



REVIEW ARTICLE

The Need of Understanding the Importance and Use of Face Masks

Dr Berlin P. Kurian¹ | Dr Shijo Daniel² | Dr. Sayantan Ghosh^{3*}  | Dr Prolay Paul⁴ | Dr Meghana A Reddy⁵ | Dr Lipika Das⁶ | Dr Darshan J C⁷ | Dr Arpan Dutta Roy⁸

¹Pharm D Intern, Department of Pharmacy Practice Sri Adichunchanagiri College of Pharmacy, B G Nagara, Karnataka-571448

²Assistant Project Manager, Doctor of Pharmacy Clinical Development, Prestige BioPharma Ltd. Singapore

³Pharm D Intern Department of Pharmacy Practice Sri Adichunchanagiri College of Pharmacy B G Nagara, Karnataka, India

⁴Pharm D Intern, Department of Pharmacy Practice Sri Adichunchanagiri College of Pharmacy, B G Nagara, Karnataka-571448

⁵Pharm D Intern, Department of Pharmacy Practice Sri Adichunchanagiri College of Pharmacy, B G Nagara, Karnataka- 571448

⁶Pharm D Intern, Department of Pharmacy Practice Sri Adichunchanagiri College of Pharmacy, B G Nagara, Karnataka-571448

⁷Pharm D Intern, Department of Pharmacy Practice Sri Adichunchanagiri College of Pharmacy, B G Nagara, Karnataka-571448

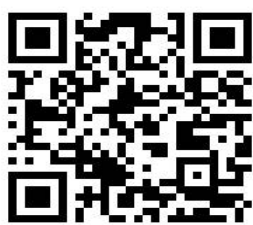
⁸Chief of Clinical Pharmacology Ruby General Hospital, Kolkata Certified NABH Assessor (QCI) HOPE Doctor of Pharmacy (PB) Clinical Research, (PhD.)

⁹Chief of Clinical Pharmacology Ruby General Hospital, Kolkata Certified NABH Assessor (QCI) HOPE Doctor of Pharmacy (PB) Clinical Research, (PhD.) Pharmacology Certified GCP, ACLS, Pharmacovigilance, NABH assessor

Abstract

Face masks are the new normal and has become an essential part in our day to day lives for preventing the entry of virus to and from others during pandemic situation. The more common physical basis of entry of micro organisms are nose, eyes, mouth. Though eyes are protected using goggles, face masks shields against the contaminating substance. The efficiency of masks are dependent on the amount of contaminant removed by it, contributing to various factors such as the number of particles, mass, weight and so on. It is well known that wearing a surgical masks can help block the droplets from entering or spreading from the environment to the wearers respiratory tract and vice versa. There were high levels of concerned raised anxiety on panic buying of face masks by the public during the initial outbreak of the pandemic, a high shortage among the essential group of people in need of face masks by the health care teams as well as the common people to fight strong against the virus. According to aerosol science, whenever liquid hangs in air it is an aerosol, or a “droplet” to mean a coarse particle five micrometers or larger, and reserve “aerosol” for fine particles smaller than five micrometers in effective diameter. Many organizations are suggesting to make use of cloth masks instead of surgical ones in order to prevent the shortage of surgical masks on the Covid 19 health works and thus reducing the economic load on the same. Hence to have in a solution for the same have led to reusing of masks which are meant to be single use by process of efficient sterilization.

Keywords: Face masks, Covid 19, sterilization, pandemic, health care, purpose, disinfection, N95



1 | INTRODUCTION

Personal protective equipment (PPE) such as the masks, safety gloves, safety shoes, helmets, protective gowns, goggles etc serves as a protection and minimize exposure against various hazards like airborne particulate matter, bio hazards, chemicals etc. The mostly used PPE being face masks, which is a protective layer made to cover the nose, mouth against harmful microorganisms or pollutants. The more common physical basis of entry of micro organisms are nose, eyes, mouth. Though eyes are protected using goggles, face masks shields against the contaminating substance. Although the use of face masks have evolved long back in surgical setting and in related to work force, face masks have become an essential part of everyday life, that is worn every day by everyone. A variety of different shapes, size, designs, forms are being used in the society today and their business of producing have spread to a large extend in 2020. The respiratory face masks, being the commonly used in this era, protects both the person who wears it and also the immediate environment. (1)

The efficiency of masks are dependent on the amount of contaminant removed by it, contributing to various factors such as the number of particles, mass, weight and so on. Filtering of masks are governed by droplet diffusion, interception and impaction. Wearing a mask can reduce the distance of droplets produced to half of that travelled without a mask. Masks serve primarily to reduce the emissions of virus-laden droplets by people when they cough, sneeze, sing, talk or simply breathe, but they can also help prevent the inhalation of droplets by the person wearing them. (2)

Since a viral outbreak from severe acute respiratory syndrome corona virus 2 (SARS-CoV-2) to Covid 19 in 2019, the use of masks are evolving with strict instructions around the globe. Masks should be rationally used in order to have an efficient purpose. (3)

As Covid 19 continues, various studies are being carried to find out the amount of droplets blocked in by a mask and the pros and cons around the Globe. Government guidelines and various steps are taken in order to prevent spread of outbreak by public

awareness of wearing masks correctly. Thus the use of face masks have become the new normal and an important health measure in light of Covid 19. (4)

2 | METHODOLOGY

This review includes data related to Face masks, their use related. Analyzing the effect of face masks and their rational use can lead to substantial reduction in the Covid 19 infections and also provide information regarding to its safe use. The information was collected through computerized search from research article and various guidelines related to face masks using various journal sites and health care organizations.

