

# COVID-19 Pandemic: Is Cloth Mask Really Protect Public From SARS-CoV-2? (The way of handling to get Results)

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**Abstract:-** N-95 masks undoubtedly provides the most effective protection against minute particulates including the novel coronavirus, but due to the extreme shortage of supply it's reserved for the front line health care personals. Surgical masks can filter large droplets and big particulate matters but still it's not advisable for use to the common public, in such a scenario wearing a universal cloth face mask in combination with meticulous hand hygiene and social distancing can provide a complementary protection and can significantly block the spread of infection.

**Keywords:-** Cloth mask, surgical mask, pandemic, Covid 19, SARS-CoV-2.

## I. INTRODUCTION

Irrational use of mask has caused serious shortage of mask availability for frontline health care workers, who really require it [1]. So, it is recommended that N-95 respirators and surgical masks should not be used by the public, as these are in critical supplies, need to hold in reserve for medical first responders [2-3]. It is clearly evident from available resources that SARS-CoV-2 is transmitted only by droplet and contact transmission [4-5]. There is remote possibilities of faeco-oral routes of transmission. But risk of airborne transmission remains questionable and requires more empirical data for confirmation [6-8]. Therefore, social distancing, meticulous hand hygiene and respiratory etiquettes have taken a significant role in curbing the infection transmission along with use of cloth mask [9]. Use of cloth mask is better than nothing. Though cloth masks can't block or filter SARS-CoV-2 but can cut the transmission of the virus from the wearer to others or from others to the wearer by impeding large droplets produced by a cough or sneeze [10]. Cloth mask could encourage more mindful behaviour including avoiding touching one's mouth nose and eyes and not to be exposed face-to-face with a person within 6-feet for more than 10 – 30 minutes [11]. Casual passing through social space has also chance of contracting infection as air borne particles produces by normal speech of individual asymptomatic but infected may be enough to transmit coronavirus.

## II. AIM OF THE REVIEW

Authors of the present review has tried to highlight the area of (i) How much cloth mask is effective; (ii) Evidence based comparison between efficacy of surgical mask, N95 and cloth mask; (iii) Which clothing would be effective; (iv) What are the other protective measures should be taken;(v) Scientific use of cloth mask. Authors has answered the mentioned zone for common people by using various search engine and offered it in an evidenced based comprehensive form.

## III. TYPE OF MASKS AND ITS USERS:

- N95, a tight-fitting respirator, approved by NIOSH, reduces wearer's exposure to aerosols and large droplets and screens 95% of airborne particles [12-13].
- Surgical mask is a loose-fitting, fluid resistant respiratory protection approved by FDA which safeguard against large droplets, splashes or sprigs of bodily or hazardous fluids [12-14]. Both of them are secured for health care provider and infected person.
- Cloth mask, a face covering made by well-secured cloth (shirt, bandana or scarf) that covers mouth and nose, recommended for uninfected one [9].

## IV. WHY MASK IS NEEDED?

When someone is breathing, speaking, sneezing or coughing, only a tiny amount of aerosol coming out. Many of these droplets will then evaporate and turn into aerosolized particles that are 3 to 5-fold smaller. Dehydrated smaller aerosol can float for longer in the air. The point of wearing a mask is to stop this process from occurring (**Papineni et al, 1997**) [15].

If an aerosol droplet hits the weave of mask fabric rather than the hole it is evidently arrested, diminish the aerosol at the R0 [reproduction number] and assist to slow the epidemic. They are not a cure but they can address the longer flatter curve which everybody try to achieve, said by **Ian Jones**, professor of virology at the University of Reading [16].

This viral disease has been found to be transmitted by direct or indirect contact also. It may enter into the eyes or transmit from fomites through hands to nasal, oral or ocular mucosa of asymptomatic and pre-symptomatic individual [9, 17]. So along with cloth mask, eye protection (close fitting goggles), full sleeves cloths are needed and it should not be used as substitute of social distancing (intrapersonal distance >6-feet) by **experts from Harvard Medical School** [18].

**V. WHICH ONE IS EFFECTIVE? SURGICAL MASK OR CLOTH MASK**

There is evidence that surgical masks help in decreasing transmission of influenza and seasonal coronaviruses, researchers report in *Nature Medicine* [19]. But very few clinical trial has opened the mystery of cloth mask against corona virus.

A comparison of homemade and surgical masks for bacterial and viral aerosols (**A Davies et al. 2013**) observed that both masks significantly block the number of microorganisms expelled by volunteers, even though surgical mask remained 3 times more effective [20]. A tea cloth mask was found to filter 60% of particles between 0.02 µm to 1 µm, where surgical masks filtered 75% (**Sande et al, 2008**) [21]. **N Leung, et al** found use of cloth masks can effectively filtered seasonal coronavirus which is of the same genus of SARS-CoV-2 in a community setting [19].

**Dato et al** (2006) note that "quality commercial masks are not always accessible." They designed and tested a mask made from heavyweight T-shirts, found considerable protection from challenge aerosol along with decent fitness and minimal leakage [22]. Although cloth and surgical masks are primarily targeted towards droplet, some evidence suggests about partial effect in reducing viral aerosol shedding (**Milton, 2013**) [23].

Different types of cloth have a wide-ranging capacity to screen virus-sized particles, though adjustment between filtration and ability to breathe is required. A mask made from 16 layers of handkerchief fabric was able to filter out 63% of 300-nanometer-sized particles was effective against coronavirus (50 to 200 nanometres in diameter) but that mask was non-breathable [10].

