evidence (e.g., publication bias, selective reporting within studies).	2
Additional analyses	16	Describe methods of additional analyses (e.g., sensitivity or subgroup analyses, meta-regression), if done, indicating which were pre-specified.	-
RESULTS			
Study selection	17	Give numbers of studies screened, assessed for eligibility, and included in the review, with reasons for exclusions at each stage, ideally with a flow diagram.	2
Study characteristics	18	For each study, present characteristics for which data were extracted (e.g., study size, PICOS, follow-up period) and provide the citations.	2
Risk of bias within studies	19	Present data on risk of bias of each study and, if available, any outcome level assessment (see item 12).	2-3
Results of individual studies	20	For all outcomes considered (benefits or harms), present, for each study: (a) simple summary data for each intervention group (b) effect estimates and confidence intervals, ideally with a forest plot.	3
Synthesis of results	21	Present results of each meta-analysis done, including confidence intervals and measures of consistency.	-
Risk of bias across studies	22	Present results of any assessment of risk of bias across studies (see Item 15).	2-3
Additional analysis	23	Give results of additional analyses, if done (e.g., sensitivity or subgroup analyses, meta-regression [see Item 16]).	-
DISCUSSION			
Summary of evidence	24	Summarize the main findings including the strength of evidence for each main outcome; consider their relevance to key groups (e.g., healthcare providers, users, and policy makers).	3-4
Limitations	25	Discuss limitations at study and outcome level (e.g., risk of bias), and at review-level (e.g., incomplete retrieval of identified research, reporting bias).	4
Conclusions	26	Provide a general interpretation of the results in the context of other evidence, and implications for future research.	4
FUNDING			
Funding	27	Describe sources of funding for the systematic review and other support (e.g., supply of data); role of funders for the systematic review.	Title Page

Table: 1: Summary of the studies

Authors, Country of study (year)	Total no. of patients in the study	Mean age (in years)	No. of asymptomatic patients	No. of symptomatic patients	Outcome
Wei Li et al., China (2020)	5	3.4	4	1	Still in the hospital for observation: 2 Discharged: 3
Feng Kai et al., China (2020)	15	7.9	8	7	Still in the hospital for observation: 10 Discharged: 5
Wang Duan et al., China (2020)	31	N/A	4	27	Still in the hospital for observation: 7 Discharged: 24
Domenico Albano et al., Italy (2020)	7	64.6	7	0	Not mentioned
Ren Jian-Guo et al., China (2020)	1	15	1	0	Discharged
Rui Huang et al., China (2020)	2	44.5	1	1	Discharged: 2
Castanheira Joana et al., Portugal (2020)	1	65	1	0	Not mentioned
Alkeridy Walid A et al., Saudi Arabia (2020)	1	73	1	0	Patient remained positive on day 13 of admission. Thus, the patient remains in hospital. (isolation ward)
Caroppo Francesca et al., Italy (2020)	1	72	1	0	Not mentioned.
Ma Yan et al., China (2020)	47	23	11	36	Still in the hospital for observation: 2 Discharged: 45
X. Wang et al., China (2020)	1012	50	30	982	Shifted to another hospital: 100 Still in the hospital for observation: 819 Discharged: 93
Ho Yuen Frank Wong et al., Hong kong (2020)	64	56	9	55	Not mentioned.
Corman Victor M et al., Germany (2020)	18	N/A	3	15	Not mentioned.
Wang Ling et al., China (2020)	2	54.5	2	0	Discharge: 2
Yang Li et al., China (2020)	8	2.5	1	7	Remained on ventilator: 1 Isolation ward: 6 Discharged: 1

Table 2: Assessment of studies using NIH Quality Assessment Tool for Case Series Studies (21)

