Case Report of COVID-19 and Applying Health Belief Model to COVID-19 Management in A Private Hospital in Bangkok, Thailand on 16th April 2020

Nathan Kunlaphattharawet, Anek Mungaomklang, Somrak Sirikhetkon
Institute for Urban Disease Control and Prevention
Received 28 Oct 2020, Revised 9 Nov 2020, Accepted 30 Dec 2020

บทคัดย่อ

โรคติดเชื้อไวรัสโคโรนา 2019 (COVID-19) เป็นโรคระบาดที่เกิดขึ้นปลายปี 2562 เป็นโรคที่สร้างความตื่นตระหนกให้กับผู้คนทั่วโลก ในประเทศไทยก็เช่นกัน จากรายงานพบว่า มีพยาบาลจากโรงพยาบาลแห่งหนึ่งได้รับการตรวจพบเชื้อไวัสโคโรนาสายพันธุ์กลุ่มอาการทางเดินหายใจเฉียบพลันรุนแรง (SARS-CoV-2) ในโรงพยาบาลและได้แจ้งสถาบันป้องกันควบคุมโรคเขตเมืองเพื่อดำเนินการสอบสวนโรค พบว่า ผู้ติดเชื้อซึ่งเป็นบุคลากรทางการแพทย์รายนี้ ปฏิบัติงานในช่วง 14 วันก่อนหน้านี้ติดเชื้อ SARS-CoV-2 เป็นผู้ป่วยที่ได้รับการผ่าตัดไส้ติ่งแตก สิ่งที่น่าสนใจ คือ ลำดับเหตุการณ์การเดินทางของผู้ป่วยรายนี้ที่อาการแสดงของผู้ป่วยที่ไม่ได้ระบุอย่างชัดเจนว่าเป็น COVID-19 รวมถึงการไม่ได้ตรวจหา COVID-19 ก่อนรับการผ่าตัด โดยวิธี nasopharyngeal and throat swab บทความนี้ได้กล่าวถึงคำแนะนำที่ทีมสอบสวนโรคจากสถาบันป้องกันควบคุมโรคเขตเมืองได้ดำเนินการสอบสวนโรคและเสนอมาตรการป้องกันควบคุมโรคให้กับโรงพยาบาลเอกชนแห่งนี้ การศึกษาได้ใช้วิธีการทบทวนเวชระเบียน ตั้งแต่วันที่ 1 มกราคม 2562 ถึง 14 เมษายน 2563 เกี่ยวกับโรคทางเดินหายใจทั้งหมด ได้รับความร่วมมือจากทีมงานโรงพยาบาลแห่งนี้ และศึกษาสถานการณ์การระบาด COVID-19 จากองค์การอนามัยโลก กระทรวงสาธารณสุขของประเทศไทย โดยพบว่า มีผู้สัมผัสทั้งหมดกับพยาบาลรายนี้ แบ่งเป็นผู้สัมผัสเสี่ยงสูง 11 ราย ผู้สัมผัสเสี่ยงต่ำ 31 ราย ไม่สามารถระบุได้ว่าผู้ป่วยหรือพยาบาลเป็นผู้เริ่มต้นการติดเชื้อ แต่เหนือสิ่งอื่นใด การป้องกันตนเองอย่างเพียงพอและเหมาะสมเป็นสิ่งที่ทุกคนพึงปฏิบัติ สิ่งที่เพิ่มเติมในบทความนี้ที่ทำให้แตกต่างจากการสอบสวนโรคทั่วไป คือการนำเสนอแง่มุมของ ทฤษฎีแบบแผนความเชื่อทางสุขภาพ (Health Belief Model: HBM) ได้ถูกนำมาประยุกต์ใช้ในมาตรการควบคุมโรคในครั้งนี้ โดยได้สอบถามพยาบาลรายนี้ถึงความเข้าใจและการป้องกันตนเองจาก COVID-19 เพื่อใช้เป็นบทเรียนและข้อเสนอแนะให้กับผู้อื่นต่อไป

คำสำคัญ : ไวรัสโคโรนาสายพันธุ์กลุ่มอาการทางเดินหายใจเฉียบพลันรุนแรง, การเก็บสารคัดหลั่งบริเวณหลังโพรงจมูก, การเก็บสารคัดหลั่ง บริเวณลำคอ