3 | BACKGROUND AND HISTORY OF FACE MASKS



FIGURE 1: Beak like masks used by physician during the bubonic plague

Back in early ages from middle ages to renaissance health care professionals used a beak like mask during the bubonic plague in order to protect themselves from miasma or blight which was well-thought-out for causing plague. These face masks were filled with herbs such as with clove, cinnamon and liquids and

Supplementary information The online version of this article (<https://doi.org/10.15520/jcmro.v4i02.388>) contains supplementary material, which is available to authorized users.

Corresponding Author: Dr. Sayantan Ghosh
Pharm D Intern Department of Pharmacy Practice Sri
Adichunchanagiri College of Pharmacy B G Nagara,
Karnataka, India
Email: gsayantan26@hotmail.com

those physicians wearing them were called as beaked doctors. The use of these masks evolved through a belief that caused spoiled air to from the East which have caused the epidemic. Although a clear picture doesn't exist, although 2 masks are remained in German museums which are assumed as forgeries.

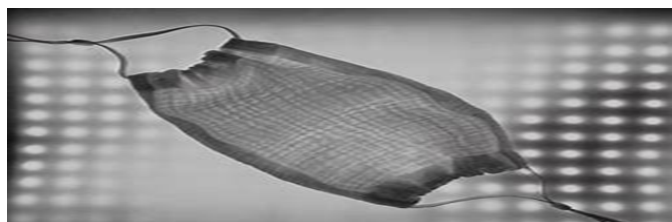


FIGURE 2: single layer gauze masks used in the bacteriologic era

Ever since the bacteriologic era and its aftermath (1875-1950) the introduction of antiseptics by Joseph Lister and Louis Pasteur, the surgical setting had a confronted about wound infections and their related containment. In 1897, Carl Friedrich developed his contributions on droplet infections, it was during this time, respiratory system that transmits germ came into research light. Operations carried out during the time had mouth bandage been used made of single layer of gauze. It later developed into a 2 layered mask meant to prevent driblet spread. Until 1910, usage of face masks was not mandatory in surgery.

In the modern era of 1920, surgical masks were used in USA and Germany during small surgeries. Later then measures to combat infection evolved with usage of masks. In 1940, reusable, washable and sterilizable masks came into use. In 1960, disposable masks made of paper and fleece came into practice. (5)

Non pharmaceutical intervention can help to combat the spread of an airborne. Throughout the era of pandemic in 2000 from SARS in 20003, HINI in 2009 to the very recent ongoing Covid 29 pandemic have proved that if they are readily available, face masks would be the best cost effective way to combat the spread. It is found that surgical and N95 masks are equally effective in preventing the spread in a laboratory setting. An N95 provides a tight fit than surgical masks and are less tolerable than surgical face masks. Due to Covid 19 outbreak across countries, the use of masks and their precautions and

campaigns about disposing and washing are on the run. Also specialized designed and Printed masks in order to make it more appealing are the new trend (6)

4 | TYPES OF FACE MASKS

1 Cloth face mask-It is merely made of different kinds of cloth material. Studies reveal that the efficiency of these cloth masks when compared to N95 has very penetration of particles. Cloth masks doesn't provide shield against virus. It does provide the user with air pollutants like dust, pollen. Therefore, it was less recommended in case of a pandemic.

2 Surgical face masks- Provides protection from droplets in clinical setting. The design of the surgical masks depends on the mode; usually, the masks are three-ply (**three layers**) or 4 ply (four layers)

2.1 This three-ply material is made up of a melt-blown polymer, most commonly polypropylene, placed between non-woven fabric. It has 3 layers, the outer layer repels water droplets, the middle layer serves as a filter and the inner layer absorbs moisture. Various investigations are carried out in order to reveal the reduction of viral detection, which in turn was found to be 25fold for coarse aerosols, 2.5 fold for fine particles. Surgical face masks provides the basic option in a pandemic. It had the drawback of not constraining discharge of smaller droplets.

2.2 The 4 ply surgical mask is like a 3 ply face mask with an added extra layer with an activated carbon filter or one more filtering layer. The first layer is made of polypropylene spun bond non-woven, second with an active carbon filter fiber or another filtering layer. The 3rd layer with melt-blown non-woven fabric and the final layer with polypropylene spun bond non-woven. They also have adjustable nose strip to give maximum protection and comfort to the user. It also gives protection against odors as well as organic vapors.