Author and year of study	Was the study question or objective clearly stated	Was the study population clearly and fully described including a case definition	Were the cases consecutive	Were the subjects comparable	Was the intervention clearly described	Were the outcome measures clearly defined, valid, reliable and implemented consistently across all study participants	Was the length of follow-up adequate	Were the statistical methods well Described ?	Were the results well described ?	Quality rating (Good, Fair, Poor)
Wei Li	Yes	Yes	not described	Yes	Yes	Yes	Yes	Yes	Yes	good
Wang Duan	Yes	Yes	not described	Yes	Yes	Yes	Yes	Yes	Yes	good
Domenico Albano	Yes	Yes	not described	Yes	Yes	Yes	not described	Yes	Yes	good
Joana Castanheira	Yes	Yes	N/A	Yes	Yes	Yes	not described	Yes	Yes	good
F. Caroppo	Yes	Yes	N/A	Yes	Yes	Yes	Yes	Yes	Yes	good
Yan Ma	Yes	Yes	not described	Yes	Yes	Yes	Yes	yes	Yes	good
X. Wang	Yes	Yes	not described	Yes	Yes	Yes	Yes	Yes	Yes	good
Ho Yuen Frank Wong	Yes	Yes	not described	Yes	Yes	Yes	Yes	Yes	Yes	good
Victor M. Corman	Yes	Yes	not described	Yes	Yes	Yes	not described	Yes	Yes	good
Ling Wang	Yes	Yes	N/A	Yes	Yes	Yes	not described	Yes	Yes	good
Walid A. Alkeridy	Yes	Yes	N/A	Yes	Yes	Yes	Yes	Yes	Yes	good
Yang Li	Yes	Yes	not described	Yes	Yes	Yes	Yes	Yes	Yes	good
Feng Kai	Yes	Yes	not described	Yes	Yes	Yes	not described	Yes	Yes	good
Jian-guo Ren	Yes	Yes	N/A	Yes	Yes	Yes	Yes	Yes	Yes	good
Rui Huang	Yes	Yes	Yes	Yes	Yes	Yes	not described	Yes	Yes	good

Table 3: Epidemiological Characteristics

Total Number of Cases	1,215
Number of Males	614
Number of Females	601
Male : Female Ratio	1.02 : 1
Number of children	73
Age Range	2.5 years to 73 years

Table 4: Comparison between Asymptomatic and symptomatic Patients

Number of Asymptomatic Patients	86
Percentage of Asymptomatic Patients	7.1%
Number of Symptomatic Patients	1,129
Percentage of Symptomatic Patients	92.9%
Ratio of Asymptomatic : Symptomatic Patients	0.08 : 1

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REVIEW ON NOVEL CORONA VIRUS (COVID-19): STATUS, CHALLENGES AND PROGRESS

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ABSTRACT

Coronavirus disease (COVID-19) was unknown before the outbreak began in Wuhan, China, in December 2019. COVID-19 is now a pandemic affecting nearly 190 countries. As of July 17, 2020, more than 13.9 million people worldwide had been infected with SARS-CoV-2 with more than 5.93 lac deaths. In Saudi Arabia as of now there are overall 245,518 cases and 2407 deaths. Many aspects of transmission, infection, and treatment still remain unclear. Personal characteristics such as age, gender, medical conditions or co-morbidities, diet, nutrition, lifestyle and environmental factors of a COVID-19 infected individual play an important role in deciding the clinical severity of the disease. Until an effective vaccine is available, the primary methods to reduce spread are face masks, social distancing, and contact tracing. Monoclonal antibodies and hyper immune globulin may provide additional preventive strategies. Advances in prevention and effective management of COVID-19 will require clinical investigation and interventions. Individual risk assessment and its management can play a key role in SARS-CoV-2 pandemic.

Keywords: Coronavirus, pandemic, preventive strategy

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INTRODUCTION

Corona viruses are a large family of viruses which may cause illness in animals or humans. In humans, several coronaviruses are known to cause respiratory infections ranging from the common cold to more severe diseases such as Middle East Respiratory Syndrome (MERS) and Severe Acute Respiratory Syndrome (SARS). The most recently discovered novel coronavirus causes Coronavirus disease (COVID-19). This infectious disease was unknown before the outbreak began in Wuhan, China, in December 2019. COVID-19 is now a pandemic affecting many countries globally.

As of July 17, 2020, more than 13.9 million people worldwide had been infected with SARS-CoV-2 with more than 5.93 lac deaths. In Saudi Arabia as of now there are overall 245,518 cases and 2407 deaths 1. (Table 1)\

Table 1: Number of COVID confirmed cases and deaths in Saudi Arabia

Location	Confirmed	Deaths
Makkah Province	67,223	1,174
Eastern Province	64,352	235
Riyadh Province	59,871	692
Al Madinah Province	17,563	111
Aseer Province	14,978	33

Clinical manifestations:

The SARS-CoV-2 is spread primarily via respiratory droplets by close face-to-face contact. Infection can be spread by asymptomatic, presymptomatic, and symptomatic carriers. The

most common symptoms are fever, dry cough, and shortness of breath. Diagnosis is made by detection of SARS-CoV-2 via reverse transcription polymerase chain reaction testing however; this is dependent on the quality and timing of testing which gives false negative reports.