Abstract

This report will demonstrate how to apply Health Belief Model (HBM) in managing the covid-19 situation in a private hospital in Bangkok, Thailand. The HBM is the method to evaluate the understanding or attitude of people in any situation. It is composed of 6 steps such as perceived susceptibility, severity, benefits, barriers, cues to action and self-efficiency. Apart from the model, this report will also show how to manage and investigate the covid-19 situation in a private hospital. One nurse from a private hospital in Bangkok has reported to the Urban Disease Control and Prevention (IUDC) on 16th April 2020 about a covid-19 infection; then the team from IUDC went to the hospital to resolve and control the spreading of COVID-19. Due to the fact that covid-19 is a new disease in this world; therefore, there is not enough evidence about it. Retrospective study one year ago of respiratory tract infections from the medical record in this hospital has been studied. Close contact cases also have been investigated and a nasopharyngeal swab was taken. The result shows the number of high risk at 11 and low risk at 31. There is one case in ward 2B where an index case (a nurse) was working during the previous 14 days. She is 62 years old with the condition of post operation ruptured appendicitis that was detected with COVID-19 positive. No evidence shows that is the first case of COVID-19 infection in this situation. Nevertheless, a universal precaution is the vital key for prevention of any infectious disease.

Keywords : SARS-CoV-2, Nasopharyngeal swab, Throat swab

Introduction

COVID-19 has known as a new pandemic disease since November 2019. The first case of COVID-19 was reported in Wuhan, China and then the cases have been spreading all around the world. On 16th April 2020, 8:00 a.m., The Institute for Urban Disease Control and prevention (IUDC) received a reported from the private hospital A in Bangkok that there is one confirmed case of COVID-19 in a Health Care worker (HCW) discovered by nasopharyngeal and throat swabs. This patient is a nurse working in ward 2B. She had shivering sensations since 11th April 2020, fever, rash along arms and legs, watery diarrhea 3 times in one day, cough, and a runny nose. The team from IUDC has investigated and undertaken to control the situation from 16th April to 31st May 2020.

Aims

1. To confirm diagnosis and outbreak.
2. To explain the distribution of outbreak classified as time, place, and person.
3. To investigate cause of disease, infection source, and associated factors.
4. To control the outbreak.
5. To apply health belief model in this outbreak.

Methods

- Review the situation of COVID-19 from world health organization and the Thai government.
- Review the medical record among HCW in the hospital by retrospective study reviewing weekly visits in HCW from 1st January 2019 until 14th April 2020, focusing on diseases including influenza, upper respiratory tract infection, pneumonia, bronchitis, common cold, pharyngitis, and tonsillitis for analyzing the situation which associated with respiratory tract infection cover the time of the spreading of COVID-19.
- Finding additional patients by the definition below:

Patient suspected COVID-19 refers to a person with whom this nurse had close contact in the hospital A, with or without any symptoms. The symptoms of the disease include fever, cough, and sneezing, nasal discharge, pain in the body, diarrhea, and a rash. Also, those who return from the countries at risk of COVID-19 such as Taiwan, China, Hong Kong, Singapore, England, America and Middle East countries.[1,2]

Patient confirmed COVID-19 refers to a suspected patient whose laboratory results have identified the genetic material of the SARS-CoV-2 virus.[1, 2]

Low-risk close contact refers to the person who had contact with index case from a distance of 1 meter or more during the previous 14 days, with or without any symptoms.[1,2]

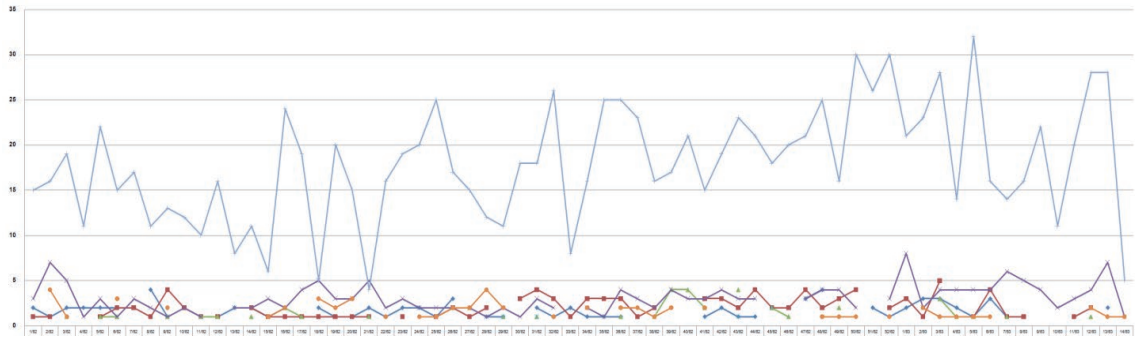
High-risk close contact refers to those who have previously been in contact with the index case by joint activities together, such as eating food together, use the same spoon, and showing signs.[1,2]

