



## Original Article

# A Teleconference to Increase Nurses' Knowledge and Attitudes to Prevent and Control COVID-19 Infection

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## ABSTRACT

This study aimed to determine the effects of a teleconference on nurses' knowledge and attitudes in the prevention and control of COVID-19 infection. The present study employed a pre-post experimental design without a control group with a total of 60 nurses as participants. The study was conducted in three hospitals in Semarang city. The inclusion criteria were nurses who worked in the emergency unit, COVID-19 isolation units, and ICU, as well as those who were permanent nurses and were not on duty while receiving the intervention. Meanwhile, the exclusion criteria were nurses who had less than two-year work experience and were apprentice nurses. This study was conducted by providing the intervention on the prevention and control of COVID-19 infection via teleconferences. Data were collected using the knowledge and attitude questionnaire that had been tested for its validity and reliability. The data on knowledge and attitudes were analysed using the paired t-test, while the participants' characteristics were presented descriptively in the frequency and percentage tables. The results indicated that there was an increase in the participants' knowledge and attitudes. The paired t-test showed a significant value in the knowledge ( $p=0.000$ ) and attitudes ( $p=0.005$ ) after the provision of teleconferences for infection control (TIC). This research is a part of the communication and information technology research in nursing. Teleconferences can expand the understanding of information about infection prevention and control during the COVID-19 pandemic.

## GRAPHICAL ABSTRACT



A Teleconference to Increase Nurses' Knowledge and Attitudes to Prevent and Control COVID-19 Infection



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## Introduction

The COVID-19 pandemic has greatly affected all aspects of life, including social, economic, and especially the health sector. Nurses are the largest number of professionals and play an important role in coordinating health services in hospitals [1]. New data obtained by the International Council of Nurses (ICN) indicates that COVID-19 is causing the nurses across the world to experience mass trauma. The number of reported nurse deaths now exceeds 2,200, and with high levels of infections continuing in the nursing workforce, in the face of ever-growing workloads, continued violence and demonstrations by anti-vaccinators, overstretched workers are experiencing increasing psychological distress. In the COVID-19 pandemic, nurses play an important role in identifying, isolating, and caring for COVID-19 patients, as well as providing support to people having close contact with the patients [2]. It is obvious that nurses always play a role in infection prevention and control and caring for patients during a health crisis in a region [3].

Research shows that from March to November 2020, at least 282 health workers, including doctors and nurses in Indonesia, died due to COVID-19 [4]. The National Hospital Infection Management and Quality Control Centre reports that the incidence of infection in health workers in the Hubei province of China is mainly due to errors in the use of personal protective equipment [5]. Health workers in workplaces with limited resources, need to have the ability to properly use personal protective equipment (PPE), including the selection, installation, removal, decontamination, and disposal of PPE. This ability must also be supported by theoretical knowledge about the indications and procedures for its use to provide effective protection in the clinical area [6]. Health workers, in this case nurses, should have the proper attitudes towards the use of PPE to succeed and win the battle against COVID-19 [6].

COVID-19 is a new disease, which has never been encountered before. Therefore, nurses need

assurance that they have sufficient knowledge to provide services since the information circulating regarding COVID-19 standards and protocols is changing rapidly [7]. Knowledge can guide nurses in dealing with this pandemic and mitigate health crises that may be faced in the future [2]. Telecommunication technology is an effective way to get around the distance and learning barriers caused by pandemic [8].

Tele-education is a teaching and learning process that uses a combination of telecommunications and computer devices for educational purposes [9,10]. There are two forms of tele-education [11]: (1) asynchronized — the internet is used to publish digital media which is used, then participants are encouraged to study independently; and (2) synchronized — the main form is real-time interactive virtual classrooms that are supported by applications developed to meet the needs of participants. A teleconference is a part of distance learning or tele-education, which serves as a medium to provide direct education; this method has been used in the area of health education. Nurses need to receive accurate information regarding the use of PPE. In this study, the researchers tried to apply synchronized teleconferences to increase nurses' knowledge about PPE and foster adaptive attitudes to pandemic conditions.