3 Full length face shield-Composed of elastic head bands along with transparent shield made of polycarbonate across the face. It prevents the wearer from splashes of sneezing, coughing or other liquid droplets. It had an advantage of being light weight

and cost -effective.It is mostly used in a clinical setting .

4Filtering face piece respirator (FFPR)-Used to filter out vapors, dust particles and infectious agents. It is mostly utilized in work place having more pollutants . Has the benefit of purifying air and cutting down the risk of contamination of the wearer.There are different types of FFPR, namely N95, P100, FFP2, FFP3 .

4.1 The most remarkably used is N95 which is called electrets filters, has a filtration of 95% of aerosols N95/N90 face mask is one of nine NIOSH certified particle respirators. Taking N95 mask as example, “N” means not resistant to oil. “95” means that the particle concentration in the mask is 95% lower than that outside the mask, when exposed to a specified number of special test particles. 95% is not the average filter rate, but the minimum value. N95 is not a specific product name. As long as the product meets N95 standard and passes NIOSH review, it can be called “N95 mask”. The degree of protection is N95, which means that under the test conditions specified in NIOSH standard, the filtering efficiency of the filter material of the mask for non oily particles (such as dust, acid mist, paint mist, microorganism, etc.) reaches 95%. However different companies manufacture different N95 and its efficiency depends on size of penetrating particles.It has 4 layers -inner , support , filter , and layer mask filter layer from inside to outside with a ventilator fan to allow reinforce breathing .N95 masks are divided into. N95 are of two types- The standard N95 and surgical N95 ,which is more efficient.

4.2 The number 90 denotes the efficiency of the mask to filter out 2.5PM dust particles.KN90 respirators with valve are more suitable for industries of non ferrous metal processing, metallurgy, food processing, construction works and all other oil and non oil particles pollutants such as dust, smoke fog.KN90 can capture more than 90% particles. Although it is not as effective as KN90 in case of particle protection,KN90 is more comfortable. KN90 is a good choice to travel in a haze for a short time.

4.3 There are a number of respirators around the world that meet the same design standard as N95s, and in China, they are certified as KN95s. These

respirators are fundamentally the same. The KN95 filters out at least 95 percent of particles down to 0.3 microns, To be effective, these respirators also must create a seal around the face and nose when worn.Covid 19 had led to rise in counterfeit N95 and KN95 respirator masks, especially online.

True N95s will have NIOSH written in block letters on the respirator, along with testing and certification numbers, as well as the designation, N95. This can help identify the fake masks on the markets.



FIGURE 3: Non valved N90 masks



FIGURE 4: valved N90 masks

numbers, as well as the designation, N95. This can help identify the fake masks on the markets.

4.4 Valved N90 and N95 masks- The use of valved face masks such as the valved N90 and N95 are stated as not preventing the virus from escaping out of the mask. The valve is essentially a ‘one-way valve’ that only protects the person wearing it and does not filter the aerosols coming out. So,an asymptomatic carrier of the corona virus can easily spread the infection to others when the valve releases the unfiltered exhaled air in the immediate environment. Thus, in a closed area, people around the carrier have a high risk of potential exposure to the Covid 19. Asymptomatic transmission transmits the infection to another person .

On the other hand, a mask without a valve will not allow the virus to spread.

4.5 The P100 respirator has a filtration of 99.7%. Studies were conducted to find and compare the efficiency of N95 and p100 before and post exercise. The permeability values was more or less the same with both before exercise. But , the scenario after exercise showed change, having advantage of using p100 masks

5 Self -contained breathing apparatus(SCBA) -It consists of a face piece that is attached to a supply of liquid air/ liquid oxygen . SCBA is held using a hose and a regulator.It mostly provides defence against airborne pollutants, making it easy for those working in smoky environment. It is used as personal firefighting cautionary.It has the drawback of being heavy, which restricts mobility of the user in the workplace.

6 Full face respirator- made of stiff transparent plastic for perception followed by a central port . It is mainly used where the patient has breathing issues, apnoea .It has the drawback of being providing mobility since if the patient rolls during sleep, the mask dislodges and can create ineffectiveness. (7)Table 1

Current role of face masks in light of covid 19

Many researchers with various opinions have been worked on the effect and advantage of different types of masks in controlling the spread of Covid 19 and are also being conducted by various organizations like WHO.

It is well known that wearing a surgical masks can help block the droplets from entering or spreading from the environs to the wearers respiratory tract and vice versa.The new virus is transmitted through respiratory droplets released by infected an infected person while talking, sneezing, or coughing. Wearing a face mask is a simple and easy way to reduce the expulsion of respiratory droplets and protect others as well as yourself from COVID-19 – the disease caused by the novel corona virus. But it is limited in case of those particles which are sub micron sized, due to the reason that the SARS-COV 2 is present in aerosols sized $<3\mu\text{m}$.surgical masks and N95 respirators were found to be likewise effective in preventing influenza-like illness and laboratory-confirmed influenza , by a meta analysis study .As

Covid 19 can be symptomatic and asymptomatic, the viral load present in the upper respiratory tract and the droplets expelled out can be controlled via universal use of masks . Thus the infection spread from person to person , and community based can be restricted to a larger extent . Due to the increase in purchase and use of face masks due to the novel corona virus, the instructions on the use of masks and the concerned factors should be brought in to light for the common people. (8) .

