

# Practices and Problems Associated With the Mandatory Wearing of Face Masks among Medical Technologists and Nurses during COVID-19 Pandemic

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**Abstract:** Wearing Face Masks in public has been a mandatory protocol during the COVID-19 Pandemic. As with the medical practitioners like Medical Technologists and Nurses, an additional burden in contacting the virus would mean extra measures to consider. Personal Protective Equipment (PPE) will weigh an utmost barrier in protecting oneself from the pathogens and wearing it for a longer period of time entail problems. This study aims to identify and describe the practices and problems associated with the mandatory wearing of face masks among Medical Technologists and Nurses. The researchers used a descriptive-quantitative approach through an online survey by using a standardized research tool and a purposive sampling technique was applied. Collected data were statistically treated and analyzed using percentage, mean, and standard deviation. A total population of 230 respondents, comprising of 111 Medical Technologists and 119 Nurses. In determining the respondents' compliance with the mandatory wearing of face masks, it was found out that 93% practiced proper disposal of used face masks whereas the physiological complication is acne (67%) and 80% of the respondents said to have communication difficulties which is considered to be a psychological complication. There is a significant difference in the wearing of face mask practices between Medical Technologists and Nurses. Acne and communication difficulties are the physiological and psychological complications experienced by the two health professionals.

**Key Words—** *Face Masks, Practices, Physiological Complications, Psychological Complications, Medical Technologists, Nurses, COVID-19.*

## I. INTRODUCTION

Coronavirus 19 disease (COVID-19) is an infectious disease caused by a newly discovered corona virus. An outbreak of mysterious pneumonia in Wuhan since December 2019 has been drawing tremendous attention around the world. Chinese government and researchers have been taking swift measures to control the outbreak and conduct etiological studies.

In January 2020, there is a guideline from the World Health Organization that urged the healthy individuals in the community to wear face masks as protection from the infection

With Severe Acute Respiratory Syndrome Coronavirus 2 (SARS-CoV-2) (Cheng et al., 2020).

Medical masks help protect the nose and mouth from splattered body fluids, serve as air filter which is part of an infection control strategy to eliminate cross-contamination. Face Mask is a part of the Personal Protective Equipment (PPE) as stated in the Standard Precautions by the Center for Disease Control and Prevention (CDC), in 1996.

Face mask generally helps in the spread of infectious disease but may cause unanticipated workplace hazards such as heat stress, psychological stress, impaired vision (fogged eyeglasses), lapse in attention to a task, risk of self-contamination, potential headache and/or breathing difficulties, development of facial skin lesions, irritant dermatitis or worsening acne, difficulty with communicating clearly,

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discomfort, poor compliance with mask-wearing, waste management issues, and environmental hazard.

Medical Grade Masks should have a filtration efficiency of at least 95% against solid aerosols, liquid aerosols and non-greasy particles. (1) N95 Respirator Mask is a respiratory protective device designed with facial tight-fitting, unresistant to oil, and well-structured filtration for respiratory airborne droplets. It can be used for 6 to 8 hours. (2) KN95 respirators (China GB2626-2006) can be used for up to 24 hours. (3) Surgical mask is described as a loose-fitting, disposable medical mask and can be used for two hours (Chan, 2020).

A medical-grade mask can block up to 99% cough aerosol as compared with face shield that blocks only 2% of the cough aerosol. This suggests that face masks are preferable other than face shields and other personal protective equipment as source control devices for the prevention of transmission of COVID-19 (Lindsley et al., 2020).

Healthcare workers play a vital role, known as the most valuable resource for health. Thus, healthcare workers are the ones who offer treatment and services either directly as physicians and nurses or indirectly as aides, assistants, laboratory technicians, or even carriers of medical waste to the sick and ailing. (Joseph & Joseph, 2016). Nurses are mainly the key caregivers in the hospitals who are significantly influence the quality of care provided which makes nurses as the most exposed to the patients (Draper et al., 2008).

In testing who may have contacted COVID-19, Medical Technologists play a critical role in ensuring that healthcare practitioners can function safely and that quality care and treatment are available to all those who need it. As soon as the coronavirus 2 (SARS-CoV-2) causative pathogen, the extreme acute respiratory syndrome was detected and its genome sequence determined, a laboratory diagnosis based on nucleic acid amplification technology was rapidly developed and played a key role in confirming the clinical diagnosis (Fang & Meng, 2020).

