



Research Article

Prevention of COVID-19 in children and neonates: A review

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Abstract

Background: The novel coronavirus, called COVID-19, first originated in China and spread to many other countries. Due to the weakness of their immune system, especially in lower ages (infants) and also to prevent and control infection in this age group, special measures should be considered to prevent their infection with SARS-COV-2. The aim of this study is to investigate the published evidences and provide a strategy for the prevention of COVID-19 in children.

Methods: Databases and e-journals including PubMed, Elsevier, Springer, Cambridge, Nature, Oxford, Google Scholar, Lancet, Cell, CDC, Nejm, JAMA, and BMC were searched using keywords derived from Mesh and get accessed until April 4, 2020. The original which reported the prevention of COVID-19 in children aged below 5 years, were included in the study.

Results: After reviewing 159 published articles, 5 articles which was related to prevention in children were finally selected. Avoiding from high-risk communities and do social distancing is very effective in protecting children and infants from the disease. Personal hygiene, especially hand hygiene and Eliminating potential environmental infections during an epidemic is very important points in protecting children and infants from COVID-19.

Conclusion: Strengthening the immune system of children and infants and ensuring mental health may also be effective in prevention.

Introduction

The novel coronavirus, called COVID-19, first originated in China and spread to many other countries. On January 30, 2020, the Emergency Committee of World Health Organization's announced it as Public Health Emergency of International Concern (PHEIC), based on reports of the prevalence rapid spread of the disease worldwide [1].

Preliminary studies have shown that the source of disease transmission is mostly from markets related to the sale of wild animals; however, further studies have shown that transmission between humans occurs through droplets or close contacts [2-4]. Based on the evidence, the possibility of rapid transmission by the COVID-19 asymptomatic carriers might be high, so it has a high potential for epidemics [5-7].



Although the mortality rate of MERS-COV was higher than SARS-COV and COVID-19, but Covid-19 has proven to be much more contagious than the other two as if over a short period of time, it has been affected more worldwide than them [8]. The most common clinical symptoms of these coronavirus infections include fever, chills, cough, shortness of breath, general weakness, drowsiness, diarrhea, confusion, shortness of breath, and pneumonia. These infections cause more severe illnesses among children, the elderly, pregnant women, and people with disabling chronic diseases such as diabetes, cardiovascular disease, and malignancies [4,8].

Currently, the knowledge about this novel virus is limited but developing. Until the best treatment or vaccine is discovered to immunize the population, the best way is to prevent the disease in order manage it [9].

The COVID-19 prevention guideline, published by the WHO on February 27, 2020, provides solutions to prevent the disease; In addition, the way of disease transmission is determined by close contact and drops. The most effective preventive measures recommended in the community include: commonly hand wash and disinfection; preventing hands from touching eyes, nose and mouth; using napkin or elbow while sneezing or coughing; using a medical mask especially when there is respiratory symptoms considering a safely disposal, as well as keep social distancing from the one with symptoms (at least one meter). Similar recommendations are also provided for health care staffs [10]. On March 19, 2020, WHO published an interim guideline specifically for health care workers to prevent COV-19, which includes five sections including: 1-Ensuring triage, early recognition, and source control (isolation of suspected cases); 2- Applying standard precautions for all patients; 3- Implementing empiric additional precautions (Droplets and contact, and whenever necessary, precautions in the air); 4- Implementing administrative controls; 5- Using environmental and engineering controls.

Numerous studies have also addressed the issue of disease prevention in different places including prevention strategies in hospital departments, such as hemodialysis and intensive care units [12,13], prevention in dental and ophthalmology offices [14,15] and prevention during pregnancy [16].

Naturally, children would also be affected during the outbreak. Due to the weakness of their immune system, especially in lower ages (infants) and also to prevent and control infection in this age group, special measures should be considered to prevent their infection with SARS-COV-2 (17). To the best of our knowledge, these has not been conducted a review on the prevention of COVID-19 among children, so, the aim of this study is to investigate the published evidences and provide a strategy for that matter.