Lockdown imposed had badly been a blow to many sectors resulting in decreased financial viability, reduced social equity, and declined sustainable mobility. The main degrees of concepts of lockdown being social distancing, the public transportation sectors are in vain. Due to their financial decline in running the services in 2020, the proper usage of face masks in closed environments in public transports can related and efficient in reducing the contagion.Hence the pandemic put in many sectors at risk resulting from an unprecedented decline in demand and revenue (9)

Many health organizations recommended that health care workers use medical masks when treating suspected case and also the cases wear masks .Air droplets being the main source of infection spread via airborne, contact and fomites. Airborne results in direct infection through inhalation of contaminated air droplets. Contact transmission via those droplets structured on an individual and then being transmitted to an area where infection can occur, for example, a hand touching a face. Fomites are indirect method where droplets first land on a surface and transmitted for to be vigilant against all forms of transmission by wearing N-95 respirators . different countries are enforcing varied strategies such just only wearing it in public transport or in shops to wearing it everywhere outside, this variations are due to the infection rate of the pandemic in different areas of the globe (10)

Mask masking can be considered as a preventive tool in this pandemic like that a seat belt due to its community exposure via different sectors. When mass masking is done in adjuant to the strict preventive measures such as lockdown criteria, hand washing and social distancing equal importance is

TABLE 1: Purpose ,Speciality featuresdifferent face masks

Mask type	Purpose	Efficiency Micron size	Reusable/dis posable	Respirato ry filter	Affordabl e	No of layers	Effective in combati ng virus/ bacteria
Cloth mask	Dust, pollens	Zero % efficient at 0.3µm	Reusable	No	yes	single	No ⁷
Surgical Mask	Virus /bacteria, dust , pollens, liquid like mist sprays	60-80% filtration of particles as small as 0.3 microns	Disposable	No	Yes	Three layered and four layered	Yes ⁷
Full length face shield	Liquid like mist sprays,	Efficient with probably a surgical or N95 masks worn	Res-usable	No	No	Two-layered	No ⁷
Filtering face piece respirator (N95)	Virus/bacteria, dust, pollens, liquid like mist sprays against non oil particles	95% efficient of particles sized 0.1-0.3 microns	Reusable	Yes	Yes	Four-layered	Yes ⁷
Filtering face piece respirator (3m 8293 P100)	Virus/bacteria, dust, pollens, liquid like mist sprays against oil and non oil particles	99.97 %efficient of particles sized 0.1-0.3 micron	Reusable	yes	No	Five-layered	Yes ⁷
Self - contained breathing apparatus(SCBA)	Emergency conditions ,Smoke particles, used in high temperatures, bacteria, virus, oil and non oil particles	99% of more than 0.3 micron	Reusable	Yes	No	Mufti-layered	Yes ⁷
Full face respirator	bacteria, virus, oil and non oil particles					6 -layered	

given. In case of masks in reducing the severity of infection and hence reducing the mortality rate. In the absence of a covid 19 vaccine , measures such as extensive testing, contract tracing , quarantine regulations and more strict policing around crowds along with adequate usage of masks are set to be a true example on decreasing the burden on health care team. As many countries are being back to normal within the pandemic due to the financial decline as assessed, people returning to work make it more in

demand for masks.Also mass masking serves as sign for social solidarity which deviates the focus from self security to altruism. (11)

Recommendations on face mask use in community settings

WHO

If you are healthy, you only need to use mask taking care of a person with suspected SARS-CoV-2 infection.

China

Those at moderate risk of contagion: surgical or disposable mask for medical use.

*Those at moderate level of infection include those working in areas of large populated areas (example- hospitals, institutions,), people who have been or live with somebody who is isolated and quarantined, and administrative members, cops, security, and couriers whose work is related to COVID-19.

People at low risk of infection: Should go for disposable mask for medical use.

People at low risk of infection include those being in areas of high population density (example- supermarket, shopping mall), those who work indoors, who attempt health care in medical establishments (other than fever clinics), and assembling of children aged 3–6 years and school pupils.

People at very low risk of infection: are not recommended to wear a mask or can wear non-medical mask (such as cloth mask).

People at very low risk of infection means the ones who mostly stay at home, who do out-of-door activities, and who occupation or study are in well-ventilated areas.

On **January 7**, officials announced they had identified a new virus, according to the WHO. The novel virus was named 2019-nCoV and was identified as belonging to the corona virus family, which includes SARS and the common cold.

Masks, hand sanitizer and temperature checks three times a day, That's the average day for millions of schoolchildren in China, where Covid-19 was first identified has all but declared victory over the corona virus.

Hong Kong

Surgical masks can forbid transmittal of respiratory viruses from group who are ill. It is primary for people who are characteristic (even if they have mild symptoms) to wear a surgical mask.

Put on a surgical mask when being in public transport or in huddled places. It is necessary to wear a mask the right way and exercise good hand sanitary, before wearing away and later relocating a mask.