#### *A. Practices in Wearing Face Masks*

The World Health Organization (2021) released an important guidelines on how to properly use a face mask: (1) Place the mask carefully, ensuring it covers the mouth and nose, and tie it securely to minimize any gaps between the face and the mask; (2) Avoid touching the mask while wearing it; (3) Remove the mask using the appropriate technique: do not touch the front of the mask but untie it from behind; (4) After removal

or whenever a used mask is inadvertently touched, clean hands using an alcohol-based hand rub or soap and water if hands are visibly dirty; (5) Replace masks as soon as they become damp with a new clean, dry mask; (6) Do not reuse single-use masks and discard after each use and dispose immediately upon removal. (7) Extra container to store the face mask when not in use. (8) Always bring extra set of face masks. (9) Follow the recommended number of hours for usage of each face mask.

#### *B. Physiological Complications*

*Headache:* According to a Singapore report, the wearing of face masks may cause or intensify headaches in healthcare workers responding to the 2019 coronavirus disease (COVID-19) crisis. According to the study conducted by a team of clinical researchers from the National University Hospital (NUH), (2020), the healthcare staff was predisposed to the development of new-onset PPE-related headaches with combined exposure to N95 face-mask and protective eyewear (e.g. goggles) used for more than four hours a day (Ong et al., 2020).

The position of pain or discomfort on the head was found to correspond anatomically to the areas of compression. Pressure in the temporomandibular joint (TMJ) that attaches at the lower jaw to the rest of the skull that can be triggered by wearing a tight face mask for a long time. As a mask pulls behind the ears, the muscles and tissues that allow the jaw to move may become irritated or tense. Pressure signals that can be detected as a headache can also be received from the nerves that affect the jaw (Ong et al., 2020).

*Heat Stress:* One needs to know what impact the wearing of different types of facemasks has on heat stress and discomfort.

There is a relative rise in warmth and dampness of the expired air allowing the formulation of moisture inside the surface of the mask, rather than the temperature across the outer surface of the mask, and it is influenced by the environment. Facemasks prevent normal transpiration and the dead space underneath the facemasks is hot and humid. And since it should cover the mouth and nose, it results in a decrease in the cooling impact of facial temperature (Li et al., 2005).

*Bruising:* The N95 face masks worn by healthcare workers in close contact with COVID-19 patients are air-tight, since the virus is easily transmittable, and travels in tiny respiratory droplets that can quickly make its way into the eyes, nose, and mouth and infect the individual with the virus. But the seal that a mask creates can be painful, and lead to irritation and bruising,

especially since healthcare workers are wearing the masks for several hours at a time.

The tightness of the face mask leaves an imprint on the skin. When with friction, humidity and sweat is a perfect ingredient for irritation leading to breakdown with the potential for bruising and discoloration (CDC, 2020).

*Red Rash and Dermatitis:* Since masks are essential, it is important to overcome the concerns on wearing it. Sometimes, for some people, wearing a mask can cause — or worsen — breakouts, rashes, and other skin problems on the face. One of which is often seen as a Perioral Dermatitis, a condition similar to rosacea. It can be observed with recurring bouts of a red, bumpy rash around the mouth and chin and can affect the eyes too.

Dermatitis is a term used to describe skin irritation. It is a condition that can be caused by different agents and occur in various forms. It usually involves itchy, dry skin or a rash on swollen, reddened skin. Or it may cause the skin to blister, ooze, crust, or flake off.

*ACNE:* All kinds of oils, sweat, and dirt, can be trapped by wearing a face mask. A person will need to constantly change the face mask, which may result in increased face-touching and mask-rubbing. These are all optimal conditions for the growth of mask-causing bacteria on the face (Rubin, 2020).

Thus, the term “maskne” was coined and is classified as a variant of *acne mechanica*, previously associated with headgear or personal protective equipment. Maskne is likely a disorder of follicular occlusion, and risk factors such as heat, pH, moisture, tropical climates, and outdoor exposure are most likely to increase the chance of getting a maskne. The clinical criteria proposed include the onset of acne within six weeks of the start of regular face mask wear, exacerbation of acne over the masked area, with a distinct pattern which is referred to as the O-zone. O-zone is the part of the face focused on the chin and parts of the cheeks (Chen, 2020).

