



Covid-19: Preventive Measures, Vaccination and Way Forward: A Review

Snarvia Khambra^{a#} and Swaroopa Chakole^{b*†}

^a *Department of Community Medicine, Jawaharlal Nehru Medical College, Datta Meghe Institute of Medical Sciences (Deemed to be University), Sawangi (Meghe), Wardha-442001, Maharashtra, India.*

Authors' contributions

This work was carried out in collaboration between both authors. Both authors read and approved the final manuscript.

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Review Article

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ABSTRACT

Background: COVID-19 or coronavirus disease 2019 is the unprecedented medical emergency having widespread and multispectral impact. The treatment uncertainty, lack of health infrastructure, lack of available medical professionals, long term implications of COVID-19 are the reasons behind adopting preventive measure over curative measure. Various preventive measures are available which are tried and tested in previous outbreaks. The measures are reliable and ready to use. Also its efficacy has also been proved. Vaccination drive must be accelerated so as to cover wide section of population as soon as possible. Various preventive measures approved by WHO and various local health authorities are being successfully used in order to gain control over the viral spread. Vaccination which is also a preventive measures has been successfully rolled out in various countries.

Conclusion: Vaccine hesitancy is the burning issue which needs to be addresses otherwise it can derail the vaccination efforts. Importance of preventive measure must be highlights time to time. Recent surge in cases in many countries is attribute to the complacent attitude and lax following of preventive guidelines. Many preventive measures are made not only for COVID-19 but it can also protect us from various other contagious diseases and daily allergies of pollution and dust. Also more innovative mitigation measures should be synthesized in order to contain the viral spread.

[#]Intern

[†]Professor

*Corresponding author: E-mail: drswaroopachakole@gmail.com;

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1. INTRODUCTION

Coronavirus disease 2019 or COVID-19 is the viral infectious disease that started its journey from Wuhan city of Hubei province in China. The sudden outbreak which quickly turned into pandemic gave little to no time in analyzing the situation. The destruction was so widespread and multi spectral that no other disease outbreak or for that matter any even in the past hundred years of human civilizational history was successful in doing so much damage. As of March 09, 2021, 117,164,167 infection cases of COVID-19 has been reported from all over the world and 2,600,504 case fatalities due to COVID-19 complications also have been reported from more than 200 regions [1]. The infection and case fatality rate is so huge that it is being called as once in a century event. World Health Organization (WHO) sensed its destructive ability and termed it as pandemic in the initial days of outbreak [2]. Unites states of America, India, Brazil, Russian federation, united kingdom and France are top countries harboring more than half of the infection cases and case fatalities [3]. The new mutated strain of the novel coronavirus have been reported from Brazil, South Africa and united kingdom which is supposedly 70 percent more virulent than the present strain [4]. The recent upsurge in infection cases across the countries is attributed to this new mutated strain. The widespread destruction and millions of casualties proved that curative measures are not that suitable for disease pandemic like COVID-19. Also the health care infrastructure which was on the verge of collapse was not made to cater such influx of patient which was huge in number. Therefore emphasis on preventive measures gained some ground which was preferred for various reasons. The treatment part can go against some patients which are vulnerable and high risk categories [5]. Also the post recovery persistence of illness also called as long COVID-19 is also a serious cause of concern among infected patients. Various preventive measures approved by WHO and various local health authorities are being successfully used in order to gain control over the viral spread. Vaccination which is also a preventive measures has been successfully rolled out in various countries. So far 305 million dosages of vaccine has been distributed and around 66 million got their full dosage means they are completely vaccinated. Vaccine hesitancy is also on the rise post Infodemic and it needs to be controlled.

