

# ANALYSIS OF COVID TRANSMISSION TO NURSES IN THE HOSPITAL

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## ABSTRACT

*COVID-19 is still an outbreak that has not been resolved throughout the world. Nurses as one of the health workers who work at the forefront of health services are at risk of being exposed to COVID-19. Until now, the number of nurses who died as a result of exposure to COVID-19 has increased. This study aims to analyze the modes of transmission of COVID-19 in nurses. This type of research is quantitative research with analytic descriptive design. The number of respondents in the study was 31 nurses, which were obtained by using total sampling technique. The results of this study indicate that the transmission of COVID-19 to nurses occurs due to a history of contact with COVID-19 patients (80,6%), eating habits with colleagues (67,7%), treating patients with confirmed COVID-19 in a non-isolation room (67,7%), history of contact with hospital staff confirmed COVID-19 (51,6%), and visiting crowded places such as traditional markets (45,2%)*

**Keywords:** Covid-19, Hospital, Nurses, Transmission

## 1. INTRODUCTION

Corona Virus Disease 2019 (COVID-19) is still an outbreak that has not been resolved worldwide. The first case of COVID-19 occurred in December 2019 in Wuhan City, China. The COVID-19 outbreak was caused by a virus called Severe Acute Respiratory Syndrome Coronavirus 2 (SARS-CoV-2) which has an ecological origin from the bat population. This virus causes respiratory illness in humans, from the common cold to more serious illnesses such as Severe Acute Respiratory Syndrome (SARS) and Middle East Respiratory Syndrome (MERS), both of which were detected for the first time in 2003 and 2012. To date, the number of COVID-19 cases is increasing day by day in various countries in the world.

World Health Organization (2020) reported that there were 8.3 million confirmed cases of COVID-19 in the world as of June 19, 2020. The total number of COVID-19 patients who died was 450,686 people. For positive cases of COVID-19 in Indonesia up to June 19, 2020, there were 43,803 cases. There was an increase of 1,041 cases from the previous day. The total number of patients who recovered was 17,349 people, while the number of positive COVID-19 patients who died was 2,373 people (Ministry of Health, 2020). As cases of COVID-19 continue to increase, public attention in Indonesia about the severity of the disease and vulnerability to exposed populations has also increased, especially for health workers. Nurses as health workers who work in hospitals or other health facilities are at very risk of being exposed to COVID-19 (Li, Peng, Wang, Ping, Zhang, & Fu, 2020). On April 12, 2020, the International Council of Nurses (ICN) first reported that more than 100 nurses had died from COVID-19. The ICN update on 6 May showed that 90,000 health workers had been infected and more than 260 nurses had died. As of June 3, the number of nurse deaths had risen to more than 600 nurses. Nurses and other health workers are at the forefront of health care who are highly likely to become infected with COVID-19 (ICN, 2020).

The large number of increasing cases of COVID-19 that occur from day to day, requires hospitals to open COVID-19 care services. Murni Teguh Memorial Hospital as one of the private hospitals in Medan City opened COVID-19 services for the first time in March 2020. Before this service was opened, the hospital had prepared Human Resources (HR), facilities and channels for providing services to patients with COVID-19 and expose staff to preventive measures. However, the risk of staff exposure cannot be eliminated given the conditions of this pandemic. In June 2020, it was discovered for the first time that Murni Teguh Memorial Hospital staff who had confirmed COVID-19 were detected by means of an RT-PCR examination. Until now, the source of the transmission of COVID-19 is still difficult to understand because there are several nursing personnel who died or were confirmed positive for COVID-19, not from the special COVID-19 treatment room. Based on this, it is important to analyze the source of transmission of COVID-19, especially in nursing personnel in hospitals.

## **2.METHODS**

This research used descriptive analytic method. It was conducted at Murni Teguh Memorial Hospital in July-August 2020. The population of this study were all nurses of Murni Teguh Memorial Hospital who experienced COVID-19. The number of respondents in the study was 31 nurses, which were obtained by using total sampling technique.

Collecting data in this study, namely through the distribution of demographic data questionnaires, and COVID-19 transmission questionnaires to nurses using google form which were sent personally to each research respondent. The demographic data questionnaire consisted of the initials name, age, gender, work unit, medical history, and comorbid diseases. For the COVID-19 transmission questionnaire to nurses, it is divided into 2 (two) parts, namely questions related to behavior at the hospital and outside the hospital. Questions related to behavior at the hospital contained 9 (nine) items and questions related to behavior outside the hospital contained 8 items. This questionnaire is in the form of multiple choice. This questionnaire is modified from the World Health Organization (WHO) questionnaire entitled Health workers exposure risk assessment and management in the context of COVID-19 virus.