*Mask Associated Dry Eye (MAD) And Impaired Vision:* MADE was first described by an ophthalmologist. White (2020) explained that airflow exhaled through the mask leads to evaporation, which then leads to a cooling of the cornea. Cold-sensing sensory nerves in the cornea are felt to be one underlying cause of neurogenic pain. Eyes feel sore, dry, and irritated, and may water and look red.

There are also instances of impaired vision due to fogged eyeglasses for people who have eye-wears. Individuals wearing glasses are more affected by the use of masks, as they collect

vapors on the glasses' lenses, which in turn decreases their ability to see (White, 2020).

*Hypoxia (Difficulty in Breathing):* The mask's physical barrier makes it difficult to breathe in oxygen; during exhalation, it also traps more carbon dioxide, which ensures end up breathing in warmer and moisture. Add to the equation a weakened respiratory system and a mask will feel downright suffocating.

Face masks make it harder to breathe. In addition, during each respiratory cycle, a portion of Carbon dioxide previously exhaled is inhaled. These phenomena increase the frequency and depth of breathing and can aggravate the burden of Covid-19 if more polluted air is spread by infected people wearing masks. If improved breathing forces the viral load down into the lungs, this can also exacerbate the health condition of infected people (Lazzarino, et. al., 2020).

### C. Psychological Complications

*Stress:* Wearing a mask with poor ventilation for a long time causes poor breathing and even a lack of oxygen. For instance, hypoxia may affect a human's body stress response and increase people's stress. Greater stress can damage mental and physical health. It is mainly reflected in the tendency to produce negative emotions such as anger, anxiety, depression, which will affect a person's normal life and can reduce work efficiency (Li et al., 2005).

*Speech and Communication Difficulty:* Wearing a face mask also serves as a communication barrier. Through this, there has been an issue that arises mainly with difficulty in understanding the person's speech.

According to American Speech-Language-Hearing Association (ASHA), with face masks on, muffle sounds were being produced, thus making it more difficult to understand speech and some higher-pitched voices. It can also be hard on people who have communication problems, like aphasia or voice problems. It is also way uncomfortable for some people, especially for those who wear hearing aids or cochlear implants (Mheidly et al., 2020).

## II. METHODOLOGY AND PROCEDURES

### A. Research Methodology

Quantitative descriptive research was implemented in conducting the study. According to Babbie (2010) and Mujis (2010), a quantitative method mainly focuses on gathering numerical data that emphasizes the statistical, numerical, and mathematical measurement of analysis via surveys,

questionnaires, and polls using an arithmetic approach. Descriptive research, as stated by Mc Combes (2019), is used to systematically characterize a situation or phenomenon by observing and measuring one or more variables.

**B. Sampling Technique**

The primary location of the research study is situated in the Philippines particularly in Region III or Central Luzon which consist of seven provinces namely Aurora, Bataan, Bulacan, Nueva Ecija, Pampanga, Tarlac and Zambales. The respondents of the study are Medical Technologists and Nurses. Using a Purposive sampling technique that is a non-probability sampling comprising of 230 participants divided into 111 Medical Technologists and 119.

**C. Research Tool**

The survey tool was a self-constructed questionnaire which were undergone Validity and Reliability Tests with a score of 0.713 (acceptable). The data were collected through an online survey via Google Forms.

The entire questionnaire is divided into 4 parts, which are the following:

Part I is the tool for the respondent’s profile including name (optional), age group, sex, province, profession, line of work, workplace, and field of the workplace (COVID/Non-COVID Facility).

Part II is the tool to assess the different practices of wearing face masks being followed by the Medical Technologists and Nurses.

Part III is the tool to identify the Physiological Complications encountered by the Medical Technologists and Nurses, with the mandatory and prolonged hours of wearing face masks.

Part IV is the tool to identify the Psychological Complications encountered by the Medical Technologists and Nurses, with the mandatory and prolonged hours of wearing face masks.