2. NEED OF PREVENTIVE MEASURE OVER CURATIVE MEASURE

Coronavirus disease 2019 or COVID-19 is the unprecedented medical emergency that is spread all over the inhabited places on Earth. Every inhabitant of the earth has been affected by COVID-19 by one way or the other in mostly adverse way. More than hundred million people has been infected by the disease which is a historic and catastrophic event in itself. In almost past hundred years of the history of human civilization, no such event was successful in creating such widespread destructions billions of people in one stroke. More than two million people has lost their lives owing to the medical complications created by COVID-19. Such destruction compelled the thinkers and observer to term it as once in a century event which highlights its grave repercussions. The medical emergency has also culminated into socioeconomic emergency as various non-pharmacological interventions has induced measures like lockdown and movement restrictions which rendered millions of people as jobless [6]. The misery of not even getting adequate amount of food and other necessary provisions were not seen in recent past of the human civilizational history. The novel coronavirus which was named as such due to its structure which harbors spike proteins that resembles to crown has not only have high virulent nature but it can prove deadly in certain section of people which was established by more than two millions casualties [7]. The novelty of the virus only adds to the woes as there is no established treatment available to contain the viral spread of the COVID-19. The support of ad hoc treatment is what sustaining the things to certain extent. There is no east west divide among the infections and casualties and all the developed and developing countries are affected on equal scale. This was prominently felt when huge number of casualties were reported nondaily basis in the initial period from economically prosperous countries like Italy and Spain. Therefore there is no bias shown by the virus among rich and poor countries and it has adversely affected all the individuals. The socioeconomic impact also is so grave that complete measurement of such aspect would result widespread losses. The health impact has been discussed all over the world and there is incentive in getting contracted with the virus. The collapsing health care infrastructure, lack of

trained medical professionals, lack of sophisticated medical equipment's is the evidence that the health care infrastructure as a whole is overwhelmed and is not designed to cater such sudden and huge demand of patient created by COVID-19 [8]. The treatment of the virus is not yet established. Also underlying medical illnesses which are also known as comorbidity is the principal decider in course of COVID-19 infection about the severity of the clinical symptoms. The comorbid patients have high chance in developing severe clinical symptoms and the fatal clinical outcome if condition worsens. Apart from hardships during the treatment phase, there is new phenomenon called as long COVID-19 condition in which the disease haunts the infected patients post recovery too. Various patients from all over the world have reportedly complaining about the less explained phenomenon called persistence of symptoms. Many symptoms of COVID-19 have been reportedly haunting the patients even after the recovery phase. Symptoms such as fatigue, occasional cough, cold and fever, intermittent loss of taste and smell, brain fogging which is the condition of confusion while making any decisions, reduction in physical capacity and so on persisted among certain section of patients even after the recovery [9]. Also after through medical analysis of the patient several internal impairments came in to lime light which is also a serious cause of concern. It establishes that novel coronavirus causing COVID-19 can cause irreparable damage to the affected person. Various tests shown that there was weakening of heart muscles, reduction in muscle capacity, myocarditis, reduced supple of blood to heart, low diffusion level of oxygen and carbon dioxide, weakening of alveolar tissue, renal and liver damage are some of the findings which emerged from the complaining patients. These are of grave in nature and if not address in time can culminate into another pandemic like situation. The high virulent nature of the novel coronavirus compels the doctors and medical professions to adhere to isolation and quarantine protocol in which the patient is kept isolated from all the non-infected family members. No meeting is allowed with the patient as the COVID-19 is extremely contagious. Medical professional have to wear the personal and protective equipment's all the time so that they do not get infected. Due to prolong isolation among severe patients, psychological stress is induced in the patient as they are unable to see their loved ones. Also there is prevalence of post traumatic distress syndrome which happens to the patient due to

near death experience. The uncertainty about the COVID-19 pandemic is already widespread among general masses and everyone is worried about their future prospects. Health care professionals on the contrary have to work over time to cater the influx of the patients suffering from COVID-19. The long hours in PPE kits makes one exhausted and tired. Also the hidden fear of transmitting the disease to their family members and loved ones overpower their mental status and efficiency of the same is affected. The psychological impact is often under calculated where as its relations with other aspects of human life is quite intimate and also it can affect the physical functioning of the body. The huge figures or case fatalities which are reported from all over the world also somewhat disheartens the mood and increases the uncertainty about the contemporary situation [10].

Therefore it is important to weigh in the cons attached to be infected with COVID-19 which is never thought by any person. The curative procedure, the long isolation periods, the long COVID-19 condition, collapsing health care infrastructure all these factors are pointing towards adopting the preventive measures more vigorously than curative measure. Also these measures cannot be enforced and these measures should be adopted at free will by people around the world. In such a way, their effectiveness can process some result. Many preventive measures are available which are listed by World Health Organization [WHO] and various national level health authorities which can be readily adopted by the layman. These measures are already tried and tested during previous outbreaks of Severe Acute Respiratory syndrome [SARS], Middle Eastern Respiratory syndrome [MERS] and Ebola. Many lives were saved by these measures during these outbreaks using preventive measures. In Ebola outbreak in Africa, Wearing of mask allowed the health care professional to trace the patients and treat them without getting infected. Other measures includes, maintain physical distancing, sanitizing hands regularly, Usage of PPE kits if needed, maintain good physical health, eating balance diet and usage of prophylactics according to doctors advise can ward off the COVID-19 [11].