The data that has been collected through a questionnaire sheet is then processed by the researcher through four stages, namely editing, coding, data entry, and cleaning. The results of this study were analyzed using descriptive analysis through the distribution of frequencies and percentages of data which included demographic data and the prevalence of transmission of COVID-19 by nurses. The analysis process is carried out using computerization by producing output tables in the form of descriptive data and frequency distribution tables

### **3.RESULTS**

Respondents involved in this study who were confirmed positive for COVID-19, totaling 31 people. It is known that most of the nurses are in the 26-35 years age group, 15 people (48.4%). The majority of nurses were female, 27 people (87.1%). For work units, it was found that it varied, but the majority of nurses who were exposed to COVID-19 came from inpatient rooms, 16 people (51.6%). Regarding a history of disease and comorbid diseases, the majority of respondents did not have a history of disease, 26 people (83.9%). Demographic characteristics of respondent are detailed in table 1 below.

Table 1.  
Demographic characteristics of respondent (n=31)

Characteristics	Frequency	Percentage
<b>Age</b>		
17 – 25 years	11	35,5
26 – 35 years	15	48,4
36 – 45 years	3	9,7
46 – 55 years	2	6,5
<b>Gender</b>		
Female	27	87,1
Male	4	12,9
<b>Work Unit</b>		
Polyclinic	1	3,2
Inpatient room	16	51,6
Intensif Care	2	6,5
Emergency	2	6,5
Hemodialysis	4	12,9
Palliative	2	6,5
Oncology	1	3,2
Operating Theater	2	6,5
Wound Care	1	3,2
<b>History of disease</b>		
Yes	5	16,1
No	26	83,9
<b>Comorbid Disease</b>		
No	26	83,9
Transient Ischemic Attack	1	3,2
Urinary tract infection	2	6,5
Sinusitis	1	3,2
Diabetes Mellitus	1	3,2

The COVID-19 transmission questionnaire was given to 31 nurses at Murni Teguh Memorial Hospital. The results of the distribution of the questionnaire part I regarding behavior in the hospital obtained data that as many as 25 people (80.6%) had a history of contact with COVID-19 patients, as many as 16 people (51.6%) had a history of contact with hospital staff confirmed COVID-19. Then, 24 people (77.4%) had used the appropriate Personal Protective Equipment (PPE) and always complied with using PPE when taking action on patients. As many as 25 people (80.6%) always do hand hygiene. For the habit of eating when having rest, as many as 21 people (67.7%) have the habit of eating together with friends at work tables. As many as 21 people (67.7%) treated patients with confirmed COVID-19. As many as 18 people (58.1%) did not perform aerosol actions, 20 people (64.5%) had used appropriate PPE when carrying out aerosol actions.

The results of the distribution of the questionnaire part II, obtained data that 29 people (93.5%) did not live with people who were confirmed positive for COVID-19. A total of 27 people (87.1%) do not live in a confirmed environment with COVID-19. There are 29 people (93.5%) did not participate in social activities for 14 days before the results of the RT-PCR came out. As many as 28 people (90.3%) practiced worship at home. For the crowded places visited, the majority visited the market, namely 14 people (45.2%). The implementation of health protocols, one of which is maintaining distance, has always been carried out by respondents, 23 (74.2%). All respondents (100%) consume vitamins and do not have a history of smoking. The distribution of the frequency and percentage of transmission of COVID-19 among nurses in hospitals can be seen in full in the table 2 below.

Table 2.  
Distribution Frequency and Percentage of COVID-19 Transmission among  
Nurses (n=31)

Variable	Frequency	Percentage
<b>I. Behavior in the hospital</b>		
History of contact with COVID-19 patients		
Yes	25	80,6
No	6	19,4
History of contact with hospital staff confirmed COVID-19		
Yes	16	51,6
No	15	48,4
Use of PPE		
appropriate	24	77,4
Not appropriate	7	22,6
Compliance with the use of PPE when performing actions		
Always	24	77,4
Often	7	22,6
Implementation Hand Hygiene		
Always	25	80,6
Often	6	19,4
The habit of eating at rest		
Eat with friends at work tables	21	67,7
Eat alone at the work table	5	16,1
Eat in the pantry	3	9,7
Not eating while working	2	6,5
Treating patients with confirmed COVID-19 in a non-isolation room		
Yes	21	67,7
No	10	32,3