Material and methods

Search strategy

Databases and e-journals including PubMed, Elsevier, Springer, Cambridge, Nature, Oxford, Google Scholar, Lancet, Cell, CDC, Nejm, JAMA, and BMC were searched using keywords

derived from Mesh and get accessed until April 4, 2020. The search strategy was as follows: prevention AND (“COVID-19” OR Coronavirus OR “Corona virus” OR “2019-nCoV” OR “SARS-CoV” OR “MERS-CoV” OR “Severe Acute Respiratory Syndrome” OR “Middle East Respiratory Syndrome”). Searching of databases was performed independently by 4 people (MT, MM, KR and LA) and the final articles were reviewed by one of the authors (MT).

Inclusion criteria

The original which reported the prevention of COVID-19 in children aged below 5 years, were included in the study. Review articles and the articles with incomplete data were excluded from the study. Also, studies on the prevention of COVID-19 in children older than 5, and at-risk groups including pregnant women and dialysis patients, were also excluded. The articles obtained from the databases were imported into the Endnote. After removing the duplications, also known as de-duplication, in the first stage, their titles and abstracts were reviewed by two authors. Then, after adapting them to the research question, in the next stage, the full text of the articles was reviewed. To reduce the chances of missing any article in the field of COVID-19 prevention in children, the references of each were investigated and related one were selected. Finally, unrelated articles were removed.

Data extraction

The key data were extracted from the articles through a researcher-made checklist which included the first author's last name, country and place of study, year of publication, type of study, target population, and actions taken. Data were extracted by all of the authors.

Results

After reviewing 159 published articles on COVID-19 prevention, 5 articles which was related to prevention in children were finally selected (Figure 1).

The articles provided various recommendations for children, the most important of which were the encouragement of keeping on their routine vaccination under the immunization program, breast deeding, isolating them, and helping them to develop their personal hygiene. Routine care for infants and children, as well as proper nutrition them to help their immune systems, are other recommendations that have been highlighted in order to prevent from the disease. In these studies, it is strongly suggested that nurses and pediatricians at hospitals use protective equipment such as hats and glasses. On the other hand, the general advices given to other people were also emphasized for children; advices such as isolation, quarantine, social distancing, and prevention of close contact with people are suspected to be infected with SARS-COV-2 are other measures that should be considered to prevent this disease in children. More details can be found in Table 1.

Discussion

Among the five studies found, there three studies were about prevention in infants [17-20] and two were about prevention in

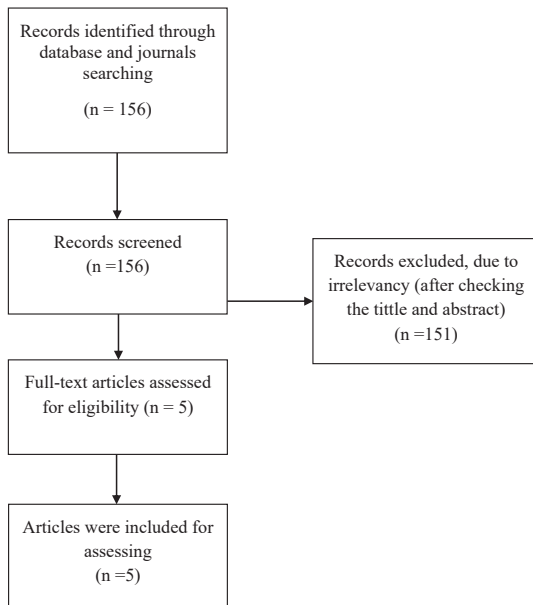


Figure 1: Flow diagram of search strategy for prevention of COVID-19 among children under five years.

children [18,21]. All studies have recommended that children or infants should be quarantined and isolated from infected people. It seems that quarantine, isolation or social distancing can effectively prevent the disease. Along with the other viral diseases, especially those of the coronavirus family such as SARS and Morse, preventing the spread of the virus would be a great help in controlling the disease, and consequently, reducing its complications [22–24].