- Laboratory studies Collect samples from throat and nasopharyngeal swab from suspected patient and send specimens for SARS-CoV-2.[3,4]
- Suggesting disease prevention and control.[3,4]

Investigation results

The number of close contacts with this nurse was found to be 42 persons: with 11 high risk persons, 31 low risk persons. Specimens from all contact cases were sent for lab tests.[3,4]

Figure 1: Weekly report graph for respiratory tract infection among HCW in hospital A from 1st January 2019 to 14th April 2020.



X= name of month and year, Y= the number of patients in each diagnosis.

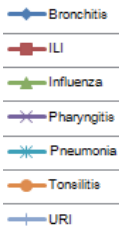


Figure 1.The number of: URI 1179 (70.7%), Pharyngitis 186 (11.2%), ILI 105 (6.2%), Bronchitis 86 (5.2%), Tonsillitis 60 (3.6%), Influenza 45 (2.7%), and Pneumonia 6 (0.4%).

Laboratory results

One positive for SAR-CoV-2 case was identified. She was the post-operation ruptured appendix patient which operation date was 31st March 2020, 62-year-old, with whom this nurse was working within the last 14 days.

Patient history (ruptured appendix)

- Patient (ruptured appendix) started developing fever after 4 days admission (3rd April 2020). She had dyspnea with decreasing oxygen saturation. Computerized Tomography (CT scan) shows both lower lungs infiltration, ground glass opacities. A chest x-ray on 7th April 2020 found the infiltration of both lower lungs, leading to suggest the condition may be from COVID-19 rather than post operation reaction. [5,6]

- Pneumonia symptoms from COVID-19 always develop after 7 to 12 days of illness. In this case, pneumonia was diagnosed by Computerized Tomography (CT scan) on 6th April 2020 after patient had a fever for 3 days. This case might have contracted the illness before 31st March 2020.[5-7] She has no history travelling in both Thailand and abroad in the last 2 months. Therefore, it was still unknown which place she has been infected.

- The confirmed case of HCW has a history of close contact to this patient and, on 6th April 2020, started to develop symptoms on 11th April 2020 after contact with this case for 5 days, which is the incubation period of COVID-19. There is a possibility that this case might have been infected with COVID-19 by the nurse.[5,6]

- No evidence shows virus causing acute appendicitis; therefore, the appendix should further investigate for COVID-19. [3,4]

- The investigation of antibody level of SARS-Co-V2 with the ELISA technique from this case was done on 22nd April 2020 and the result show IgG Ab positive (Ratio 8.04) which is a high ratio. The explanation is that patient had contracted COVID-19 infection more than 2 weeks previously.[3,4]

- The universal precautions among HCW cases must be of positive concern during practice. [7,8]

- In this case a COVID-19 test before the operation had not been done; therefore, it is concluded that the existence of COVID-19 should be tested before an operation.[3,4]

Discussion

HCWs are the high-risk group and prone to be infected by COVID-19. World Health Organization (WHO) and the public health organization of Thailand advise HCWs to use N95 while working with patients who are suspected or confirmed infected by COVID-19.[7,8] In this case, the nurse was working as a private nurse for a post-operation patient who showed no evidence of being infected with COVID-19 or respiratory infection symptoms. When this nurse was confirmed as infested with COVID-19, then an investigation was conducted to find out the first case. All contact persons around the nurse were investigated and finally the post operation patient was confirmed with COVID-19 infection.[4-6] Health belief model was applied to evaluate the knowledge of nurse in this case. She was informed of the information about COVID-19 by the hospital staff; however, she still needs to understand and adopts precautionary techniques for protecting herself and the team while they are working. If HCWs and patients understand the nature of COVID-19, it would be of great benefit in protecting themselves and those with whom they are in contact and achieve the ultimate outcome of completely controlling the spread of COVID-19. It should not be disregarded that the nurse might have been infected by COVID-19 from the community outside the hospital. The situation of infection COVID-19 in both patients in the ward and the nurses working there might be coincidental. Nevertheless, universal precautions are the most important thing to be aware of and adopted. The disseminated COVID-19 information must be implemented all around the world for controlling the spreading of COVID-19.[8-11]