3. PREVENTIVE MEASURES DURING COVID-19

As mentioned above, various preventive measures has been approved by competent authority all over the world. Wearing of mask is

the prime and most important preventive measure which can drastically reduce the chance of getting infected by COVID-19. Novel coronavirus mainly enters the human body through nasal and oral openings. Either by sneezes or breathing of infected person, or transmission through hand to mouth or nose are the possibilities of transmission. Therefore it is necessary to cover nose and mouth to prohibit any droplets laden with virus or any droplets for that matter to enter into the body. Various masks are available to be used in order to protect oneself from the infection. The usage of mask is prevalent among the people affected by previous outbreaks of SARS and MERS. They are well known about their efficacy and usage. This is the reason behind low infection rate in SARS and MERS hit countries which were already accustomed to this measure. New study found that double masking can immensely help in protecting oneself and covering almost all the flaws of single masking [12]. Wearing mask not only helps in preventing COVID-19 infection but it also prevent us from other contagious disease like asthma, bronchial diseases, tuberculosis and so on. Therefore this measure has compounding effect which will be seen in coming days. Most allergies like allergies to dust and pollution can also be tackled by usage of proper masks. But there are some serious issues attached to inculcating the habit of wearing masks. There are many people who are wearing masks improperly. Some people wear it below nose, exposing openings and likewise. This type of behaviors only creates false sense of security and the person is extremely vulnerable to getting infected. Therefore proper wearing of masks is needed to ensure highest efficacy. Also mask which are used for one time usage or non-reusable masks are being used repeatedly due to lack of knowledge about masks. Therefore widespread awareness campaign should be launched to aware people about various types of masks and their proper usage. As these habits should be continue for the longer term so that safe hygiene practices can promoted [13].

Maintain minimum physical distance among the public also acts as preventive measure. The objective of the measure is to break the chain. Generally it is advisable to be 6 meter apart from any human being. In this measure, every other individual is assumed to be the carrier of the novel coronavirus and hence the distance is maintained, prominently at daily provisions store, sir ports, other transport services and junctions where there are high footfalls. This 6 meter

distance along with wearing of mask reduce the chance of getting infected by COVID-19 to considerable extent [14].

Various other measures also acts as associate measures such as maintain hand hygiene by sanitizing hands at regular intervals, wearing face shields, PPE kits if protocol mandates. Especially hand hygiene is essential in contagious disease outbreak like COVID-19. Hands are the primary vehicle for the novel coronavirus to reach the nasal and oral openings. Also various surfaces have found to be harboring the virus for considerably long period of time. Touching those surfaces ay invite COVID-19. Therefore sanitization of hands through alcohol bases sanitizer and washing hands with soap for at least 20 seconds can eliminate the virus. Sanitizers are especially suitable for such conditions as it does not require water to wash and it is readily available. Many institutions have installations of hands free dispensation of sanitizer before entering inti premises. These healthy practices will not only help in COVID-19 pandemic but also will serve us for good in longer run. Usage of prophylactics approved by medical professionals is also suitable for building immunity. The mechanism of novel coronavirus is such that it attacks the weaker immune system and takes the control of hoist cell via angiotensin converting enzyme 2 (ACE 2) receptors. Therefore it is necessary to build string immune system so that body can tolerate the invasion of external pathogens. Certain foods and vegetables are also supposed to have immunity boosting aspects which can be extracted and taken in. Maintaining proper and balance diet is also a crucial aspect. Most of the disease happens due to improper diet. Therefore it is necessary to carefully curate the diet which will help us in leading healthy life. Also approaching any doctor or medical professional for non-COVID-19 avoidable ailments is dangerous as it may increase chance of getting infected. Adoption of balance diet and adequate and minimum physical exercise can help us in fighting such infectious viruses with ease. Various supplementary foods like vitamin c, vitamin d, prophylactics are directly connected to innate immune response. Vitamin c is associated with antioxidants properties and also anti-inflammatory properties which are extremely necessary in COVID-19 as oxidative stress as well as inflammatory condition is increased during COVID-19 infection. Vitamin D is also associated to efficient functioning of lungs. Therefore adequate amount of sunlight which is

the primary source of Vitamin d must be taken to maintain balance levels. There are lots of microbial organisms which are present in human gut and are very useful in digesting many enzymes and building immunity. Therefore maintaining good gut health should be on priority list. All these supplements after taking under medical supervision and advice can help in maintaining healthy human body [15].