Two studies out of three which were about prevention in infants, investigated breastfeeding [17,19]. These studies emphasized that there is a possibility of vertical transmission through breast milk from an infected mother to her child and caution should be considered in this regard. In other viruses, such as Rhinovirus, there was no relationship between breast milk and the prevalence of the disease in infants [25]. Also, the results of a case study about SARS virus improved that the antibodies of this virus do exist in breast milk [26]. Recent studies about the possibility of transmitting COVID-19 through breast milk have acknowledged that further studies are needed to be determined [27].

Zimmermann and Lu have suggested hand hygiene and hand washing to prevent infants and children from COVID-19 in their study [18,20]. In a study by Koul, et al. 300 pilgrims who returned from a pilgrimage in 2014 and 2015 were examined for MERS-CoV and other respiratory viruses. Studies have shown that these people often suffer from this respiratory disease. To prevent such disasters, it is necessary to provide measures such as vaccinations, train how to cough and hand hygiene in order to prevent and control the infections [28]. Also in a study by Al-Tawfiq, et al. patients infected with MERS-CoV were Screened and triaged while using Personal Protective Equipment (PPE) including scrubs, gloves, headgear and N95 mask, and the importance of hand hygiene were emphasized [29]. In a study by Sikkema, et al. In order to prevent people

who are at high risk places from getting infected with MERS-CoV, proper hand hygiene had identified as an effective factor [30]. Other similar studies have suggested washing hands to prevent coronavirus transmission (MERS-CoV and SARS-CoV) in different populations, including controlling SARS infection in a hospital, prevention of infection in medical students who deal with patients infected with SARS-COV at hospital, as well as staffs working at health centers which deal with travelers arriving from high-risk areas and places with high prevalence of MERS-CoV and SARS-CoV [31–35].

Among the studies found, there were two about the effects of environmental disinfection to prevent disease in children and infants [19,21]. This has also been addressed in the case of novel coronaviruses. In a study by Hulkower, et al. different types of disinfectants were used to disinfect surfaces infected with coronavirus including Murine Hepatitis Virus (MHV) and Transmissible Gastroenteritis Virus (TGEV) contaminants, in which ethanol proved to be effective in reducing contamination after one minute. The disinfectant must be chosen carefully [36]. Regarding the strategies to prevent the transmission of SARS-COV, and based on the World Health Organization's proposal to use home-made disinfectants that are involved in inactivating the Murine Hepatitis Virus (MHV), Dellanno, et al. showed that they could possibly be used to kill the SARS virus [37]. On a larger scale, Chen, et al. investigated the prevention of the SARS-COV transmission through sewage using chlorine disinfection [38]. The use of povidone-iodine products (PVP-I) as well as using high temperatures were other methods used to kill SARS-COV in two studies by Kariwa and Rabenau [39,40].

A number of studies have also suggested supportive care and stress management to help protect children from COVID-19 [17, 21]. The use of appropriate supportive care, such as maintaining fluid and electrolyte balance in the body and providing adequate oxygenation for SARS-COV prevention, was emphasized in the study of Hui, et al. [41]. Also the results of two studies by Park and Kim in which nurses working at a hospital during the MERS epidemic were investigated, and given that the prevalence of an epidemic has negative effects on mental health, showed that an educational / intervention program that covers all aspects of work hardship and stress might be a preventative measure [42,43].

Conclusion

Based on the results of the present study, it is recommended that health organizations, in collaboration with other health-promoting institutions, implement measures to prevent social gatherings and to implement social distancing at the community. They also should reduce the risk of transmitting covid-19 by removing potential contamination from the environment where presence is needed. More importantly, necessary measures should be implemented by them to educate families in order to prevent children from getting infected with SARS-COV2 or transmit it. This can be done through various ways such as using media to train the children to take care of their personal health especially the health of their hands, as well as strengthening the child's immune system and mental health.

