

Incorrect Use of Protective Equipment against COVID-19 can cause more Inconvenience, a Questionnaire-Based Study of 7000 Participants

Abstract

Aims: At present, there is no definitive treatment for COVID-19 and to break the pandemic chain, prevention is the best choice. Meanwhile different controlling strategies are considered, in this study, we aimed to understand public insights toward the medical advisement. **Material:** A self-constructed questionnaire including information regarding various preventive elements such as wearing a mask, using gloves, attention to safe social distance, using disinfectant materials was prepared. After content validity, the questionnaire was circulated in cyberspace and the public was invited to complete it. After five days, the percentage of risky behavior related behaviors to the mask (RBM), hygiene (RBH), and social distance (RBD) were analyzed and compared in different situations with tableau and SPSS 26. **Results:** A total of 7,000 people with the mean age of 31.5 ± 12.2 years completed the questionnaire, of which 39% were men. RBM was 76.54% whereas hand hygiene and distance risky behaviors were 11.49% and 15.33%, respectively ($P = 0.01$). RBD was significantly higher among people with COVID-19 patients in their families. The pattern of RBH based on the level of worry about getting COVID-19 was similar in the group without worry and with the highest level of worry. **Conclusions:** In this ever-changing situation of the COVID-19 pandemic, community awareness, and logical perception regarding correct use and has a crucial role in optimal COVID-19 controlling, which should not be neglected. It is important to have the latest information, which comes from trustworthy sources as a preventive key in both healthcare and community settings.

Keywords: COVID-19, pandemics, society attitude, surveys and questionnaire

Introduction

The outbreak of Novel coronavirus disease (COVID-19) was initially noticed from China in mid-December, 2019, and then has spread worldwide that on January 30, the World Health Organization declared the coronavirus outbreak a Global Public Health Emergency.^[1] The case fatality rate has been estimated at around 2%, in the WHO press conference held on January 29, 2020, and WHO's estimated R_0 (r-zero) is 1.4 to 4.0.^[2,3] For comparison, the R_0 for the common flu and SARS is 1.3 and 2.0, respectively.^[4]

There is clear evidence of direct transmission of COVID-19 through respiratory droplets generated during cough, sneeze, or exhale and fecal shedding of the symptomatic patient and even asymptomatic carrier. It also gets transmitted by indirect and airborne transmission.^[5,6] Thus, because of significant environmental contamination

by infected patients, the environment is mentioned as a potential medium of transmission and supports the need for strict adherence to personal hygiene.^[7]

Personal Protective Equipment (PPE) is protective gear designed to safeguard the health of workers by minimizing the exposure to a biological agent. Although Components of PPE are goggles, face-shield, mask, gloves, coverall/gowns (with or without aprons), headcover, and shoe cover that each component has its rationale for use. The main parts of PPE for patient and society members could be masks although PPEs are not an alternative to basic preventive public health measures such as hand hygiene. As public health interventions are being deployed in every country, active engagement of many specific groups ranging from health care professionals to taxi drivers through different approaches as well as through social media are critically important.^[8] There is a pressing requirement to reduce

Shafaghi Shadi,
Ghorbani Fariba¹,
Taranian Zohreh²,
Doozandeh Neda¹,
Varahram
Mohammad³

Lung Transplantation Research Center, National Research Institute of Tuberculosis and Lung Diseases, Shaheed Beheshti University of Medical Sciences, Tehran, Iran,
¹Tracheal Diseases Research Center, National Research Institute of Tuberculosis and Lung Diseases, Shaheed Beheshti University of Medical Sciences, Tehran, Iran,
²Mycobacteriology Research Center, National Research Institute of Tuberculosis and Lung Diseases, Shaheed Beheshti University of Medical Sciences, Tehran, Iran,
³Statistical Centre of Iran

Address for correspondence:

Dr. Fariba Ghorbani,
Tracheal Diseases Research Center, National Research Institute of Tuberculosis and Lung Diseases, Shaheed Beheshti University of Medical Sciences, Tehran, Iran.
E-mail: Dr.f.ghorbani@sbmu.ac.ir

Access this article online

Website:
www.ijpvmjournal.net/www.ijpvm.net

DOI:
10.4103/ijpvm.IJPVM_228_20

Quick Response Code:



How to cite this article: Shadi S, Fariba G, Zohreh T, Neda D, Mohammad V. Incorrect use of protective equipment against COVID-19 can cause more inconvenience, a questionnaire-based study of 7000 participants. Int J Prev Med 2022;13:12.