Singapore

Recommends of wearing mask for those facing respiratory problems, such as a cough or runny nose.

Japan

The effectiveness of wearing a face mask to protect yourself from contracting viruses is thought to be limited. If you wear a face mask in confined, badly ventilated spaces, it might help avoid catching droplets emitted from others but if you are in an open-air environment, the use of face mask is not very efficient.

USA

Sets on guidelines as per the Centers for Disease Control and Prevention (CDC) and suggests that there it is not actually needed for people who are well and immune strong to wear a face mask. Earlier in 2020, USA was one of the top countries affected by covid situation and that the mortality level were high. USA were ignored of wearing a masks in public, but the graph of the progression of covid decreased when they practiced mass masking.

UK

UK suggests on wearing face masks as they show a very important role in places such as hospitals, but there is very tiny proof of widespread gain for those of the public. The cases of worsened covid were high in UK, but the guideline of wearing the right mask in public helped reduce the level of worsening the condition.

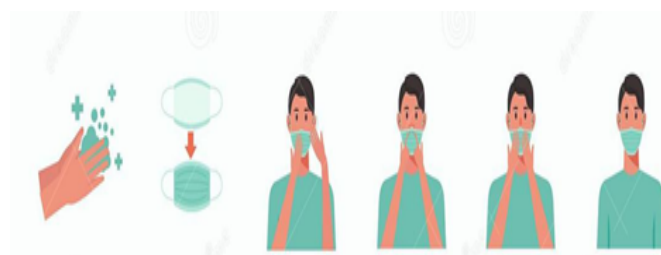
Germany

.According to WHO, putting on a mask where it is not suggested to do so can lead to a wrong sense of security because of the reason that it might pave way to inattention of primal hygiene measures, like that of, proper hand hygiene. (3)

How to wear and remove face mask- the proper way

Wearing a medical mask:-

Figure 3- How to wear a mask



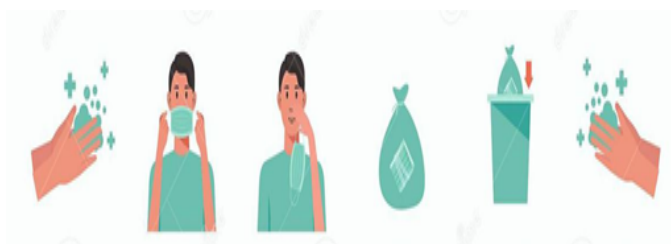
THE NEED OF UNDERSTANDING THE IMPORTANCE AND USE OF FACE MASKS

Clean your hands with soap and water or hand sanitizer

- Holding the mask by the ear loops and place a loop around each ear
- Mold or pinch the stiff edge to the shape of your nose
- Avoid touching the front of the mask when wearing

Removing a medical mask:-

Figure 4- How to remove a mask



Clean your hands with soap and water or hand sanitizer

- Avoid touching the front of the mask . only touch the ear loops.
- Hold both of the ear loops and gently lift and remove the mask.
- Throw the mask in the trash .
- Clean your hands with soap and water or hand sanitizer. (10)

What will be the consequence if people do not wear mask nowadays and what will be the future

In the environment of the Covid-19 pandemic, barrier gestures such as regular hand-washing, social distancing, and wearing a face mask are highly mandatory in fighting the virus. The use of facial covering (mask) reduces the risk of disease spread by preventing transmission by even asymptomatic individuals. Wearing a mask will hence help prevent future lock-down in various community related to COVID-19. public transportation, grocery/food stores, and schools, are the domains where the Public

perception of the importance of mask usage are revealed indicating a possible mismatch in areas public health entities reference as highest risk for spread versus locations the public sees as most important for mask usage.

The debates on whether to wear a mask or not after vaccination still remains controversial. But many researches suggests that wearing a mask even after getting the first shot of vaccine is necessary. Due to the reason that 95 percent of effectiveness will be achieved only after 2 shots of the vaccine , Therefore, for the good of our fellow mankind, the need to continue to wear that mask, and maintain physical distance from others continues. Due to the presence of the new variant of Covid19 , the urge of using masks despite being vaccinated should be on the longer run. As per Forbes, wearing a mask continues to be important as colder temperatures force us back indoors in closer proximity to others. Also since the full roll out of vaccinations won't end overnight, continuing the masking until the very single person get vaccinated should not be stopped (12)