**D. Statistical Analysis**

Data collected were presented through descriptive statistics such as the frequency, percentage, mean, and standard deviation – processed and evaluated by the statistician. Replicate analyses between the level of practices between the two professions were expressed as means ± standard deviations of the mean, t-values were determined and p value of <0.05 was considered significant.

**III. RESULTS AND DISCUSSIONS**

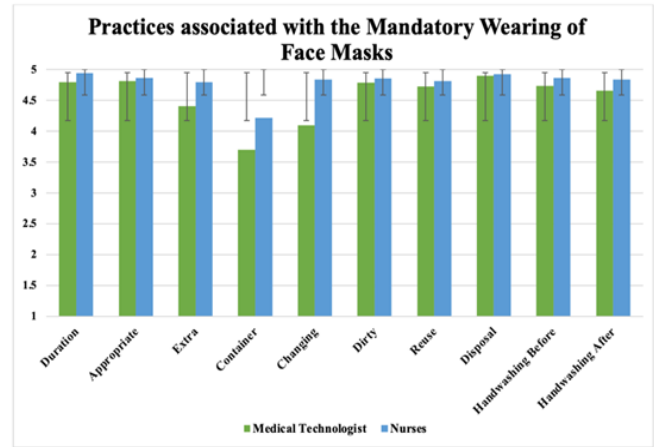


Fig.1. Practices associated with the mandatory wearing of face masks among Medical Technologists and Nurses during this COVID-19

The data that practice with the highest mean for Medical Technologist (4.90±0.356) and Nurses (4.93±0.283) is the proper disposal with 93% respondents who answered always or of the population. This result shows that the healthcare workers comply with the WHO guidelines, to not reuse the medical grade masks, which are considered as single-used masks.

Among the practices, containers to store face masks when not in use, gathered the overall mean and standard deviation, the Medical Technologists (3.70±1.523) while Nurses (4.22±1.250) which means implies that Nurses have slightly higher level of practices in terms of wearing facemasks rather than the Medical Technologists.

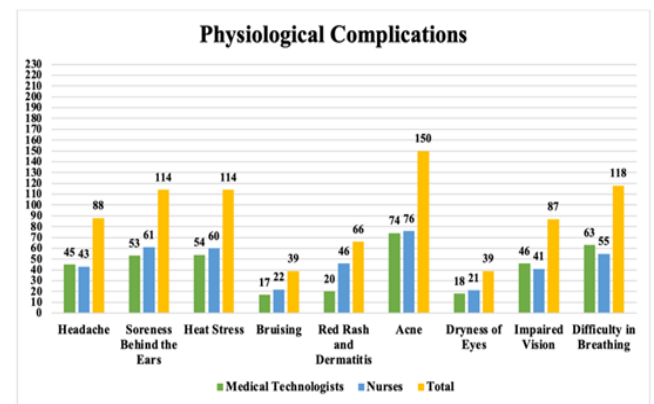


Fig.2. Physiological Complications encountered by Wearing of Face Masks of the Medical Technologists and Nurses

The percentage of physiologic complications are as follows: In 111 respondents of Medical Technologists, 32% experienced Acne, 27% experienced Difficulty in Breathing, 23% experienced Soreness behind the ears, 23% experienced Heat Stress, 20% experienced Impaired Vision, 19% experienced Headache, 9% experienced Red Rash and Dermatitis, 8% experienced Dryness of eyes and, 7% experienced Bruising. Meanwhile, among 119 respondents of Nurses, 33% experienced Acne, 26% experienced Soreness behind the ears, 26% experienced Heat Stress, 24% experienced Difficulty in Breathing, 20% experienced Red Rash and Dermatitis, 19% experienced Headache, 18% experienced Impaired Vision, 10% experienced Bruising, and 9% experienced Dryness of eyes.

In general, the highest complication encountered is Acne with 67% – related to this is the study of Chen (2020), wherein the term “*Maskne*” is coined. Acne are most prone to occur due to the prolonged wearing of mask – trapping dirt, sweat and dust in the skin.

Meanwhile, the lowest complications encountered are Bruising, which is due to the tightness of the face mask (CDC, 2020) and Dryness of eyes, which is due to the exhaled air evaporated in the direction of the eyes (White, 2020) – both with 17%.