This is an open access journal, and articles are distributed under the terms of the Creative Commons Attribution-NonCommercial-ShareAlike 4.0 License, which allows others to remix, tweak, and build upon the work non-commercially, as long as appropriate credit is given and the new creations are licensed under the identical terms.

For reprints contact: reprints@medknow.com

community viral spread by finding better accurate ways to communicate and engage the public.^[9] The attitude of society toward the presented information is another confounding factor that should be addressed. This study aimed to understand public perceptions of pandemic interventions to determine the level of national knowledge and motivate them to follow medical advisement by preparing educational materials facilitates via gathering peoples' concerns.

Methods

The researchers' concern in this study was not only the use of preventive equipment but more importantly, the proper use of these devices. A self-constructed questionnaire including information regarding various preventive elements such as wearing a mask, using gloves, attention to safe social distance, using disinfectant materials was prepared. Content validity was assessed by different people including the general population and medical team and some questions regarding the content or available answers were modified, The Final content validity index was more than 90% for all questions. Then, the questionnaire was circulated on March 2020 in cyberspace and the public was invited to collaborate to complete it. Communication channels have been utilized as social messaging platforms including websites, WhatsApp, Telegram, and Instagram. All people were welcome to the study and in case of completing the questionnaire, the forms were eligible for analysis.

After five days, the results were reviewed and analyzed with tableau and SPSS 26.

The questionnaire has three important sections:

- 1- Behaviors related to the mask was considered as RBM (related behaviors to mask)
High-risk behaviors about RBM was corresponded to any incorrect use of the mask, manipulating and movement of the mask outdoors for the speaking or other situations, or hanging the mask from the chin that increases the possibility of exposure to contamination. Cronbach's Alpha >0.8.
- 2- The behaviors related to handwashing, wearing gloves, and using sanitizers were mentioned RBH (related behaviors to hygiene), Cronbach's >0.8
High-risk behaviors concerning RBH refer to not performing hand hygiene frequently and completely with an alcohol-based hand rub or soap and water for enough time (at least 20 seconds).
- 3- Finally, the ones corresponded to the safe social distance were stated RBD (related behaviors to distance).
High-risk behaviors regarding RBD means not maintaining social distance (a minimum of 1.5 m) from individuals or staying at home for quarantine
The distribution of RBM, RBH, and RBD was compared in either sex, age, jobs, and different situations obtained through the questions. In the case of high-risk behavior,

the researchers tried to clarify the exact cause in each scenario.

Ethical consideration

The questionnaire was an anonymous and simple type. We put also useful information regarding safe-behaviors during the Covid-19 pandemic. The data bank was available only for the research team.

Statistical analysis

For statistical analysis, SPSS statistics software version 26.0 and Tablue were used. Quantitative data were stated as Mean \pm SD and qualitative variables were expressed as a percent. The ordinal scales were compared employing Mann-Whitney-u or Kruskal Wallis. Logistic regression was used to report Odds. The statistical significance level was considered by the *P* value of <0.05, CI: 95%.

Results

In the first five days of the study, the response rate was 53% and 7,000 people with the mean age of 31.5 ± 12.2 years completed the questionnaire, of which 39% were men. The more the questionnaire was circulated in the authorized space, the better the chances that men would complete the questionnaire. In another word, among the last 1,000 people who completed the questionnaire, 48% were gentlemen.

The age category of the participants is summarised in Table 1. Various kinds of jobs and levels of education such as employees, teachers, drivers, students, shopkeepers, etc. were contributed to the study.

Overall, 55% of people use the mask when they go out the door. Meanwhile, 26% of people were not able to use the mask easily due to their limitations, more than 45% of people believe only N95 or N 99 are useful for protection.

Mask-related high-risk behavior was 76.54% whereas hand hygiene and distance risky behaviors were 11.49% and 15.33%, respectively (*P* = 0.01).