The manifestations of COVID-19 include asymptomatic carriers and fulminant disease characterized by acute sepsis and acute respiratory failure. Approximately 5% of patients with COVID-19, and 20% of those hospitalized, experience severe symptoms necessitating intensive care. More than 75% of patients hospitalized with COVID-19 require supplemental oxygen. Ongoing trials are testing antiviral therapies, immune modulators, and anticoagulants. The case-fatality rate for COVID-19 varies markedly by age, ranging from 0.3 deaths per 1000 cases among patients aged 5 to 17 years to 304.9 deaths per 1000 cases among patients aged 85 years or older in the US. At least 120 SARS-CoV-2 vaccines are under development.

Pathophysiology:

Coronaviruses are large, enveloped, single-stranded RNA viruses found in humans and other mammals, such as dogs, cats, chicken, cattle, pigs, and birds. Coronaviruses cause respiratory, gastrointestinal, and neurological disease. The most common coronaviruses in clinical practice are 229E, OC43, NL63, and HKU1, which typically cause common cold symptoms in immunocompetent individuals. SARS-CoV-2 is the third coronavirus that has caused severe disease in humans to spread globally in the past 2 decades[2]. The first coronavirus that caused severe disease was severe acute respiratory syndrome (SARS), which was thought to originate in Foshan, China, and resulted in the 2002-2003 SARS-CoV pandemic[3] .The second was the coronavirus-caused Middle East respiratory syndrome (MERS), which originated from the Arabian peninsula in 2012[4].

Transmission of SARS-CoV-2 Infection

Epidemiologic data suggest that droplets expelled during face-to-face exposure during talking, coughing, or sneezing is the most common mode of transmission. Prolonged exposure to an infected person (being within 6 feet for at least 15 minutes) and briefer exposures to individuals who are symptomatic (eg, coughing) are associated with higher risk for transmission, while brief exposures to asymptomatic contacts are less likely to result in transmission[5]. Transmission may also occur via aerosols (smaller droplets that remain suspended in air), but it is unclear if this is a significant source of infection in humans outside of a laboratory setting[6-8]. The existence of aerosols in physiological states (eg, coughing) or the detection of nucleic acid in the air does not mean that small airborne particles are infectious[9]. Maternal COVID-19 is currently believed to be associated with low risk for vertical transmission. In most reported series, the mothers' infection with SARS-CoV-2 occurred in the third trimester of pregnancy, with no maternal deaths and a favorable clinical course in the neonates[10-12].

Symptoms of COVID 19

The most common symptoms of COVID-19 are fever, dry cough, and tiredness. Other symptoms that are less common and may affect some patients include aches and pains, nasal congestion, headache, conjunctivitis, sore throat, diarrhea, loss of taste or smell or a rash on skin or discoloration of fingers or toes. These symptoms are usually mild and begin gradually. Some people become infected but only have very mild symptoms or even asymptomatic.

Most people (about 80%) recover from the disease without needing hospital treatment. Around 1 out of every 5 people who gets COVID-19 becomes seriously ill and develops difficulty breathing. Older people, and those with underlying medical problems like high blood pressure, heart and lung problems, diabetes, or cancer, are at higher risk of developing serious illness. However, anyone can catch COVID-19 and become seriously ill. People

of all ages who experience fever and/or cough associated with difficulty breathing/shortness of breath, chest pain/pressure, or loss of speech or movement should seek medical attention immediately.

Protection against COVID-19

Practicing hand and respiratory hygiene is important at all times and is the best way to protect others and yourself. Whenever possible maintain at least a 1 meter distance between yourself and others. This is especially important if you are standing by someone who is coughing or sneezing. Since some infected persons may not yet be exhibiting symptoms or their symptoms may be mild, maintaining a physical distance with everyone is a good idea if you are in an area where COVID-19 is circulating. Until an effective vaccine is available, the primary methods to reduce spread are face masks, social distancing, and contact tracing. Monoclonal antibodies and hyper immune globulin may provide additional preventive strategies.