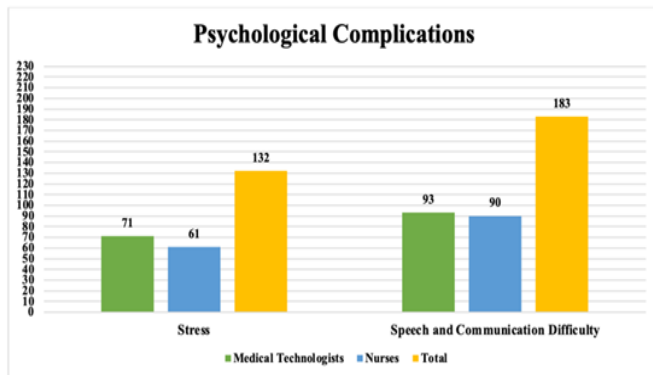


Fig.3. Psychological Complications encountered by Wearing of Face Masks of the Medical Technologists and Nurses

Data represent the percentage of psychological complications wherein 40% of Medical Technologists and 39% of Nurses experienced Speech and Communication difficulty. In line with this is the study of Tian (2020), in which muffled sounds are being produced when talking while wearing face mask resulting to miscommunication.

Meanwhile, 31% of Medical Technologists and 27% of Nurses answered Stress. In general, an overall, 80% of the population experienced speech/communication difficulty and 57% experienced stress.

#### IV. CONCLUSION

The research study aimed to identify and describe the practices and the problems associated with wearing face masks among Medical Technologists and Nurses. The participants were 230 Medical Technologists and Nurses working in Region III (Central Luzon, Philippines). The respondents signed an informed consent and answered the instrument of the study through an online survey link.

Therefore, with the results shown from the data which is supported by the other studies and literature gathered, it is concluded that the practices and problems encountered while wearing face masks have a significant difference in the situation of Medical technologists and Nurses during this COVID-19 Pandemic.

For the practices of wearing face masks, the mean values showed that the Nurses have a high level of rate in following in practice the duration of wearing face masks which has significance between the overall level of practices of Nurses and Medical Technologists. Hence, Medical technologists overall (Mean = 4.56, Standard Deviation = 0.365) on a 5-point Likert scale. In comparison between Medical Technologists and Nurses who work on COVID-19 facilities, the data obtained shows that Nurses have the highest mean among the significance in the level of practices of Nurses in terms of appropriate wearing of face masks (Mean = 4.75, Standard Deviation = 0.298). Hence, In comparison to the level of practices between Medical Technologists and Nurses working on Non-Covid-19 facilities has no significance observed.

For the physiological complication encountered while wearing the face mask of Medical Technologists and Nurses, it showed that the high percentage encountered is Acne with 67% followed by Difficulty in breathing with 51% and followed by Soreness or Redness behind the ears and Heat stress or Excessive Sweating – both with 50%. For the psychological complications encountered by Medical technologists and Nurses while wearing face masks, it showed that the high



percentage obtained is Speech or Communication Difficulty with 80%.