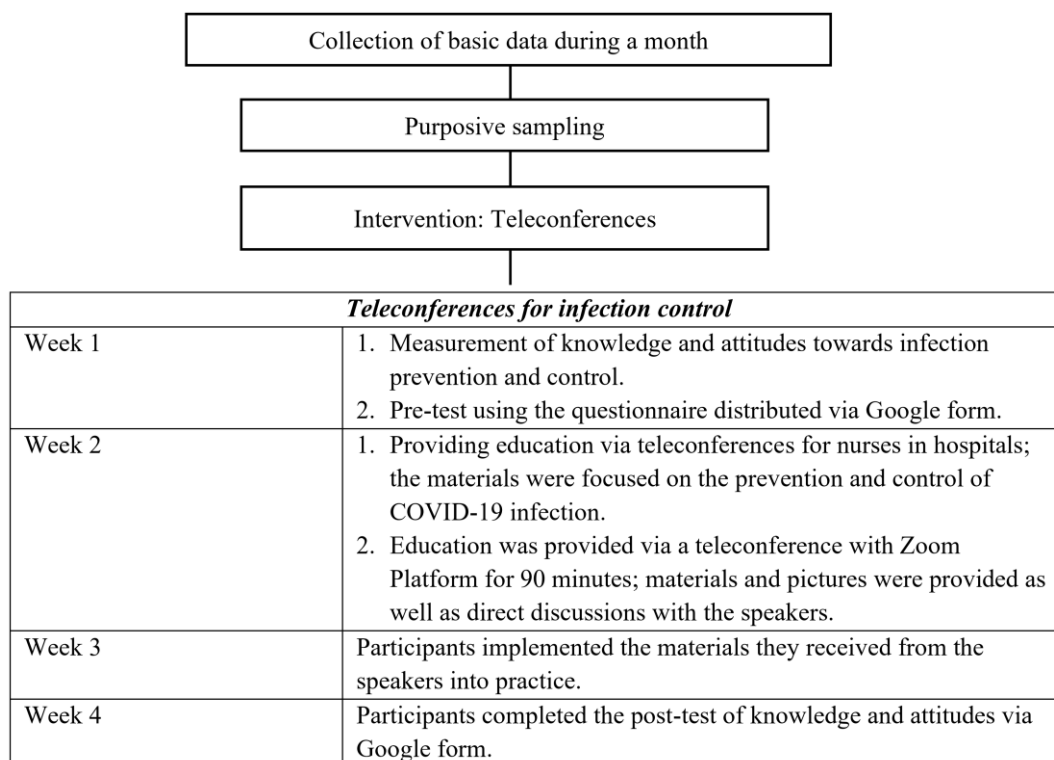
## Material and methods

The present study used a pre-post quasi-experimental design [12] without a control group. Approval to conduct this study was obtained from the Research Ethics Committee of Sultan Agung Islamic Hospital (No. 03/EC/KEPK/2020). The samples were 60 nurses from three hospitals in Semarang city, Indonesia. Non-probability sampling with a consecutive sampling technique was employed to recruit the samples. The inclusion criteria were nurses who worked in the emergency units, COVID-19 isolation units, ICU, and nurses who were off duties during this research. Meanwhile, the exclusion criteria were nurses who had less than two-year work experience and apprentice

nurses. This study was conducted from May to June 2020.

The data in this study were collected using the knowledge and attitude questionnaire. Three microbiologists were invited to provide expert judgment on the questionnaire. In addition, this questionnaire was also tested for its validity and reliability; the result showed the Guttman split-half coefficient of 0.66. Teleconferences were conducted as the study's interventions. The speakers were a virologist and the head of the infection prevention and control committee in a hospital in Semarang. The video conferences

were conducted simultaneously with the participants synchronously for an hour and a half. The subject materials were the prevention and control of COVID-19 infection in the hospitals, including the infection transmission measures, models for suspected COVID-19 patients, caution with PPE, and procedure illustrations for wearing and removing PPE as indicated by its level. The questionnaire was administered to all participants before and after the intervention using the Google form on the first and fourth weeks of the study. Figure 1 shows the research procedures in one month during the study.



**Figure 1:** Research procedure with a teleconference intervention

The collected data were tested for homogeneity using the Kolmogorov-Smirnov test. The result showed an alpha value of  $>0.05$ , indicating the data were normally distributed. Therefore, the paired t-test was used for data analysis. The paired t-test with a p-value of  $<0.05$  or t-count  $>$  t-table was performed to determine significance. The characteristics of participants were presented with percentage and frequency.