Proper use, disposal and consequences use of face masks

To prevent the transmission of virus in Covid19 scenario, and due to the panic, anxiety, the indiscriminate use , handling and disposal of use of masks appropriately has led to bunches of issues around the globe. Though Covid19 initial lockdown had created better quality of breathable air due to the less traffic and the risks to the wildlife had decreased, the use of plastic PPE mostly that of masks are a threat . It is said that Surgical masks and gloves not be worn longer than a few hours and that should be properly and keenly discarded in order to prevent cross-contamination. The threat around the globe does not subside if masks are inappropriately discarded which can lead to increase in infection rate and hence the worsening of the situation. In regard to this, many countries have implemented measures regarding the disposal of the same, some have focused disposing it as mixed waste which is not recyclable in closed and leak proof containers and later handing over to incineration (preferable) or land filling . Many countries have thought it as a bad idea of recycling it due to the chances of spread of Covid 19 in the recycling centers. N95 masks which are manufactured

of plastics like polypropylene (PP) and polyethylene terephthalate (PET) Moreover, pollution due to plastic can also act as a transmitter of various contaminants, invasive species, and infective agents like that of a SARS-CoV. Utile masks without filters (washing method: washing machine) contributes to the lowest to climate change ($< 2.00E + 008$ Kg CO₂ eq), On the other hand, single use and reusable ones with disposable filters had the contributed to most to climate change ($\sim 1.47E + 009$ and $1.50E + 009$; respectively Kg CO₂ eq). Thus, the use of single use masks like that of a surgical mask which is not washable would bring in more climate change by 10 times when compared to the reusable ones such as the N95. This property of reusing and washing can ultimately lead to decline in generation of medical waste. (13)

Any method acting on to remove the pathogen or dirt in disposable N95 filtering face piece respirator or medical mask must remove the viral threat, be nontoxic to the user, and which does not give up on the integrity device. And it was found to find none of them providing an efficient way to do so. Also, studies couldn't find simple way to modify the constructing procedure or to dispense with fit-testing that would allow N95 respirators to be reusable respirators like elastomeric respirators having face pieces that can be cleaned and reused are available, having the drawback of being more expensive than the disposable N95 ones, making it as an alternative. However Protecting a disposable N95 respirator from contamination could allow for limited reuse. If it has to be done, it can be done so by placing a medical mask or a wash-and-wear face shield over respirator to assist it from external contamination.. maintaining the physical integrity and efficacy of the respirator by proper storage and use. Thoroughly washing up before and after removal of both the respirator and the device used to shield it and, if necessary and possible, appropriately disinfect the object used as a shield. It is recommended not to use damaged or dirty, difficult to breathe while wearing the device Washable, woven cloth masks have been used in hospitals in some countries.

Usage of t-shirts, scarves, or other cloth, in order to facilitate proper breathing is not proven for its efficacy in case of contamination, due to the deficiency

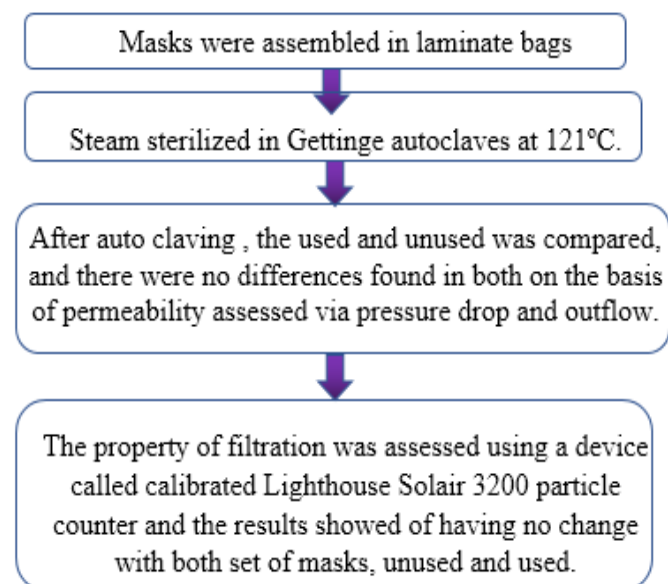
of adequate data either supporting the effectiveness of woven cloth masks. It might lead to false sensation of protection that could encourage risk-taking. Manufacturing units making respirators and masks should be keen in considering changes to processing conditions, chemicals, and finishes in order to bring in the durability of filters. (14)

Sterilization and disinfection of face masks

Due to the need of having increased number of face masks day by day by the public and the urge of health care teams, economic burden is more on purchasing of face masks shortage. Hence to have in a solution for the same have led to reusing of masks which are meant to be single use by process of efficient sterilization. Studies conducted with enormous techniques, one such study suggested single use FFP2 masks which were subjected to sterilization with a 15-minute process at a temperature of 121 °C, by employing dry sterilization process as well as with a regular steam process And it was proved that the effectiveness of these processes are adequate enough to deactivate the activity of corona virus. And a comparison was made between the unused sterilized ones which looked like little curved with that of the used sterilized ones which revealed that it was not recognized both on the basis of breathing efficiency, fit and also visually.

In order to determine the water repellent properties and permeability criteria for bacteria, *Staphylococcus epidermidis* solution was sprayed on to the masks and checked with the air drawn into masks. The results was such that, the reprocessing technique of single use face masks did not affect its said properties.