Perform aerosol action		
No	18	58,1
Yes	13	41,9
Use of PPE during aerosol action		
Appropriate	20	64,5
Not appropriate	11	35,5

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## II. Behavior outside the hospital

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Living with a person who are confirmed COVID-19		
No	29	93,5
Yes	2	6,5
Living in the environment with confirmed COVID-19		
No	27	87,1
Yes	4	12,9
Social activities that are followed		
Nothing	29	93,5
Environment social gathering	1	3,2
Wirid	1	3,2
Worship		
At home	28	90,3
Go to the place of worship	3	9,7
Crowded place visited		
Traditional market	14	45,2
Mall	5	16,1
Cafe	3	9,7
Nothing	9	29
Keep a distance from other people		
Always	23	74,2
Often	7	22,6
Sometimes	1	3,2
Take vitamins		
Yes	31	100



#### **4.DISCUSSION**

COVID-19 has a very high level of infection. The results of this study indicate that the transmission of COVID-19 to nurses occurs due to a history of contact with patients and hospital staff who have been confirmed with COVID-19, the habit of eating together with colleagues, caring for patients with confirmed COVID-19 in non-isolation rooms, and visiting crowded place like a market.

Research conducted by Jin et al. (2020) showed that the route of transmission of 39 cases occurred through contact with colleagues. The transmission of COVID-19 starts from animal-to-human infection, but the virus has evolved into a form that can cause rapid human-to-human transmission. Human-to-human spread of the virus occurs due to close contact with an infected person, whether coughing, sneezing, or aerosols. Aerosols can penetrate the human body, especially the lungs through inhalation through the nose or mouth. Coronaviruses also show a higher transmission rate than SARS due to genetic recombination which has increased transmission ability (Shereen et al, 2020).

According to Tellier, Li, Cowling, & Tang (2019), the transmission of COVID-19 through aerosols, droplets, and direct contact. Aerosol transmission is thought to be the main mode of transmission. Aerosols are particles with a diameter below 100  $\mu\text{m}$ . Airborne transmission contributes to the incidence of COVID-19. The findings showed that the transmission of COVID-19 in the air is in line with reports of SARS incidents in the past (Sheng et al, 2020)

Nosocomial transmission of COVID-19 patients in health services can be controlled by taking adequate safety or control measures such as hand hygiene, use of PPE and complying with health protocols established by the government (Rahman et al, 2020). This is in line with Chou et al's (2020) study of 64 studies meeting the inclusion criteria, 43 studies discuss the infection burden of health workers and 34 studies discuss risk factors. The results showed that health workers account for a significant proportion of COVID-19 infections and may experience a very high incidence of infection after unprotected exposure. The use of PPE and infection control training was associated with a reduced risk of infection, and certain exposures were associated with an increased risk.

Currently, nurses are actively involved in interventions for COVID-19, and nurses will remain a key person in stopping the pandemic with adequate assistance. Therefore, nurses must be provided with a healthy work environment to empower their efforts in controlling and overcoming the outbreak. Work safety is key to the work of nurses during COVID-19, as they come face to face with dangers every day. The main task of nursing management is to ensure that appropriate precautions and safety measures are taken to reduce hazards in the workplace. In this regard, the organization must have appropriate infection control procedures and personal protective equipment (masks, gloves, goggles, gowns, handrub / hand sanitizers, soap and water, and other cleaning agents) in sufficient quantities for nurses who did the caring to the patients with COVID-19 confirmed.

Nursing supervisors must provide knowledge of workplace safety, instructions and guidance on infection prevention and control, how to properly wear, remove and dispose of personal protective equipment. In this regard, staff members should also be guided on how to carry out regular self-assessments, and directed at how to follow quarantine or isolation measures, if indicated, to protect them, their families and their communities, and to maintain their safety, mental health and well-being. them (Fawaz, Anshasi & Samaha, 2020).

Health workers are naturally at high risk for COVID-19 infection due to workplace exposures that may occur multiple times in health care settings or while providing care to COVID-19 patients. Transmission can also occur in nonmedical areas of the hospital while talking or eating. Therefore, regular screening of health workers, even when asymptomatic and especially among those at high risk for SARS-CoV-2 transmission, can enable early detection and isolation of health workers (Çelebi et al, 2020). In addition to screening, nurse managers must be prepared to face the impact of a pandemic on staff and need to ensure availability and replacement of quality personal protective equipment, train strategies for communicating with patients while wearing personal protective equipment and establish protocols for communicating with relatives (Catania, 2020).