## Result and Dissection

### *Characteristics of participants*

The participants in this study were 60 nurses. Data on the participants' characteristics and levels of knowledge and attitudes are presented in Table 1. The majority of the participants were aged 26-35 (40%), who showed moderate knowledge (40%) and attitudes (45%), and males (35%), who showed moderate knowledge (35%) and attitude (45%) as well. Furthermore, the

majority of the participants had work experience of more than five years with moderate knowledge (50%) and attitudes (58.33%), and attended the

infection prevention and control training with moderate knowledge (51.67%) and attitudes (56.67%) as well.

**Table 1:** Characteristics of participants by percentage and frequency (n = 60)

Characteristics	Knowledge			Attitudes		
	Poor f(%)	Moderate f(%)	High f(%)	Good f(%)	Moderate f(%)	Poor f(%)
Age (year)						
17-25	0(0.00)	3(5.00)	2(3.33)	0(0.00)	3(5.00)	2(3.33)
26-35	7(11.67)	24(40.00)	7(11.67)	9(15.00)	27(45.00)	2(3.33)
36-45	3(5.00)	11(18.33)	3(5.00)	1(1.67)	16(26.67)	0(0.00)
Gender						
Male	7(11.67)	21(35.00)	7(11.67)	5(8.33)	27(45.00)	3(5.00)
Female	3(5.00)	17(28.33)	5(8.33)	5(8.33)	19(31.67)	1(1.67)
Work experience						
≤5 years	4(6.67)	8(13.33)	5(8.33)	3(5.00)	11(18.33)	3(5.00)
>5 years	6(10.00)	30(50.00)	7(11.67)	7(11.67)	35(58.33)	1(1.67)
Training of prevention and infection control						
Yes	7(11.67)	31(51.67)	7(11.67)	7(11.67)	34(56.67)	4(6.67)
No	3(5.00)	7(11.67)	5(8.33)	5(8.33)	12(20.00)	0(0.00)

*The level of nurses' knowledge and attitude after receiving the teleconference for infection control*

The level of nurses' knowledge before the intervention was generally moderate (68%) to high (7%). After the intervention, there was an increased level of knowledge: high (20%) and moderate (63%). The nurses' attitudes in this

study were generally at moderate (70%) and poor (13%) levels. However, after the intervention, the participants with a moderate level increased to 77%, while those with a poor level decreased to 7%.

**Table 2:** Knowledge and attitudes before and after the teleconference for infection control (n = 60)

Knowledge	Pre-Intervention			Post-Intervention		
	Poor	Moderate	High	Poor	Moderate	High
	12(20%)	41 (68%)	12 (7%)	17%	63%	20%
Attitudes	Pre-Intervention			Post-Intervention		
	Good	Moderate	Poor	Good	Moderate	Poor
	10(17%)	42(70%)	8(13%)	10(17%)	46(77%)	4(7%)

*Analysis of differences before and after the teleconference intervention for infection control*

The analysis of the differences before and after the intervention is presented in Table 3. It is shown that after the intervention, the p-values for nurses' knowledge and attitudes were 0.000

and 0.005, respectively. This indicates that the intervention of teleconference for infection control was effective in increasing nurses' knowledge and attitudes towards infection prevention and control.

**Table 3:** Analysis of differences before and after the teleconference for infection control (n = 60)

Variables	Mean	Std. Deviation	t	p
Knowledge	2.233	1.430	12.093	0.000
Attitudes	1.000	2.636	2.938	0.005

This study shows that the use of teleconference provided a significant effect on nurses' knowledge and attitudes in the prevention and control of COVID-19 infection. The results

showed a p-value of 0.000 for knowledge and 0.005 for attitudes. In addition, there was an increase in the value of high knowledge to 20% and a decrease in the value of poor attitudes to

7%. In this study, the teleconference for infection control functions as an electronic medium for exchanging information with experts, including a virologist. The COVID-19 pandemic has an impact not only on the area of health but also on health education; health care students should use telecommunication to obtain information. Telecommunication in education is the most effective method used during a pandemic. Online learning can be used to provide an overview of the skills performed by patients [8]. However, this contrasts with the results of another study, which stated that the existence of e-learning does not really have an impact on students who receive information. This is because online learning requires a strong signal [13].