Self Isolation

Self-isolation is an important measure taken by those who have COVID-19 symptoms to avoid infecting others in the community, including family members. Self-isolation is when a person who is experiencing fever, cough or other COVID-19 symptoms stays at home and does not go to work, school or public places. This can be voluntarily or based on his/her health care provider's recommendation. If a person is in self-isolation, it is because he/she is ill but not severely ill (requiring medical attention) should do the following:

- stay in a large, well-ventilated area with hand-hygiene and toilet facilities
- If this is not possible, place beds at least 1 meter apart
- Keep at least 1 meter from others, even from the family members
- Self monitor the symptoms daily & isolate for 14 days, even if you feel healthy
- If you develop difficulty breathing, contact your healthcare provider immediately – call them first if possible
- Stay positive and energized by keeping in touch with loved ones by phone or online, and by exercising yourself at home.

Precautionary Measures

The chances of being infected or spreading COVID-19 by taking some simple precautions can be reduced by the following measures:

- Regularly and thoroughly clean the hands with an alcohol-based hand rub or wash them with soap and water. Why? Washing your hands with soap and water or using alcohol-based hand rub kills viruses that may be on your hands.
- Maintain at least 1 meter distance with others. Why? When someone coughs, sneezes, or speaks they spray small liquid droplets from their nose or mouth which may contain virus. If you are too close, you can breathe in the droplets, including the COVID-19 virus if the person has the disease.
- Avoid going to crowded places. Why? Where people come together in crowds, you are more likely to come into close contact with someone that has COVID-19 and it is more difficult to maintain physical distance of 1 meter.
- Avoid touching eyes, nose and mouth. Why? Hands touch many surfaces and can pick up viruses. Once contaminated, hands can transfer the virus to your eyes, nose or mouth.
- Make sure you, and the people around you, follow good respiratory hygiene. This means covering your mouth and nose with your bent elbow or tissue when you cough or sneeze.
- Stay home and self-isolate even with minor symptoms such as cough, headache, mild fever, until you recover. If you have a fever, cough and difficulty breathing, seek

medical attention, but call by telephone in advance if possible and follow the directions of your local health authority.

Prevention and Vaccine Development

COVID-19 is a potentially preventable disease. The relationship between the intensity of public health action and the control of transmission is clear from the epidemiology of infection around the world[13-16]. However, because most countries have implemented multiple infection control measures, it is difficult to determine the relative benefit of each[17,18].

In general, these interventions can be divided into those consisting of personal actions (eg, physical distancing, personal hygiene, and use of protective equipment), case and contact identification (eg, test-trace-track-isolate, school or workplace closure), regulatory actions (eg, governmental limits on sizes of gatherings or business capacity; stay-at-home orders; proactive school, workplace, and public transport closure or restriction), and international border measures. The evidence underlying these public health interventions has not changed since the 1918 flu pandemic[19]. Empirical evidence support that public health interventions, including home quarantine after infection, restricting mass gatherings, travel restrictions, and social distancing, are associated with reduced rates of transmission[20-22].

A human vaccine is currently not available for SARS-CoV-2, but approximately 120 candidates are under development. Approaches include the use of nucleic acids (DNA or RNA), inactivated or live attenuated virus, viral vectors, and recombinant proteins or virus particles[23,24]. Other considerations include the potential duration of immunity and thus the number of vaccine doses needed to confer immunity[25]. More than a dozen candidate SARS-CoV-2 vaccines are currently being tested in phase 1-3 trials. Other approaches to prevention are likely to emerge in coming months, including monoclonal antibodies, hyper immune globulin, and convalescent titer.

Conclusion and Relevance

Many aspects of transmission, infection, and treatment remain unclear. Advances in prevention and effective management of COVID-19 will require basic and clinical investigation and public health and clinical interventions. Personal characteristics such as age, gender, medical conditions or co-morbidities, diet, nutrition, lifestyle and environmental factors of a COVID-19 infected individual play an important role in deciding the clinical severity of the disease. Individual risk assessment and its management can play a key role in SARS-CoV-2 pandemic.

Limitations

This review has several limitations. First, information regarding SARS CoV-2 is limited. Second, information provided here is based on current evidence, but may be modified as more information becomes available. Third, few randomized trials have been published to guide on the management of COVID-19. The development of a potent and effective vaccine is still awaited.