Also various experiments to test the pressure or flow and particle tests were performed. Before performing the steam sterilization :-



Also there are procedures of sterilization technique which can indeed hamper the efficiency of face masks such as that of steam sterilization at very high temperature of 134°C making it more sticky and distorted. The filter capacity of face masks showed decreasing filtering capacity when employed with gamma radiation. There are high need of the FFP2 face masks ,which can be sorted out by performing the mentioned techniques making it more cost effective, quick and easy process to meet in the demand without loosing its efficiency. However adjustment can be made in sterilization process using available autoclaves in hospital. (15)

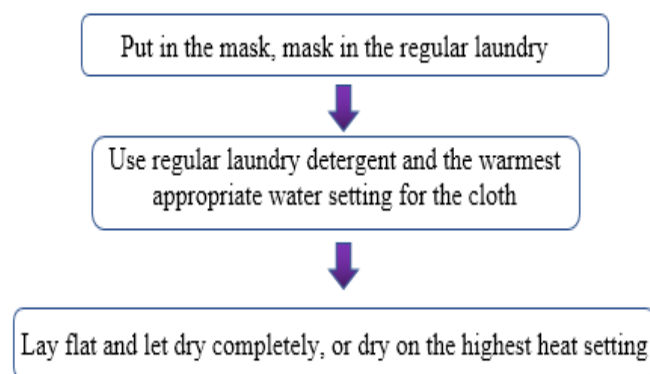
It is proven that corona viruses remain on nonliving surfaces such as glass or plastic metal, wood up to 9 days. But they can be killed by using 62–71% ethanol, using 0.5% hydrogen peroxide or 0.1% sodium hypochlorite within 1 min of exposure Also a proposed way of decontamination using concentrations of ozone solution disinfectant and found that it could be inactivated using a high concentration of 27.73 mg/L for 4 min. The ozone concentrations required are 10-20ppm with 10 minute exposure and indicated that the viricidal more on the efficient run than degradation of FFP respirator.

However it must be taken into account that the effectiveness of UV relies on the dose and shading, since it only trigger off by irradiating surfaces. Therefore it must be done on both sides

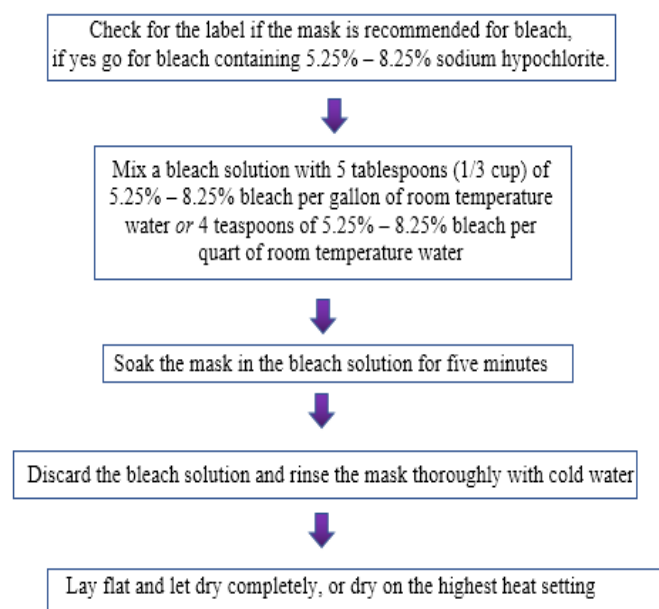
Ethylene oxide, which is widespread used in hospitals, is considered less safe than hydrogen peroxide vaporization and not surroundings friendly. The use of traditional alcohol powder or soap can lead to decreasing efficiency leading to decline filtration and retention of fibres.¹⁵

Sterilization of face masks at home

If using a washing machine



Washing by hand (bleach)



5 | CONCLUSION

Results of various articles,journals, official guidelines of various countries throughout, wearing a mask can reduce the distance of droplets produced to

half of that travelled without a mask. To prevent the transmission of virus in Covid19 scenario, and due to the panic, anxiety, the indiscriminate use, handling and disposal of use of masks appropriately has led to bunches of issues around the globe. Though Covid19 initial lockdown created better quality of breathable air due to the less traffic and the risks to the wildlife had decreased, the use of plastics PPE mostly that of masks are a threat. It is said that Surgical masks and gloves not be worn longer than a few hours and that should be properly and keenly discarded in order to prevent cross-contamination. The main degrees of concepts of lockdown being social distancing, the public transportation sectors are in vain. Due to their financial decline in running the services in 2020, the proper usage of face masks in closed environments in public transports can be related and efficient in reducing the contagion.