Mask-related high-risk behaviors, were significantly more common in age-category of 15 to 24 years old (86.95%) compared to the other age groups which are summarized in Table 1 (*P* = 0.02).

Although individuals aged more than 24 years old followed handwashing recommendations better, it was poor in

Table 1: Percentage of high-risk behaviours concerning RBM, RBH, and RBD in different age categories

Age category (years)	n (%)	RBM (%)	RBH (%)	RBD (%)
<15	73 (1.02)	83.56	23.29	12.33
15-24	261 (3.66)	86.59	14.18	16.86
24-65	6542 (91.86)	82.71	6.47	21.17
>65	246 (3.45)	83.33	2.03	10.98
<i>P</i>	-	0.46	0.000	0.000

younger persons. In this regard, younger persons had a high-risk behavior of 23.29%. Hence, RBD was impaired in participants in the range of 24–65 years old.

From the gender point of view, high-risk behavior was somehow higher among men compared to women. RBM was 83.30% and 82% in men and women, respectively ($P = 0.09$).

RBH in men (6.14%) was almost as similar as women (7.17%) but social distance behavior was more protective among women compared to the men. Indeed RBD was 17.61% and 25.18%, respectively ($P = 0.02$).

In terms of education, high-level educated persons had a lower rate of high-risk behavior in all categories. High-risk behaviors of RBM were 80% among persons with master or higher degree. While among other levels of education, it was more than 85%. High-risk behaviors of RBH were significantly higher among uneducated people (13.63%).

Respecting positive Covid-19 patients in the family, participants were categorized into two groups; people with Covid-19 patients in the family or not. High-risk behaviors of RBD were more common (30.8%) than other un-safe behaviors that were shown in Figure 1. Among those with and with no Covid-19 patients, RBM was 82.8% vs 62.2% ($P = 0.004$, Odds = 2.98).

Our participants have different levels of concern about covid-19. We analyzed their high-risk behaviors including RBM, RBH, and RBD according to their worry in Figure 2.

People with either no worry or very much had lower risky behaviors. But in case of low and much worry about getting the disease, there were more unsafe behaviors.

Regarding sources of obtaining proper information about Covid-19 protection, 56.57% and 26.7% of the general population get their information from TV programs and social networks respectively. Eight percent of participants got their information directly from well-informed people and in this category, RBM was significantly lower than whom received their information from TV and social networks as the first source (80%, 83.9%, and 82.9%,

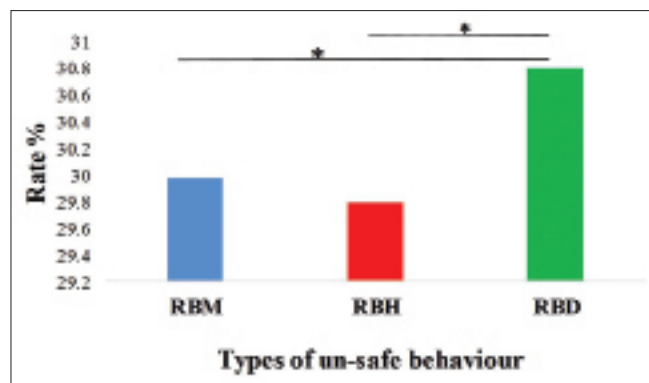


Figure 1: Percentage of high-risk behaviors concerning RBM, RBH, and RBD in people with Covid-19 patients in their family

$P = 0.01$, respectively), RBH was also 5.7%, 7.1%, and 7.5% ($P = 0.03$, respectively) while RBD was 23.3%, 18.6%, and 24.7%, $P = 0.00$. Thus, RBD dramatically diminished by TV programs.

Discussion

In this study, we analyzed the various behaviors for covid-19 protection in society. Regarding using the mask as a protection device, although 55% of the people use different kinds of masks, only 20% of them were aware of correct utilization.