## **5. CONCLUSIONS**

COVID-19 transmission to nurses occurs because of a history of contact with COVID-19 patients (80.6%), the habit of eating together with colleagues (67.7%), treating patients with confirmed COVID-19 in a non-isolation room (67,7%), a history of contact with hospital staff with confirmed COVID-19 (51.6%), and visiting crowded places such as traditional market (45.2%).

The suggestion in this study is that nurses should adhere the health protocols set by the government and hospitals regarding the use of Personal Protective Equipment (PPE), hand hygiene and keep the distance in order to reduce the spread of COVID-19.

## REFERENCES

- Catania, G., Zanini, M., Hayter, M., Timmins, F., Dasso, N., Ottonello, G., Aleo, G., Sasso, L., & Bagnasco, A. 2020. Lessons from Italian front-line nurses' experiences during the COVID-19 pandemic: A qualitative descriptive study. *Journal of nursing management*, <https://doi.org/10.1111/jonm.13194>
- Çelebi, G., Pişkin, N., Çelik Bekleviç, A., Altunay, Y., Salcı Keleş, A., Tüz, M. A., Altınsoy, B., & Hacıseyitoğlu, D. 2020. Specific Risk Factors for SARS-CoV-2 Transmission among Health Care Workers in a University Hospital. *American Journal of Infection Control*, 48(10), 1225–1230. <https://doi.org/10.1016/j.ajic.2020.07.039>
- Chang, Le., Yan, Y., Wang, L. 2020. Coronavirus Disease 2019: coronaviruses and blood safety. *Transfusion Medicine Reviews*.
- Chou, R., Dana, T., Buckley, D. I., Selph, S., Fu, R., & Totten, A. M. 2020. Epidemiology of and Risk Factors for Coronavirus Infection in Health Care Workers: A Living Rapid Review. *Annals of internal medicine*, 173(2), 120–136. <https://doi.org/10.7326/M20-1632>
- Fawaz, M., Anshasi, H., & Samaha, A. 2020. Nurses at the Front Line of COVID-19: Roles, Responsibilities, Risks, and Rights. *The American journal of tropical medicine and hygiene*, 103(4), 1341–1342. <https://doi.org/10.4269/ajtmh.20-0650>.
- Guan et al. 2020. Clinical Characteristics of Coronavirus Disease 2019 in China. *The New England Journal of Medicine*. <https://doi.org/10.1016/j.tmr.2020.02.003>
- International Council of Nurses. 2020. Protecting Nurses from COVID-19 a Top Priority: A Survey of ICN's National Nursing Association.
- Keputusan Menteri Kesehatan Republik Indonesia. 2020. Pedoman Pencegahan dan Pengendalian Corona Virus Disease 2019 (COVID-19)

- Li, Y-k., Peng, S., Li, L-q., Wang, Q., Ping, W., Zhang, N., & Fu, X-n. 2020. Clinical transmission characteristic of Covid-19 – A retrospective study of 25 cases from a single thoracic surgery department. *Current Medical Science*, 40 (2). <https://doi.org/10.1007/s11596-020-2176-2>
- Persi. 2020. *Pneumonia COVID-19: Diagnosis & Penatalaksanaan di Indonesia*. Jakarta: Perhimpunan Dokter Paru Indonesia.
- Shen, Y., Li, C., Dong, H., Wang, Z., Martinez, L., Sun, Z., & Wang, F. 2020. Airborne transmission of COVID-19: Epidemiologic Evidence from Two Outbreak Investigations.
- Shereen, M.A., Khan, S., Kazmi, A., Bashir, N. & Siddique, R. 2020. COVID-19 Infection: Origin, Transmission, and Characteristics of Human Coronaviruses. *Journal of Advanced Research*, vol. 24, pp. 91–8
- Tellier, R., Li, Y., Cowling, B. J., & Tang, J. W. 2019. Recognition of aerosol transmission of infectious agents: a commentary. *BMC Infectious Diseases*. <https://doi.org/10.1186/s12879-019-3707-y>
- Wang, W., Xu, Y., Gao, R., Lu, R., Han, K., Wu, G., Tan, W., 2020. Detection of SARS-CoV-2 in different types of clinical specimens. *J. Am. Med. Assoc.* <https://doi.org/10.1001/jama.2020.3786>
- World Health Organization. 2020. Modes of transmission of virus causing COVID-19: implications for IPC precaution recommendations. Retrieved from <https://www.who.int>