In a contradictory study where a controlled comparison has performed on effectiveness of surgical versus cotton masks in blocking SARS-CoV-2 among 4 patients, both seem to be ineffective in preventing SARS-CoV-2 to transmit to the environment and external mask surface (**Bae S et al**)[24].

**VI. WHICH ONE IS GOOD MATERIAL FOR MAKING CLOTH MASK?**

The CDC and Vanderbilt University Medical Center in Nashville recommends to use tightly woven cotton fabric (denim, jeans, bedding) for facial coverings as virus particles are tiny, ranging from 0.1 to 0.3 micron, so small-sized fibres allow for more compact fabric structures to reduce transmission, more comfortable to feel next to face and absorbs moisture well [25-26].

➤ *Aims of fabric selection for cloth mask*

- To reduce spread virus[26]
- To wrap around the face and be comfortable next to the skin[26]
- To be easy to wash and sanitize[26]

Therefore Cotton fabric (T - shirts, denims, jeans, bandanas, bedding) is more preferable as soft, non-stretchable, limited allergic reaction, absorbent, moisture regain 7-11%, 11-22 micron in size, easily washable, not damaged by detergent or bleach and can be dried at high temperature.

It is said to avoid knit fabrics because they create holes when they stretch, less protective against virus. Nonwoven interface and its substitute like HVAC filters, coffee filters, HEPA vacuum bags can also use as they have good filtration capabilities but if nonwoven fabric are too compacted, it impede breathing[26].

A three-layer system includes a space between the inner and outer layers for a removable middle one can be used. A replaceable "filter" can be put. It can be non-woven breathable filter along with anti-microbial finish [26].

**VII. HOW TO WEAR A CLOTH MASK?**

Cloth masks is advisable and recommended for public use or for an uninfected one. It's good that people are doing it but sometimes they are wrong in wearing it. Guidance about wearing the cloth mask is presented in Table -1.

Do's	Don'ts
Mask should come all the way up, close to the bridge of nose, and the way down under the chin.  It should be best to tighten, so it's snug around the face, without gaps.	Mask shouldn't wear below the nose or leave the chin exposed.  Mask shouldn't wear loosely with gaps on the sides.  It is instructed not to push the mask under chin to rest on one's neck.

Table 1:- Guidance and instruction to wear cloth masks in an effective way [27]

**VIII. WHAT ARE THE ETIQUETTES OF USING CLOTH MASK?**

- Always wash hands before wearing a mask.
- Mask should be secured with ties or ear loops [11].
- The anterior of the mask should not be touched and not to be put it anywhere, others can touch.
- One should not be pulling up or putting down the mask while in outside. One of the biggest mistakes is sometimes people pull them under their noses or completely off their faces [27-28].
- Individual should be alert not to touch eyes, nose or mouth at the time of removing cloth mask and immediately wash hands just after removal [27-28].

- Cloth mask should be washed daily and keep it in a clean, dry place without damaging
- People don't have a false sense of security. Masks offer limited protection, and work better when combined with hand washing, avoid unnecessary touching, respiratory etiquettes and social distancing

**IX. WHEN CLOTH MASK IS RECOMMENDED? AND WHEN IT'S NO NEED?**

Now using cloth masks or face covering is mandatory for public. But there are some scenario when it is not recommended.

When to wear a cloth mask	When not to wear a cloth mask
Trips to the grocery store, pharmacy, doctor or hospital At home if one is sick and have other people in the house Home care workers caring for vulnerable populations Riding the bus, taxi, or ride share Walking on a busy and crowded street	Going for a walk in the woods or in neighborhood. At home, if everyone in the home isn't showing symptoms Going for a run on the bike path, if it's not too crowded Children under the age of two, anyone who has difficulty in breathing Anyone who is unable to remove the mask without assistance

Table 2:- Recommendation for and against wearing of cloth masks [11]

**X. DISPOSE OF VS. REUSE OF THE MASK**

It is an advantage of cloth mask that it is washable and can reuse [29-30]. Before making it in home it is advisable to prewash the fabrics by using hot water to kill germs and to pre-shrink the material so it doesn't change shape after made. It is made sure to use dry masks as fabric could be more likely to transmit virus when get wet [11, 25]. So, the mask should be discard as soon as it's damp. To remove it, handle the elastic around the ears, touching the front should be avoided. The mask should be thrown away immediately either in a closed plastic bag or in a bin with a lid [11]. Cloth masks should be regularly washed with detergent by hand or in washing machine [11]. Bleach or other harsher chemicals should be avoided until we know its effect on the fabric [25]. It is guided to keep at least two cloth masks, so that they can be cycled for wash and dry after daily use. UV disinfection box or Sanitizer spray is also helpful for safe use of the mask in a single day [16].

**XI. CONCLUSION**

Among the COVID-19 patients 80 % are asymptomatic, only 15% turn into severe and 5% may become critical cases [31-33]. Across the globe there is a clear evidence of SARS-CoV-2 transmission from asymptomatic carriers [34]. Transmission probability is very high when a COVID-19 carrier without mask comes in contact with a healthy individual. The probability of transmitting would be less if everyone uses a face mask.

Therefore, to win the battle against SARS-CoV-2 a simple cloth mask can be an effective tool.

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