According to some guidelines, for the susceptible person, it is recommended to avoid crowded regions and use surgical masks when exposing to a high-risk situation.^[10] Moreover, using masks by the general population is yet to answer although there is an agreement to use masks in symptomatic patients and health providers in medical centers.^[11] Also, caregivers who provide any care to the Covid-19 outpatients should use protective equipment including masks.^[12]

By the way, considering the fact that the virus survives in the air for hours, rather than using a face mask, appropriately usage is important. In this study, the wrongest behavior was touching the front part of the mask, frequently manipulation and repositioning for speaking. Indeed, in case of any hand-contamination, these manners will result in infection transmission. Incorrect usage of the mask will more expose the consumer to be contaminated. Unfortunately, these kinds of behaviors are common even among health providers that can be observed in the media. These risky behaviors among young persons are more important due to their attitude based on belief to follow the protection rules. Besides, it is of value that about one-quarter of the people cannot use the mask because of some personal difficulties. Thus, it seems that we need more creativity in this field to replace conventional masks with other friendly use options.

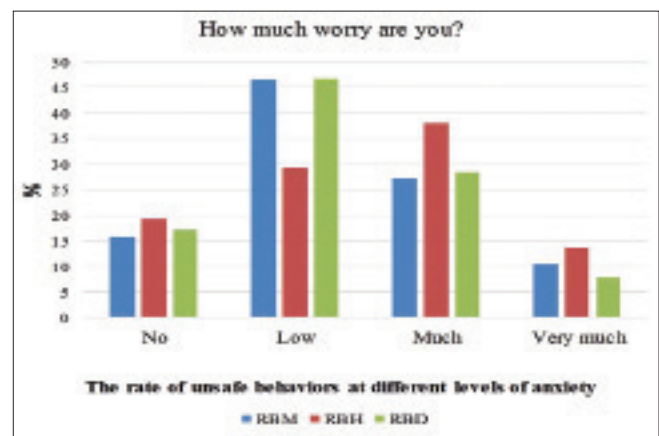


Figure 2: Percentage of high-risk behaviors concerning RBM, RBH, and RBD based on the level of worry about getting Covid-19 (no, low, much, and very much worry)

Since the virus Covid-19 is surviving for several hours to several days in the air or on the surfaces, individual hygiene tips such as regular hand washing is another concern.^[13] Given the fact that respecting the time of handwashing was not followed by 11.49% of the people for the reasons such as disremembering or unbelief in the idea, the supply of disinfectant should be more available through the outdoor environment. Correspondingly, using a wet towel containing soap or sodium hypochlorite is recommended to cover this limitation.^[13,14]

Employing PPE could create potential psychological benefits due to offering a sense of security. Despite the reported psychological benefits, using PPE is a double-edged sword; less level of anxiety can result in lower society attention to follow recommendations like hand hygiene and quarantine.^[15] Moreover, rational use of the limited sources to avoid overuse, misuse, and keeping the level of PPE are other concerns that should be considered.^[16]

Studies in many countries such as China^[17] and India^[18] demonstrated restrictions on activities especially school and workplace closures and quarantine would probably lead to delay epidemic peak especially in the absence of vaccines. Physical distancing and health promotions to avoid crowded places are often used in epidemic settings. Providing a clear rationale for the benefits of quarantine to society and ensuring sufficient supplies can be favorable that the public follows the social distance rules accurately.^[19]

Conclusion

In this ever-changing situation of the COVID-19 pandemic, it is important to have the latest information, which comes from trustworthy sources as preventive and mitigation keys in both healthcare and community settings. Community awareness has a crucial role in optimal COVID-19 controlling, which should not be neglected in any way. In this regard, regular monitoring of public awareness and attention to wrong behaviors to properly plan to correct them should be a serious task of health systems.

Author's contribution

To do this study, all authors contribute to the conception and design of the work. And cooperate for acquisition, analysis, and interpretation of the data. All authors discussed the results. Final approval of the version to be published was performed by all authors too.

Ethical approval

This animal study was approved by the Ethics Committee of the National Research Institute of Tuberculosis and Lung Diseases. Shahid Beheshti University of Medical Sciences, Tehran, Iran. *IR.SBMU.NRITLD.REC.1399.057*.

Acknowledgment

We appreciate Professor Parisa Farnia for her kindly supporting the project. We would like to thank Dr. Seyed Mohammad Seyedmehdi and all the participants that contributed their expertise to the development of the questionnaire. We also like to thank all people who completed the questionnaire and in particular, Gostar Gista System.