The HBM will be used to evaluate understanding of COVID-19 among HCW. This nurse will be representative of HCW in this private hospital and then this information will be applied for public health. HBM relies on 6 key concepts; composed of: perceived susceptibility, severity, benefits, barriers, cues to action and self-efficacy as table-1.[8-11]

TABLE 1: Appling HBM to nurses at a private hospital during the pandemic of COVID-19.

Concept	Using PPE during working time among HCW through the COVID-19 pandemic period.	Result from interview the nurse.
1. Perceived susceptibility	HCW believe they can be infected by COVID-19 if unprotected or inappropriate PPE-used.	The nurse said that she was doing activity with patient as fellows: wound dressing, distributing medicine, injections and intravenous fluid. She was protecting herself with a surgical mask. She has never thought that she would be infected by covid-19 due to the fact that normally she works in the chemotherapy ward but unfortunately the post-operation ward was full of patients at that time, therefore this patient had to be admitted to the chemotherapy ward. In fact, a high-risk group of COVID-19 patients were admitted to a special ward. Unfortunately, there was no pre-operation test for COVID-19 in this patient.

Concept	Using PPE during working time among HCW through the COVID-19 pandemic period.	Result from interview the nurse.
2. Perceived severity	HCW believe that the consequence of COVID-19 infection may cause an increase in the infection rate and may cause mortality or death in herself or others.	After she learned that she had been detected with COVID-19, she became worried about her symptoms. Nonetheless, she was more worried about those who had close contact to her because she was living with her parents in the same room and she also was socializing with co-workers.
3. Perceived benefits	HCW believe that the recommended actions of using PPE would protect them from COVID-19 infection.	She agreed to use PPE when she was working with patients because it could reduce COVID-19 infection rate or other airborne transmission diseases.
4. Perceived barriers	HCW to identify their personal barriers to using PPE.	She also said that her own protection during working at that time was not affected properly and accurately.
5. Cues to action	HCW receive reminder cues for action, such as messages in the hospital newsletter or mobile massages or verbal reminding messages before the start of work each day and displayed on a computer screen.	Normally, she received the reminder cues for action such as messages in the hospital newsletter, mobile messages and verbal messages reminding her before the start of work each day by the infectious control team from the hospital.

Concept	Using PPE during working time among HCW through the COVID-19 pandemic period.	Result from interview the nurse.
6. Self-efficacy	- HCW receives training in using PPE correctly. - HCW receives enough and accurate information and can apply it in reality during working.	She now already knows that she must use PPE properly, i.e., using N-95, washing hands thoroughly, and seriously protecting herself and the team for the ultimate outcome of controlling COVID-19.

Abbreviation: PPE = Personal Protective Equipment, HCW = HealthCare Workers

The policies for controlling the spreading of COVID-19 in hospital A must do as follows:

- HCW must follow universal precautions such as wearing masks, eating hot food, washing hands properly, individually having meals, and physical distancing.[8-11]

- All HCW living in Dormitory X, where this nurse was living, must be investigated with nasopharyngeal and throat swabs registering viahttp://uvillecare.ddc.moph.go.th/covid/monitoring/index/anonymous hospital then record and report every day.[3-5]

- All patients treated by this nurse must be investigated with laboratory tests for COVID-19.[3-5]

- High risk group of HCW must stop working for 14 days and report their medical condition every day via:http://uvillecare.ddc.moph.go.th/covid/monitoring/index/anonymous hospital.[8-11]

- Low risk group of HCW will be allowed to work; however, record and report personal medical condition daily via:http://uvillecare.ddc.moph.go.th/covid/monitoring/index/anonymous hospital for 14 days.[8-11]