## REFERENCES

- [1]. Babbie, E. (2010) *the Practice of Social Research*. 12th ed. Belmont, CA: Wadsworth Cengage
- [2]. CDC. (1996) *Hospital Infection Control Practices Advisory Committee. Guideline for isolation precautions in hospitals. Infect Control Hosp Epidemiol* 1996.
- [3]. CDC. (2021). *How to Make Masks to Help Slow Spread*.
- [4]. Chan, T. (2020). *N95 Mask vs. KN95 Mask Difference: Where to Buy Online? Which Is Best?* Rolling Stone.
- [5]. Chen, A. (2020). *Coronavirus: Tips to Avoid “Maskne” Skin Irritation* | Johns Hopkins Medicine.
- [6]. Cheng, K. K., Lam, T. H., & Leung, C. C. (2020). *Wearing face masks in the community during the COVID-19 pandemic: altruism and solidarity*. In *The Lancet*. Lancet Publishing Group.
- [7]. Dayrit, M., Lagrada, L., Picazo, O., Pons, M., Villaverde, M. (2018). *The Philippine Health System Review*. European Union. (Vol. 8, No. 2, p. 177).
- [8]. Draper DA, Felland LE, Liebhaber A, Melichar L. *The role of nurses in hospital quality improvement*. *Res Brief*. 2008 Mar; (3):1-8.
- [9]. Fang, B., & Meng, Q. H. (2020). *The laboratory’s role in combating COVID-19*. *Critical Reviews in Clinical Laboratory Sciences*, 57(6), 400–414.
- [10]. FDA Advisory No. 2020-1374 || *Advice On The Use Of Face Mask With Valve - Food and Drug Administration of the Philippines*. (2020).
- [11]. Gulino, E. (2020). *N95 Face Masks Are Giving Nurses Bruises On Face*.
- [12]. Joseph, B., & Joseph, M. (2016). *The health of the healthcare workers*. In *Indian Journal of Occupational and Environmental Medicine* (Vol. 20, Issue 2, pp. 71–72). Medknow Publications.
- [13]. Kelkar, U. S., Gogate, B., Kurpad, S., Gogate, P., & Deshpande, M. (2018). *How effective are face masks in operation theatre? A time frame analysis and recommendations*. *International Journal of Infection Control*, 9(1), 1–6.
- [14]. Lazzarino, A. I., Steptoe, A., Hamer, M., & Michie, S. (2020). *Covid-19: Important potential side effects of wearing face masks that we should bear in mind*. In *The BMJ* (Vol. 369). BMJ Publishing Group.
- [15]. Li, Y., Tokura, H., Guo, Y. P., Wong, A. S. W., Wong, T., Chung, J., & Newton, E. (2005). *Effects of wearing N95 and surgical facemasks on heart rate, thermal stress and subjective sensations*. *International Archives of Occupational and Environmental Health*, 78(6), 501–509.
- [16]. Lindsley, W. G., Blachere, F. M., Law, B. F., Beezhold, D. H., & Noti, J. D. (2020). *Efficacy of face masks, neck gaiters and face shields for reducing the expulsion of simulated cough-generated aerosols*. *Aerosol Science and Technology*, 1–12.
- [17]. Liu, Y. C., Kuo, R. L., & Shih, S. R. (2020). *COVID-19: The first documented coronavirus pandemic in history*. In *Biomedical Journal* (Vol. 43, Issue 4, pp. 328–333).
- [18]. McCombes, S. (2019). *Descriptive Research Design | Definition, Methods and Examples*.
- [19]. Mheidly, N., Fares, M. Y., Zalzal, H., & Fares, J. (2020). *Effect of Face Masks on Interpersonal Communication during the COVID-19 Pandemic*. *Frontiers in Public Health*, 8, 582191.
- [20]. Muijs, Daniel. (2011) *Doing Quantitative Research in Education with SPSS*. 2nd edition. London: SAGE Publications.
- [21]. Ong JY, Bharatendu C, Goh Y, Tang JZY, Sooi KWX, Tan YL, Tan BYQ, Teoh HL, Ong ST, Allen DM, Sharma VK. *Headaches Associated With Personal Protective Equipment - A Cross-Sectional Study Among Frontline Healthcare Workers During COVID-19*. *Headache*. 2020 May; 60(5):864-877.
- [22]. Rodriguez-Martinez, C. E., Sossa-Briceño, M. P., & Cortés, J. A. (2020). *Decontamination and reuse of N95 filtering facemask respirators: A systematic review of the literature*. *American Journal of Infection Control*, 48(12).
- [23]. Rubin, C., (2020). *Maskne Is the New Acne, and Here’s What Is Causing It - The New York Times*. *American Journal of Infection Control*, 48(12).
- [24]. Summit Orthopedics. (2020) *Can a Face Mask Give You a Headache?*
- [25]. Teo, W.-L. (2020). *Diagnostic and Management Considerations for ‘Maskne’ in the Era of COVID-19*. *Journal of the American Academy of Dermatology*.
- [26]. Tian, Z., Kim, B.-Y., & Bae, M.-J. (2020). *A Study on the Effect of Wearing Masks on Stress Response*.
- [27]. White, D. E. (2020). *MADE: A new coronavirus-associated eye disease*.
- [28]. WHO. (2021). *COVID-19 Clinical management: living guidance*.
- [29]. Yuxiang Can Making. (2020). *KN95 Shield\_Changzhou Yuxiang Canning Making Co., Ltd*.