**Table 1:** Protective recommendations for the prevention of children against COVID-19.

Authors	Country	Date of Publish	Study Design	Target population	Recommendations
Laishuan Wang, et al. [17]	China	2020 Feb	-	Neonate	a) Suspected asymptomatic neonates: <ol style="list-style-type: none"> 1. Quarantine ward 2. Tertiary prevention 3. Close monitoring 4. Supportive care 5. Monitoring Heart rate, respiration, oxygen saturation, temperature, blood pressure, blood glucose, and gastrointestinal symptoms continuously 6. Feeding plan: In Healthy mothers 7. A multi-disciplinary team (MDT) for the management of critical neonates with 2019-nCoV infection is recommended. MDTs involve combinations of the following sub-specialties trained in 2019-nCoV prevention: obstetric, neonatal, and intensive care specialists, pulmonologists, radiologists, specialists of infection, specialist nurses, and social workers b) Diagnosed asymptomatic neonates <ol style="list-style-type: none"> 1. Chest imaging or lung ultrasound 2. Quarantine ward 3. Tertiary prevention 4. Close monitoring and supportive care 1. Feeding plan: In Healthy mothers
Petra Zimmermann, Nigel Curtis [18]	-	March 12-2020	Review	Children	<ol style="list-style-type: none"> 1. immune-modulating 2. Vaccines 3. Isolating patients and quarantine contacts as early as possible. 4. strict hand hygiene
Fang Li, Zhi Chun Feng, Yuan Shi [19]	China	March 4, 2020	Letter	Newborn infants	<ol style="list-style-type: none"> 1. The neonatal department should be strictly stratified into transitional, quarantine, living and work areas 2. negative pressure isolation rooms 3. After admission, follow prevention and control strategies adequately 4. Avoid breast feeding from COVID-19 mother until recovery 5. Strict hand hygiene disinfecting environment protocol
Qi Lu Yuan Shi [20]		March 2020	Review	neonate	<ol style="list-style-type: none"> 1. Early identification 2. Early isolation 3. No visiting is allowed for neonates of COVID-19
Rasmussen, et al. [21]	USA	April 3, 2020	Narrative Review (VIEWPOINT Article)	Children	<ol style="list-style-type: none"> 1. In communities with widespread transmission: <ol style="list-style-type: none"> A. limiting healthy children from visiting the health care system for nonurgent reasons (eg, nonurgent surgeries) might be warranted; B. continuing to see newborns and infants for preventive care and younger children who need vaccines. 2. Robust telephone triage and expansion of existing telehealth visits. 3. In communities with widespread transmission, community mitigation interventions, such as school closures, cancellation of mass gatherings, and closure of public places. 4. Finding ways to maintain nutrition for those who depend on school lunches Provide online mental health services for stress management for families whose routines might be severely interrupted for an extended period of time