4. VACCINATION

Although there is no medical history of novel coronavirus hence no drug is readily available to treat COVID-19. Researchers and scientists along with medical professionals worked extremely hard and added another measure to preventive arsenal against COVID-19. That measure is vaccine. Many vaccine candidates have been approved by various health authorities after completing three stage trials and necessary checks and they are ready to be rolled out. Vaccine for COVID-19 got breakthrough in record time. No other vaccine for disease has been prepared in such less time. Whole world was grappled with COVID-19 which has multispectral implications and needed to be contained as soon as possible. According to World Health Organization (WHO) as of February 18, 2021, seven different vaccine candidate across different platforms have been rolled out. Vaccine are already saving many lives for different fatal and contagious diseases. Vaccines are very crucial in containment efforts of any disease outbreak. Pfizer Biontech, Moderna, Johnson and Johnson are the leading vaccine candidates that are being used all over the world. Also Major producer of pharmaceuticals like India and China have also launched their indigenous vaccines that are quite robust and efficient. Also the prices are also lower in later cases. There are generally two jabs that are being administered generally between 28 days but days may vary. Johnson and Johnson is a single shot vaccine that has been approved by US authorities. Also several vaccine candidates are under trial and they will also join the global efforts of vaccination. Distribution of vaccine is prioritized according to the exposure at work culture. Health care professionals being the front line workers are being administered first. Then in phases thereafter various old aged person with lesser comorbidities can be administered. Efficacy of the vaccine candidates is different according to the age, medical condition, geography etc. Therefore comparing would be injustice to them [16].

But as the harmful effects of Infodemic kicks in there is widespread prevalence of misinformation about vaccines. Vaccine hesitancy is the resultant product of the Infodemic [17]. Various new about vaccine that it can render humans impotent, it can kill someone, politicizing the medicinal progress is extremely bad precedent. The uncertainty and lack of knowledge about post vaccination fallout also worries the vaccine recipient. Therefore confidence building measures are needed to ensure increased vaccination. People must come out voluntarily and vaccine must not be forced. Various state heads and premiers took vaccine dosage along with their deputies and ministers to induce the confidence about vaccine among general masses. These steps are useful and showing results. Although full-fledged vaccine results are not out yet, but no major adverse impact has been so far seen among major vaccinated candidates [18].

Many studies about Covid-19 reflected on different aspects of impact throughout the world [19-22]. Gaidhane et. al. reported on depression, anxiety and stress among the general population in the time of Covid-19 lockdown [19]. Ingole and Bhutada reviewed on the transmission of Covid 19 through Eyes [23]. Jachak et. al. reported on impact of Covid-19 in India [24]. Jaiswal et. al. elaborated on clinical approach to COVID-19 [25]. Rana and Borage reported on utility of vaccination adopted in India for children to fight against COVID-19 [26]. Sharma [27] and Khatod et al. [28] discussed the preventive approaches for Covid-19 in healthcare sector. Gaps in routine vaccination in middle income countries were reported [29,30].

5. CONCLUSION

There is definitely a case for preventive measure over curative measures in COVID-19 pandemic as one can avoid treatment, post recovery trauma and much more. Preventive measures needed to be popularized so that it can reach to lowest strata. Importance of preventive measure must be highlights time to time. Recent surge in cases in many countries is attribute to the complacent attitude and lax following of preventive guidelines. Many preventive measures are made not only for COVID-19 but it can also protect us from various other contagious diseases and daily allergies of pollution and dust. Prophylactics must strictly be taken under medical supervision. Eating healthy and nutritious foods and avoiding junk food can build

immunity which in turn will help in fighting external pathogenic invasion like COVID-19. Vaccination has been started and millions of dosage are already been given. Least developed countries must also get vaccine as vaccine hoarding is prevalent among developed economies. Vaccine hesitance is also an emerging issue which needs to be addressed as soon as possible.

ETHICAL APPROVAL

Ethical clearance taken from IEC, DMIMS, Wardha, India.

CONSENT

It is not applicable.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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