- Those who are detected with symptoms as follows, must stop working until recovery; such as illness like influenza, actual Influenza, bronchitis, pneumonia, pharyngitis, tonsillitis, upper respiratory tract infection, and lower respiratory tract infection.[8-11]

Conclusion

HCWs are the high-risk group for infection by COVID-19 as they are working among many infected patients. The information about COVID-19 has been initially limited after the beginning of the pandemic; therefore, HCW may not have fully understood about self-protection (universal precautions).[3-11] In this case, while medical staff and the patients were staying in the same room for many days, they did not protect themselves properly during the pandemic of COVID-19. Unprotected or improperly protected during working time in HCW may increase the number of infections in any infected disease especially COVID-19 infection. Prolonged patient contact, inappropriate protection during contact with asymptomatic patients with respiratory tract infections were involved in the COVID-19 infection. Early recognition, isolation of suspected case of COVID-19 and recommended universal precaution (PPE) can minimize the rate of infection in healthcare workers and reduce the number of patients contracting COVID-19.[8-11]

Acknowledgments

Thanks to the director and the team from private hospital A for providing all information and good corporation in this outbreak investigation. Also thanks to both Dr.Prabda Praphasiri and Dr.Joshua Adam Mott for the suggestion of this article.

Ethical issue

Ethical clearance was not compulsory because this study was part of the routine outbreak investigation of the national response to infectious disease.

Suggested citation for this article

Kunlaphattharawet N., Mungaomklang A., Sirikhetkon S. Case report of COVID-19 and applying health belief model to COVID-19 management in a private hospital in Bangkok, Thailand on 16th April 2020. Institute for Urban Disease Control and Journal 2020; 5(2): page 1-12.

References

1. Lu R, Zhao X, Li J, et al. Genomic characterization and epidemiology of 2019 novel coronavirus: implications for virus origins and receptor binding. Lancet. 2020; 395 (10224):565-574. doi: 10.1016/S01406736(20)30251-8.
2. World Health Organization. Naming the coronavirus disease (COVID-19) and the virus that causes it [Internet]. World Health Organization. 2020 [update 2020 Feb 11; cited 2020 July 20]. https://www.who.int/emergencies/diseases/novel-coronavirus-2019/technicalguidance/naming-the-coronavirus-disease(covid-2019)-and-the-virus-that-causes-it
3. Pung R, Chiew CJ, Young BE, Chin S, Chin S, Chen MI, et al. Investigation of three clusters of COVID-19 in Singapore: implications for surveillance and response measures. Lancet. 2020 Mar 28;395(10229):1039-1046. doi: 10.1016/S0140-6736(20)30528-6.
4. Tan WJ, Zhao X, Ma XJ, et al. A novel coronavirus genome identified in a cluster of pneumonia cases -Wuhan, China 2019-2020. China CDC Weekly 2020; 2:61-2.
5. Zhu N, Zhang D, Wang W, et al. A novel coronavirus from patients with pneumonia in China, 2019. N Engl J Med. 2020; 382(8): 727733. doi:10.1056/NEJMoa2001017.
6. The Novel Coronavirus Pneumonia Emergency Response Epidemiology Team. The epidemiological characteristics of an outbreak of 2019 Novel Coronavirus Diseases (COVID-19) - China, 2020[J]. China CDC Weekly, 2020, 2(8): 113-122.
7. World Health Organization. COVID-19 situation reports [Internet]. World Health Organization. 2020 [cited 2020 July 20]. https://www.who.int/emergencies/diseas es/novel-coronavirus-2019/situationreports/
8. The Straits Times. Coronavirus: 5 good personal hygiene practices to keep the virus at bay, health news & top stories [Internet]. April 2020 [cited 2020 July 20]. https://www.straitstimes.com/singapore/ health/coronavirus-5-good-personalhygiene-practices-to-keep-the-virus-atbay

9. 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.
10. Ye G, Lin H, Chen S, Wang S, Zeng Z, Wang W, et al. Environmental contamination of SARS-CoV-2 in healthcare premises. J Infect. 2020.
11. Norman P, Conner M. Health belief model. Science Direct [Internet]. [cited 2020 July 20].https://sciencedirect.com/topics/medicine-and-dentistry/health-belief-model.