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COVID-19 & CO-MORBIDITIES: A GLOBAL CONCERN

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ABSTRACT

Patient of any age may develop mild to severe respiratory illness, and those having chronic diseases are more susceptible to COVID-19. The risk of death from COVID-19 strongly depends on older age and pre-existing health conditions or certain underlying medical conditions. The published evidence from China and India on COVID-19 has reported the pre-existing chronic medical conditions that put individuals at increased risk for severe COVID-19 illness including hospitalization, intensive care, intubation or mechanical ventilation and/or death. Patients with pre-existing health conditions or co-morbidities are recommended to follow strictly all the basic preventive measures and keep receiving and complying with the appropriate healthcare management.

Keywords: COVID-19, Co-morbidities, severe illness, deaths

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INTRODUCTION

Patient of any age may develop mild to severe respiratory illness, and those having chronic diseases are more susceptible to COVID-19. The risk of death from COVID-19 strongly depends on older age and pre-existing health conditions or certain underlying medical conditions. Older patients and those with chronic co-morbidities, such as cardiovascular disease (CVD), hypertension (HTN), diabetes mellitus(DM), pulmonary disease and immune-suppressed are much more prone to critical and fatal disease outcomes. [1] The established risk factors increasing the susceptibility to severe infection and mortality include - Respiratory Disease (Asthma and Chronic lung Diseases), Hypertension, Diabetes Mellitus, Serious Heart Conditions (Coronary Heart Disease (CHD), Heart Failure, Congenital Heart Disease, Cardiomyopathies, and Pulmonary Hypertension), Obesity, Chronic Kidney Disease (CKD), Liver disease including hepatitis, Immuno-compromised patients including those on cancer therapies, Bone marrow or organ transplantation, and those suffering from immune deficiencies, poorly controlled HIV or AIDS, and prolonged use of corticosteroids, immunosuppressants and Smoking. Use of Biologics (THF and Interleukin inhibitors), History of transplant and other

immunosuppression, HIV and CD4 count < 200 cells/µl are possible epidemiologic risk factors for severe COVID-19.

COVID-19 & co-morbidities

Recent data on COVID-19 suggest that a higher proportion of severe illness or deaths are among those aged above 65 years and more likely among those who have co-morbidity such as hypertension, diabetes, cardiovascular disease, or chronic lung disease. (Table 1) Differential neutrophil count and RBS levels can be used as early screening tools of mortality risk in COVID-19 patients and they assist in further patient management. A combination of real-time RT-PCR and clinical features facilitates management of COVID - 19 outbreak. (Table 2)

The published evidence from China and India (table-1 & 2) on COVID-19 has reported the pre-existing chronic medical conditions that put individuals at increased risk for severe COVID-19 illness including hospitalization, admission to the intensive care, intubation or mechanical ventilation and/or death.

On the contrary, a recent study in Berlin [10], Germany observed data on clinical and autoptic causes of death and co-morbidities of 26 non-survivors after COVID-19 and revealed that causes of death were directly related to COVID-19 in most of the cases and not an immediate consequence of pre-existing health conditions and co-morbidities, i.e. these patients – despite often suffering from severe health conditions – would not have died in the absence of COVID -19 at the given point of time.

Although COVID-19 can affect any group but the older people are at the higher risk of serious disease. The immune systems of older adults weaken with age, making it harder to fight off infections. Also, older adults commonly have chronic diseases that can increase the risk of severe illnesses from COVID-19. All prescribed medications for any underlying health conditions should be continued and the advice of the healthcare provider should be followed. Health care plan for the elderly summarizing health conditions and current treatments should be adhered and complied strictly.

CONCLUSION

Patients with pre-existing health conditions or co-morbidities are recommended to follow strictly all the basic preventive measures and keep receiving and complying with the appropriate healthcare management. At least a 30-day supply of medicines should be maintained to avoid frequent visits to the pharmacy and unnecessary exposure.

While there is no specific treatment approved currently, preventive and promotive measures reduce the risk of contracting the disease in susceptible individuals. Personal characteristics such as age, medical conditions or co-morbidities, diet, nutrition, lifestyle and environmental factors of a COVID-19 infected individual play an important role in deciding the clinical severity of the disease. Individual risk assessment and its proper management play a key role in combating COVID-19 pandemic.