Usage of t-shirts, scarves, or other cloth, in order to facilitate proper breathing is not proven for its efficacy in case of contamination, due to the deficiency of adequate data either supporting the effectiveness of woven cloth masks. It might lead to false sensation of protection that could encourage risk-taking. Hence to have a solution for the same have led to reusing of masks which are meant to be single use by process of efficient sterilization. (15)

REFERENCES

1. Matuschek C, Moll F, Fangerau H, Fischer JC, Zänker K, van Griensven M, Schneider M, Kindgen-Milles D, Knoefel WT, Lichtenberg A, Tamaskovics B. Face masks: benefits and risks during the COVID-19 crisis. *European journal of medical research*. 2020 Dec;25(1):1-8.
<https://eurjmedres.biomedcentral.com/articles/10.1186/s40001-020-00430-5>
2. Dbouk T, Drikakis D. On respiratory droplets and face masks. *Physics of Fluids*. 2020 Jun 1;32(6):063303.
<https://doi.org/10.1063/5.0015044>
3. Feng S, Shen C, Xia N, Song W, Fan M, Cowling BJ. Rational use of face masks in the COVID-19 pandemic. *The Lancet Respiratory Medicine*. 2020 May 1;8(5):434-6
[https://doi.org/10.1016/S2213-2600\(20\)30134-4](https://doi.org/10.1016/S2213-2600(20)30134-4)
4. Rab S, Javaid M, Haleem A, Vaishya R. Face masks are new normal after COVID-19 pandemic. *Diabetes & Metabolic Syndrome: Clinical Research & Reviews*. 2020 Nov 1;14(6):1617-9.
<https://dx.doi.org/10.1016%2Fj.dsx.2020.08.021>
5. Matuschek C, Moll F, Fangerau H, Fischer JC, Zänker K, Van Griensven M, Schneider M, Kindgen-Milles D, Knoefel WT, Lichtenberg A, Tamaskovics B. The history and value of face masks. *European journal of medical research*. 2020 Dec;25(1):1-6.
<https://dx.doi.org/10.1186%2Fs40001-020-00423-4>
6. Mniszewski SM, Del Valle SY, Priedhorsky R, Hyman JM, Hickman KS. Understanding the impact of face mask usage through epidemic simulation of large social networks. In *Theories and Simulations of Complex Social Systems 2014* (pp. 97-115). Springer, Berlin, Heidelberg.
<https://doi.org/10.3389/fpsyg.2020.566886>
7. Tcharkhtchi A, Abbasnezhad N, Seydani MZ, Zirak N, Farzaneh S, Shirinbayan M. An overview of filtration efficiency through the masks: Mechanisms of the aerosols penetration. *Bioactive materials*. 2020 Aug 11;6(1):106-22.
<https://dx.doi.org/10.1016%2Fj.bioactmat.2020.08.002>
8. Esposito S, Principi N, Leung CC, Migliori GB. Universal use of face masks for success against COVID-19: evidence and implications for prevention policies. *European Respiratory Journal*. 2020 Jan 1.
DOI:10.1183/13993003.01260-2020
9. Tirachini A, Cats O. COVID-19 and public transportation: Current assessment, prospects, and research needs. *Journal of Public Transportation*. 2020;22(1):1.
<https://doi.org/10.5038/2375-0901.22.1.1>
10. O'Dowd K, Nair KM, Forouzandeh P, Mathew S, Grant J, Moran R, Bartlett J, Bird J, Pillai SC. Face masks and respirators in the fight against the COVID-19 pandemic: A review of current materials, advances and future perspectives. *Materials*. 2020 Jan;13(15):3363.
<https://dx.doi.org/10.3390%2Fma13153363>
11. Cheng KK, Lam TH, Leung CC. Wearing face masks in the community during the COVID-19 pandemic: altruism and solidarity. *The Lancet*. 2020 Apr 16.
[https://doi.org/10.1016/S0140-6736\(20\)30918-1](https://doi.org/10.1016/S0140-6736(20)30918-1)

12. Silva AL, Prata JC, Walker TR, Duarte AC, Ouyang W, Barcelò D, Rocha-Santos T. Increased plastic pollution due to COVID-19 pandemic: Challenges and recommendations. *Chemical Engineering Journal*. 2020 Aug 17:126683.

<https://dx.doi.org/10.1016/j.cej.2020.126683>

2Fj.cej.2020.126683

13. Bailer JC, Burke DS, Brosseau LM, Cohen HJ, Gallagher EJ, Gensheimer KF. Reusability of facemasks during an influenza pandemic. *Institute of Medicine of the National Academies*. 2006.

<https://slender2020.jp/11637.pdf>

14. de Man P, van Straten B, van den Dobbelsteen J, van der Eijk A, Horeman T, Koeleman H. Sterilization of disposable face masks by means of standardized dry and steam sterilization processes; an alternative in the fight against mask shortages due to COVID-19. *Journal of Hospital Infection*. 2020 Jun 1;105(2):356-7

<https://doi.org/10.1101/2021.01.15.21249843>.

15. Rubio-Romero JC, del Carmen Pardo-Ferreira M, García JA, Calero-Castro S. Disposable masks: Disinfection and sterilization for reuse, and non-certified manufacturing, in the face of shortages during the COVID-19 pandemic. *Safety Science*. 2020 May 13:104830.

<https://doi.org/10.1016/j.ssci.2020.104830>

How to cite this article: P. Kurian , D. B., Daniel, D. S., Ghosh, D. S., Paul, D. P., A REDDY, D. M., Das, D. L., JC, D. D., & Dutta Roy, D. A. (2021). **The Need of Understanding the Importance And Use Of Face Masks**. *Journal of Current Medical Research and Opinion*, 4(02).

<https://doi.org/10.15520/jcmro.v4i02.388>