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References

1. Velavan TP, Meyer CG (2020) The COVID-19 epidemic. *Trop Med Int Health* 25: 278-280.
2. Li Q, Guan X, Wu P, Wang X, Zhou L, et al. (2020) Early transmission dynamics in Wuhan, China, of novel coronavirus-infected pneumonia. *N Engl J Med* 382: 1199-1207. [Link: https://bit.ly/2YnsitE](https://bit.ly/2YnsitE)
3. Wang D, Hu B, Hu C, Zhu F, Liu X, et al. (2020) Clinical characteristics of 138 hospitalized patients with 2019 novel coronavirus-infected pneumonia in Wuhan, China. *JAMA* 323: 1061-1069. [Link: https://bit.ly/2ATQuv0](https://bit.ly/2ATQuv0)
4. Pal M, Berhanu G, Desalegn C, Kandi V (2020) Severe Acute Respiratory Syndrome Coronavirus-2 (SARS-CoV-2): An Update. *Cureus* 12. [Link: https://bit.ly/3dv3LXP](https://bit.ly/3dv3LXP)
5. Zhao S, Lin Q, Ran J, Musa SS, Yang G, et al. (2020) 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. *International Journal of Infectious Diseases* 92: 214-217. [Link: https://bit.ly/3erlhwh](https://bit.ly/3erlhwh)
6. Huang C, Wang Y, Li X, Ren L, Zhao J, et al. (2020) Clinical features of patients infected with 2019 novel coronavirus in Wuhan, China. *Lancet* 395: 497-506. [Link: https://bit.ly/37QRE6s](https://bit.ly/37QRE6s)
7. Munster VJ, Koopmans M, van Doremalen N, van Riel D, de Wit E (2020) A novel coronavirus emerging in China—key questions for impact assessment. *New England Journal of Medicine* 382: 692-694. [Link: https://bit.ly/2NjMDKf](https://bit.ly/2NjMDKf)
8. Meo S, Alhowikan A, Al-Khlaiwi T, Meo I, Halepoto D, et al. (2020) Novel coronavirus 2019-nCoV: prevalence, biological and clinical characteristics comparison with SARS-CoV and MERS-CoV. *Eur Rev Med Pharmacol Sci* 24: 2012-2019. [Link: https://bit.ly/314yd8R](https://bit.ly/314yd8R)
9. Lai CC, Shih TP, Ko WC, Tang HJ, Hsueh PR (2020) Severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) and corona virus disease-2019 (COVID-19): the epidemic and the challenges. *Int J Antimicrob Agents* 55: 105924. [Link: https://bit.ly/2YqiQpu](https://bit.ly/2YqiQpu)