Table 1: Summary of recent studies regarding COVID-19 morbidity and mortality from China

Study details	Key findings & Interpretations
➢ Ruchong Chen et al [3] ➢ Retrospective cohort study. ➢ 575 hospitals in China. ➢ 1,590 hospitalized patients	Non-survivors included elderly people and subjects with coexisting chronic illness, dyspnea, and laboratory abnormalities on admission compared with survivors. Multivariate Cox regression analysis showed following independent risk factors associated with fatal outcome: age ≥ 75 years (hazard ratio [HR], 7.86; 95% CI, 2.44-25.35), age between 65 & 74 years (HR, 3.43; 95% CI, 1.24-9.5), CHD (HR, 4.28; 95% CI, 1.14-16.13), CVD (HR, 3.1; 95% CI, 1.07-8.94), dyspnea (HR, 3.96; 95% CI, 1.42-11), procalcitonin level > 0.5 ng/mL (HR, 8.72; 95% CI, 3.42-22.28), & aspartate aminotransferase level > 40 U/L (HR, 2.2; 95% CI, 1.1-6.73).
➢ Jing Yang et al [4] ➢ Meta-analysis ➢ Studies from China ➢ 1576 infected patients	The most prevalent co-morbidities were HTN (21.1%, 95% CI: 13.0-27.2%) ,diabetes (9.7%, 95% CI: 7.2-12.2%), followed by CVD (8.4%, 95% CI: 3.8-13.8%) and respiratory system disease (1.5%, 95% CI: 0.9-2.1%). When compared between severe and non-severe patients, the pooled OR of HTN, respiratory system disease, and CVD were 2.36 (95% CI: 1.46-3.83), 2.46 (95% CI: 1.76-3.44) and 3.42 (95% CI: 1.88-6.22) respectively.
➢ Fei Zhou et al [5] ➢ Retrospective cohort study ➢ Jinyintan Hospital, Wuhan Pulmonary Hospital, China. ➢ 191 adult inpatients.	HTN was the commonest co-morbidity, followed by DM and CHD. Multivariable regression showed increasing odds of in-hospital death associated with older age (odds ratio 1 · 10, 95% CI 1 · 03–1 · 17, per year increase; p=0 · 0043), higher Sequential Organ Failure Assessment (SOFA) score (5 · 65, 2 · 61–12 · 23; p<0 · 0001), and d-dimer greater than 1 μg/mL (18 · 42, 2 · 64–128 · 55; p=0 · 0033) on admission. Median duration of viral =shedding was 20 · 0 days (IQR 17 · 0–24 · 0) in survivors, but SARS-CoV-2 was detectable until death in non-survivors. The potential risk factors of older age, high SOFA score, and d-dimer greater than 1 μg/mL could help clinicians to identify patients with poor prognosis at an early stage.
➢ Chen et al [6] ➢ Retrospective case series ➢ Tongji Hospital, Wuhan. ➢ 799 critical patients.	The median age of deceased patients (68 years) was significantly older than recovered patients (51 years). Male sex was more predominant in deceased patients (83; 73%) than in recovered patients (88; 55%). Chronic hypertension and other cardiovascular comorbidities were more frequent among deceased patients (54 (48%) and 16 (14%)) than recovered patients (39 (24%) and 7 (4%)). Acute respiratory distress syndrome and respiratory failure, sepsis, acute cardiac injury, and heart failure were the most common critical complications during exacerbation of covid-19.
➢ Zunyou Wu et al [1] ➢ Case series ➢ Mainland China ➢ 44 672 confirmed cases.	The overall case-fatality rate (CFR) was 2.3% (1023 deaths among 44 672 confirmed cases). Cases aged 70 to 79 years had an 8.0% CFR and cases aged 80 years and older had a 14.8% CFR. The CFR was 49.0% among critical cases. CFR was elevated among those with preexisting comorbid conditions—10.5% for cardiovascular disease, 7.3% for diabetes, 6.3% for chronic respiratory disease, 6.0% for hypertension, and 5.6% for cancer. A total of 1716 were health workers (3.8%). Overall, 14.8% of confirmed cases among health workers were classified as severe or critical and 5 deaths were observed.