The COVID-19 pandemic requires all health workers to increase their knowledge and attitudes to improve the quality of health services, especially those related to infection control and prevention [14]. Increased knowledge and attitudes can prevent infection transmission to health workers. The use of digital information technology is, therefore, required as social distancing is applied during the pandemic. One of the digital technologies used to exchange information during a pandemic is teleconferencing, which is one form of the Information Communication Technology (ICT) tools [15]. ICT tools function as an electronic device to store, process, and exchange information. This digital technology is a service that is used as a medium for knowledge transfer [16]. The teleconference utilized in this study focused on the materials about infection prevention and control, along with video animations on the use of PPE during the pandemic. The proper use of PPE should be known by all health workers during the pandemic as a preventive measure to prevent infection transmission to health workers while caring for COVID-19 patients. It is also imperative to know how to set up, remove, and discard PPE [17].

This study showed that the nurses' knowledge with high levels increased from 11.7% to 20%. The utilization of video conference is an

alternative to digital technological communication media to provide information for individuals who cannot meet face to face [18]. The teleconference used in this study was the Zoom application. Zoom is a platform for video conferencing that can be utilized for live small group discussions. The current pandemic condition has essentially expanded the use of the Zoom application [19]. A previous study showed that participants were satisfied with the use of video conferences for education since they could increase their knowledge integratively [20]. In addition, nurses' attitudes with the poor category in this study also decreased from 13.7% to 6.7%, indicating that the face-to-face interactions through video conferences affected nurses' knowledge and attitudes.

The result of this study showed that teleconference had a positive impact on the nurses' knowledge and attitudes towards infection prevention and control. Adequate knowledge about infection prevention and control will decrease disease incidence among health workers [21]. The nurses' knowledge and attitudes improved at a significant level; this was also upheld by the fact that 75% of the participants had attended general training on infection prevention and control to have already obtained such background knowledge. This result is in accordance with a previous investigation that showed that health workers who attended the infection control training had high knowledge of the related topic [22]. Having high knowledge will lead health workers to have positive attitudes and good practices in infection control [5]. Knowledge is a prerequisite for taking preventive actions and developing positive attitudes in fighting diseases [23]. Moreover, another study showed that nurses who attended the infection prevention and control training were more cautious and had increased compliance in undergoing practices according to the applied standards [24]. The majority of the participants were at the age of 26-35 years old. The results showed that, at this age, the participants had moderate (40%) and high

(11.67%) knowledge and moderate (45%) and good (15%) attitudes after the teleconference intervention. This study also showed that early adults (20-30 years old) had a good level of knowledge. Similarly, another study reported that younger people with higher levels of education have a higher level of knowledge [25]. This study supports previous research, which showed that most respondents were above 25 years of age [14].

Work experience is related to nurses' knowledge and attitudes. This study showed that most participants with work experience of  $\geq 5$  years have moderate knowledge and attitudes with a percentage of 58.33%. It is congruent with another research that found that health workers who have more than five-year-work experience are 1.5 times more knowledgeable than other staff [21]. It is also in line with a study in Ethiopia that reported that more years of practice in infection prevention and control made senior nurses be more experienced since the information they received was more than that of junior nurses [26]. Similarly, this study also showed that nurses who work under five years have moderate attitudes (15.33%) and high knowledge (8.33%). This study has a limitation as it only involved one group and did not examine the correlation between demographic characteristics and other variables.

### Conclusion

Based on the results of this study, it could be concluded that teleconference affected the increased knowledge and attitudes of nurses in the prevention and control of COVID-19 infection. The teleconference can be used as an alternative in providing distance education to nurses and health workers in the hospitals. Nurses can provide care services by paying attention to infection prevention and control service standards to minimize the transmission of the virus to health workers. Further research is suggested to analyse the characteristics of nurses with knowledge, attitudes and practices using the control and intervention groups. It is also

recommended to expand this treatment to other hospitals in Indonesia.

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### Authors' contributions

All authors contributed toward data analysis, drafting and revising the paper and agreed to be responsible for all the aspects of this work.

### Conflict of Interest

We have no conflicts of interest to disclose.

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