10. Organization WH (2020) Rational use of personal protective equipment for coronavirus disease 2019 (COVID-19). [Link: https://bit.ly/3dqXoc](https://bit.ly/3dqXoc)
11. Organization WH (2020) Infection prevention and control during health care when COVID-19 is suspected: interim guidance. World Health Organization. [Link: https://bit.ly/2V5JKRq](https://bit.ly/2V5JKRq)
12. Basile C, Combe C, Pizzarelli F, Covic A, Davenport A, et al. (2020) Recommendations for the prevention, mitigation and containment of the emerging SARS-CoV-2 (COVID-19) pandemic in haemodialysis centres. *Nephrol Dial Transplant* 35: 737-741. [Link: https://bit.ly/2YncHKK](https://bit.ly/2YncHKK)
13. Wujtewicz M, Dylczyk-Sommer A, Aszkiewicz A, Zdanowski S, Piwowarczyk S, et al. (2020) COVID-19—what should anaesthesiologists and intensivists know about it? *Anaesthesiology Intensive Therapy* 52: 34-41. [Link: https://bit.ly/2V9DNDg](https://bit.ly/2V9DNDg)
14. Sabino-Silva R, Jardim ACG, Siqueira WL (2020) Coronavirus COVID-19 impacts to dentistry and potential salivary diagnosis. *Clinical Oral Investigations* 24: 1619-1621. [Link: https://bit.ly/37SK37n](https://bit.ly/37SK37n)
15. Lai TH, Tang EW, Chau SK, Fung KS, Li KK (2020) Stepping up infection control measures in ophthalmology during the novel coronavirus outbreak: an experience from Hong Kong. *Graefes Arch Clin Exp Ophthalmol* 258: 1049-1055. [Link: https://bit.ly/2V9LbhX](https://bit.ly/2V9LbhX)
16. Qiao J (2020) What are the risks of COVID-19 infection in pregnant women? *Lancet* 395: 760-762. [Link: https://bit.ly/384DWgx](https://bit.ly/384DWgx)
17. Wang L, Shi Y, Xiao T, Fu J, Feng X, et al. (2020) Chinese expert consensus on the perinatal and neonatal management for the prevention and control of the 2019 novel coronavirus infection. *Ann Transl Med* 8: 47. [Link: https://bit.ly/3eqB7Zv](https://bit.ly/3eqB7Zv)
18. Zimmermann P, Curtis N (2020) Coronavirus Infections in Children Including COVID-19. *Pediatr Infect Dis J* 20. [Link: https://bit.ly/3hXkqHK](https://bit.ly/3hXkqHK)
19. Li F, Feng ZC, Shi Y (2020) Proposal for prevention and control of the 2019 novel coronavirus disease in newborn infants. *Arch Dis Child Fetal Neonatal Ed* [Link: https://bit.ly/2Z3kdQe](https://bit.ly/2Z3kdQe)
20. Lu Q, Shi Y (2020) Coronavirus disease (COVID-19) and neonate: What neonatologist need to know. *J Med Virol* 564-567. [Link: https://bit.ly/37QWRLy](https://bit.ly/37QWRLy)
21. Rasmussen SA, Thompson LA (2020) Coronavirus Disease 2019 and Children: What Pediatric Health Care Clinicians Need to Know. *JAMA Pediatr* [Link: https://bit.ly/2V7noiE](https://bit.ly/2V7noiE)
22. Song Z, Xu Y, Bao L, Zhang L, Yu P, et al. (2019) From SARS to MERS, thrusting coronaviruses into the spotlight. *Viruses* 11: 59. [Link: https://bit.ly/2Np6Zl7](https://bit.ly/2Np6Zl7)
23. Hui DS (2005) An overview on severe acute respiratory syndrome (SARS). *Monaldi Arch Chest Dis* 63: 149-157. [Link: https://bit.ly/2zWc1md](https://bit.ly/2zWc1md)
24. Zhong NS, Wong GW (2004) Epidemiology of severe acute respiratory syndrome (SARS): adults and children. *Paediatr Respir Rev* 5: 270-274. [Link: https://bit.ly/2V9PnhH](https://bit.ly/2V9PnhH)
25. Van Bente I, Koopman L, Niesters B, Hop W, Van Middelkoop B, et al. (2003) Predominance of rhinovirus in the nose of symptomatic and asymptomatic infants. *Pediatr Allergy Immunol* 14: 363-370. [Link: https://bit.ly/2A0WL7G](https://bit.ly/2A0WL7G)
26. Robertson CA, Lowther SA, Birch T, Tan C, Sorhage F, et al. (2004) SARS and pregnancy: a case report. *Emerg Infect Dis* 10: 345-348. [Link: https://bit.ly/3drgLOf](https://bit.ly/3drgLOf)
27. Wu Y, Liu C, Dong L, Zhang C, Chen Y, et al. (2020) Coronavirus disease 2019 among pregnant Chinese women: Case series data on the safety of vaginal birth and breastfeeding. *BJOG: an International Journal of Obstetrics and Gynaecology*. [Link: https://bit.ly/2Nj6b1c](https://bit.ly/2Nj6b1c)
28. Koul PA, Mir H, Saha S, Chadha MS, Potdar V, et al. (2018) Respiratory viruses in returning Hajj & Umrah pilgrims with acute respiratory illness in 2014-2015. *Indian J Med Res* 148: 329-333. [Link: https://bit.ly/2AROfZ9](https://bit.ly/2AROfZ9)