Table 2: Summary of recent studies regarding COVID-19 from India

Study details	Key findings & Interpretations
➢ Bhattacharya et al [7] ➢ Retrospective case series. ➢ New Delhi, India ➢ 298 confirmed cases	Majority were males (75.8%) with mean age of 39.07 years (0.6-88 years). The mean duration from symptom onset to first positive RT-PCR was 4.7 days (SD 3.67), while that of symptom onset to last positive test was 17.83 days (SD 6.22). Proportions of positive RT-PCR tests were 100%, 49%, 24%, 8.7% and 20.6% in the 1st, 2nd, 3rd, 4th & >4 weeks of illness. 12 symptomatic patients had prolonged positive test results even after 3 weeks of symptom onset. Age >= 60 years was associated with prolonged RT-PCR positivity. Study showed that the average period of PCR positivity is more than 2 weeks in COVID-19 patients; elderly patients have prolonged duration of RT-PCR positivity and requires further follow up.
➢ Bhandari S et al [8] ➢ Retrospective case–control study. ➢ Rajasthan, India ➢ 70 inpatients	A predictor model of mortality risk from routine hematologic parameters was developed. It was observed that differential neutrophil count (%) and random blood sugar are the statistically significant regressors. The performance metrics of the model with 5-fold cross-validation showed area under the receiver operating characteristic curve, sensitivity, specificity, and validation accuracy to be 0.95, 90%, 92%, and 70%, respectively. The cutoff probability came out at 0.30 for the outcome (non survivor as success).
➢ Gupta N et al [9] ➢ Descriptive case series. ➢ New Delhi, India ➢ 21 confirmed cases	More than half (57.1%) of the patients were symptomatic. The common presentation experienced by nine patients was cough and fever. Sore throat, breathlessness, and headache were present in 5(23.8%), 1(4.8%), 3 (13.6%), respectively. Six patients (28.6%) had comorbidities. The most common comorbidity was hypertension (5 patients) and diabetes mellitus (3 patients) adequately controlled with drugs. One (4.8%) patient with hypertension and one with diabetes mellitus also showed anxiety disorder and hypothyroidism.

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COVID-19 AND THE GERIATRIC POPULATION: EFFECTS BEYOND THE INFECTION

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Dear Editor,

As SARS-CoV-2 is advancing rapidly, the number of infected individuals has crossed the 7 million mark including 0.4 million deaths as of June 13, 2020. The demographic data presented in the recent studies show that the older population has been affected more severely than any other age group. Countries with higher number of older adults, like Italy, which is said to have the second oldest population worldwide, has been hit hard by the pandemic [(1)].

The older adults are considered at a higher risk as with age: (a) likeliness of having chronic conditions increases; (b) immune system weakens, making the host more vulnerable to infections of all types. If the immune system gears up, a phenomenon called "cytokine storm" is likely to occur, where the immune system produces excessive inflammatory substances to fight the infections, which may also lead to organ failure. Adults with co-morbidities may also have modifications in the angiotensin-converting enzyme 2 (ACE 2) receptors, through which the virus is said to enter the host cell [(2)].

COVID-19 infection mainly affects the respiratory system and spreads through aerosols and close contact. The incubation period is 4-6 days and most patients develop symptoms within 11 days of exposure [(3)]. Prominent symptoms include fever, dyspnoea, cough, diarrhoea, myalgia, and fatigue. Imaging studies report ground-glass opacities involving one or both the lungs in the affected individuals. Older adults are more likely to have multiple lobe lesions [(4)]. The laboratory tests in the elderly have low levels of lymphocytes, attributing to reduced defence function in the elderly. While elevated levels of neutrophils, C-reactive protein, interleukin-6, and very high levels of angiotensin II were noted [(2)].

Kai Liu et al. illustrated that ARDS in the elderly group was higher (22.22%) than in the young and middle-aged group (5.26%) [(4)]. The study also reported that more number of older patients required ICU admission (9.6% vs. 1.4%, $P < 0.001$) and may progress to severe disease as compared to patients less than 60 years of age [(4)]. Therefore, mortality rate, being higher i.e.10-12% among the elderly [(5)].

In conclusion, COVID-19 infection poses a severe threat among older individuals than any other age group. This calls for rapid production of vaccines and promising treatment regimens. Isolating the elderly may mitigate the transmission of the virus and delay the surge in the cases. Many older patients require intubation and prolonged use of mechanical ventilation, a shortage of ventilators has arisen. This is challenging for the medical staff as they may face difficulties in making a decision concerning life-sustaining care. Thus, to alleviate such issues, implementation of standard protocols is needed. Provision of all the necessities including medications, groceries at the doorstep for the older individuals may prevent infection among them. Staffs of the old-age and nursing homes may be informed regarding the threat imposed on the elderly and guide them towards adapting sanitization methods, using aseptic wipes to clean

surfaces and social distancing. The psychological effects and mental well-being of the elderly during this time of social distancing need special attention. Peer support and cognitive behavioural therapies could be delivered online to avoid loneliness and promote mental well-being of the elderly.

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