Financial support and sponsorship

This Manuscript was supported by the National Research Institute of Tuberculosis and Lung Diseases (NRITLD).

Conflicts of interest

There are no conflicts of interest.

Received: 02 May 20 **Accepted:** 27 Jul 20

Published: 19 Jan 22

References

1. Cascella M, Rajnik M, Cuomo A, Dulebohn SC, Di Napoli R. Features, Evaluation, and Treatment Coronavirus (COVID-19). In: StatPearls [Internet]. StatPearls Publishing; 2020.
2. World Health Organization. Statement on the second meeting of the International Health Regulations (2005) Emergency Committee regarding the outbreak of novel coronavirus (2019-nCoV). 2020.
3. Zhao S, Lin Q, Ran J, Musa SS, Yang G, Wang W, *et al.* Preliminary estimation of the basic reproduction number of novel coronavirus (2019-nCoV) in China, from 2019 to 2020: A data-driven analysis in the early phase of the outbreak. *Int J Infect Dis* 2020;92:214-7.
4. Contini C, Di Nuzzo M, Barp N, Bonazza A, De Giorgio R, Tognon M, *et al.* The novel zoonotic COVID-19 pandemic: An expected global health concern. *J Infect Dev Ctries* 2020;14:254-64.
5. Shim E, Tariq A, Choi W, Lee Y, Chowell G. Transmission potential and severity of COVID-19 in South Korea. *Int J Infect Dis* 2020;93:339-44.
6. Holland M, Zaloga DJ, Friderici CS. COVID-19 Personal Protective Equipment (PPE) for the emergency physician. *Vis J Emerg Med* 2020;19:100740.
7. Ong SWX, Tan YK, Chia PY, Lee TH, Ng OT, Wong MSY, *et al.* Air, surface environmental, and personal protective equipment contamination by severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) from a symptomatic patient. *JAMA* 2020;323:1610-12.
8. Cook AR, Zhao X, Chen MIC, Finkelstein EA. Public preferences for interventions to prevent emerging infectious disease threats: A discrete choice experiment. *BMJ Open* 2018;8:e017355.
9. Wong JEL, Leo YS, Tan CC. COVID-19 in Singapore—Current experience: Critical global issues that require attention and action. *JAMA* 2020. doi: 10.1001/jama.2020.2467.
10. Adams JG, Walls RM. Supporting the health care workforce during the COVID-19 global epidemic. *JAMA* 2020;323:1439-40.
11. Pagliano P, Kafil HS. Protection and disinfection policies. 2020;2.
12. World Health Organization. Rational use of personal protective equipment for coronavirus disease (COVID-19): Interim guidance, 27 February 2020. World Health Organization; 2020.
13. World Health Organization. Water, sanitation, hygiene and waste management for COVID-19: Technical brief, 03 March 2020. World Health Organization; 2020.

14. Ma QX, Shan H, Zhang HL, Li GM, Yang RM, Chen JM. Potential utilities of mask wearing and instant hand hygiene for fighting SARS-CoV-2. *J Med Virol* 2020. doi: 10.1002/jmv.25805.
15. Wang C, Pan R, Wan X, Tan Y, Xu L, Ho CS, *et al.* Immediate psychological responses and associated factors during the initial stage of the 2019 coronavirus disease (COVID-19) epidemic among the general population in China. *Int J Environ Res Public Health* 2020;17:1729.
16. Cook TM. Personal protective equipment during the coronavirus disease (COVID) 2019 pandemic—a narrative review. *Anaesthesia* 2020;75:920-7.
17. Prem K, Liu Y, Russell TW, Kucharski AJ, Eggo RM, Davies N, *et al.* The effect of control strategies to reduce social mixing on outcomes of the COVID-19 epidemic in Wuhan, China: A modelling study. *Lancet Public Heal* 2020;5:e261-70.
18. Sengupta S, Jha MK. Social policy, COVID-19 and impoverished migrants: challenges and prospects in locked down India. *Int J Community Soc Dev* 2020;2:152-72.
19. Brooks SK, Webster RK, Smith LE, Woodland L, Wessely S, Greenberg N, *et al.* The psychological impact of quarantine and how to reduce it: Rapid review of the evidence. *Lancet* 2020;395:912-20.