29. Al-Tawfiq JA, Rothwell S, Mcgregor HA, Khouri ZA (2018) A multi-faceted approach of a nursing led education in response to MERS-CoV infection. *J Infect Public Health* 11: 260-264. [Link: https://bit.ly/2YsLdDE](https://bit.ly/2YsLdDE)
30. Sikkema RS, Farag EA, Himatt S, Ibrahim AK, Al-Romaihi H, et al. (2017) Risk factors for primary Middle East respiratory syndrome coronavirus infection in camel workers in Qatar during 2013–2014: a case-control study. *J Infect Dis* 215: 1702-1705. [Link: https://bit.ly/2YVUBhY](https://bit.ly/2YVUBhY)
31. Ki HK, Han SK, Son JS, Park SO (2019) Risk of transmission via medical employees and importance of routine infection-prevention policy in a nosocomial outbreak of Middle East respiratory syndrome (MERS): a descriptive analysis from a tertiary care hospital in South Korea. *BMC Pulm Med* 19: 190. [Link: https://bit.ly/2zWlud7](https://bit.ly/2zWlud7)
32. Otter J, Donskey C, Yezli S, Douthwaite S, Goldenberg S, et al. (2016) Transmission of SARS and MERS coronaviruses and influenza virus in healthcare settings: the possible role of dry surface contamination. *J Hosp Infect* 92: 235-250. [Link: https://bit.ly/2Yqaz4T](https://bit.ly/2Yqaz4T)
33. Memish ZA, Assiri AM, Alshehri M, Hussain R, Alomar I (2012) The prevalence of respiratory viruses among healthcare workers serving pilgrims in Makkah during the 2009 influenza A (H1N1) pandemic. *Travel Med Infect Dis* 10: 18-24. [Link: https://bit.ly/2V95n3q](https://bit.ly/2V95n3q)
34. Yen MY, Lu YC, Huang PH, Chen CM, Chen YC, et al. (2010) Quantitative evaluation of infection control models in the prevention of nosocomial transmission of SARS virus to healthcare workers: implication to nosocomial viral infection control for healthcare workers. *Scand J Infect Dis* 42: 510-515. [Link: https://bit.ly/2ByGffg](https://bit.ly/2ByGffg)
35. Wong TW, Wai-San Tam W (2005) Handwashing practice and the use of personal protective equipment among medical students after the SARS epidemic in Hong Kong. *Am J Infect Control* 33: 580-586. [Link: https://bit.ly/2ARCAcQ](https://bit.ly/2ARCAcQ)
36. Hulkower RL, Casanova LM, Rutala WA, Weber DJ, Sobsey MD (2011) Inactivation of surrogate coronaviruses on hard surfaces by health care germicides. *Am J Infect Control* 39: 401-407. [Link: https://bit.ly/2Ypn9kK](https://bit.ly/2Ypn9kK)
37. Dellanno C, Vega Q, Boesenberg D (2009) The antiviral action of common household disinfectants and antiseptics against murine hepatitis virus, a potential surrogate for SARS coronavirus. *American journal of infection control* 37: 649-652. [Link: https://bit.ly/2BtG8BZ](https://bit.ly/2BtG8BZ)
38. Chen C, Zhang XJ, Wang Y, Zhu L, Liu J (2006) Waste water disinfection during SARS epidemic for microbiological and toxicological control. *Biomed Environ Sci* 19: 173-178. [Link: https://bit.ly/2Nqal7m](https://bit.ly/2Nqal7m)
39. Kariwa H, Fujii N, Takashima I (2006) Inactivation of SARS coronavirus by means of povidone-iodine, physical conditions and chemical reagents. *Dermatology* 212: 119-123. [Link: https://bit.ly/3esqk0S](https://bit.ly/3esqk0S)
40. Rabenau H, Cinatl J, Morgenstern B, Bauer G, Preiser W, et al. (2005) Stability and inactivation of SARS coronavirus. *Medical microbiology and immunology* 194: 1-6. [Link: https://bit.ly/3178QTV](https://bit.ly/3178QTV)
41. Hui DS, Zumla A (2019) Severe Acute Respiratory Syndrome: Historical, Epidemiologic, and Clinical Features. *Infect Dis Clin North Am* 33: 869-889. [Link: https://bit.ly/3erSVDv](https://bit.ly/3erSVDv)
42. Park JS, Lee EH, Park NR, Choi YH (2018) Mental health of nurses working at a government-designated hospital during a MERS-CoV outbreak: a cross-sectional study. *Arch Psychiatr Nurs* 32: 2-6. [Link: https://bit.ly/3dkvo64](https://bit.ly/3dkvo64)
43. Kim JS, Choi JS (2016) Factors influencing emergency nurses' burnout during an outbreak of Middle East Respiratory Syndrome Coronavirus in Korea. *Asian Nurs Res* 10: 295-299. [Link: https://bit.ly/2zW94SF](https://bit.ly/2zW94SF)

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