Journal of Multidisciplinary Care (JMDC)
doi: 10.34172/jmdc.1331 2024;13(2):102-106 http://jmdc.skums.ac.ir

Case Report

Application of Roy's adaptation model in a child with COVID-19: Case study and review

Haydeh Heidari[1*]

[1]Department of Nursing and Midwifery, Faculty of Nursing and Midwifery, Modeling in Health Research Center, Shahrekord University of Medical Sciences, Shahrekord, Iran

Abstract

Background and aims: Studies have shown that traditional measures are not enough in the care and treatment of children with coronavirus. Although the model has been used in adults, it has been used less in children. While children need a comprehensive care approach due to their special sensitivity, so the purpose of this study was to apply Roy's adaptation model in children with COVID-19.

Methods: we used Roy's adaptation model in a child with COVID-19. Roy's nursing model considers the goal of nursing actions to promote adaptive responses in each of the four dimensions of Physiological Mode, Self-Concept Mode, Independence and Interdependence Mode, and Role Function Model.

Case Presentation: A 2-year-old girl develops febrile seizures following COVID-19. He weighed 10 kg. He had a history of complete vaccination and a history of close contact with a patient with respiratory signs and symptoms. The patient had a febrile seizure and the fever had started the day before. The patient recently had chills for several minutes, cyanosis, and tachycardia. The patient was admitted for further evaluation. Due to seizure, EEG was done, which showed normal signs. Laboratory findings showed an inflammatory condition. High-resolution computed tomography (HRCT) of the chest showed peripheral involvement, but a chest X-ray was normal. In addition, based on paraclinical findings, we further evaluated the patient for SARS-Cov-2 infection. After thorough evaluation, based on polymerase chain reaction (PCR), using nasopharyngeal and oropharyngeal swabs and chest HRCT, the patient was diagnosed as a positive case of COVID-19. In this way, the patient was treated and cared for and discharged after five days of hospitalization with normal vital signs. The data were collected using observation, interview and patient documentation and were analyzed in four dimensions, based on the steps of the nursing process in Roy's adaptation model.

Conclusion: The results of our study showed that the use of Roy's adaptation model with emphasis on physical and mental dimensions in children improved nursing care. Although this is a case study and the number of samples was small, it is recommended that researchers can use this model in children's nursing care in future experimental studies.

Keywords: Nursing care, Roy adaptation model, COVID-19, Case study

***Corresponding Author:**
Haydeh Heidari,
Email: haydehheidari@gmail.com

Received: October 21, 2024
Revised: December 31, 2024
Accepted: March 11, 2025
ePublished: June 18, 2025

Cite this article as: Heidari H. Application of Roy's adaptation model in a child with COVID-19: case study and review. Journal of Multidisciplinary Care. 2024;13(2):102–106. doi: 10.34172/jmdc.1331.

Introduction

The coronavirus disease caused more than 9 million infections and more than 475000 deaths worldwide (1). The coronavirus is one of the viruses that cause respiratory infections. This virus can appear in the form of mild diseases such as colds to more severe diseases (2). Corona disease has been introduced as an important global health problem and a great threat to physical and mental health (3). A study reported the presence of neurological symptoms in this disease (4). During the corona epidemic, children experienced many challenges and major health disorders (5). In severe infection with this virus, children need hospitalization in the pediatric special care unit (6). Studies have shown that traditional measures are not enough in the care and treatment of children with coronavirus (7).

Nursing theories are a guide and an important source for practice and education. These theories facilitate and improve the quality of care in clinical centers by improving the knowledge and skills of nurses and students (8). Pediatric nurses, due to the special and different conditions of children, need specialized knowledge and skills to communicate and care for children, so they need to be familiar with nursing theories in order to reduce the gap between theory and practice (9). The aim of the Roy adaptation nursing model is to promote adaptation at the

physical, psychological and social levels. In this model, the nurse improves the patient's adaptation by identifying stimuli that have led to problems and performing appropriate nursing interventions (10). Roy's adaptation model has been used in the care of various patients (11,12) but it has not yet been used in the care of children with corona disease.

Although the model has been used in adults, it has been used less in children. However, no study was found on the application of Roy's adaptation model in children with COVID-19, while children need a comprehensive care approach due to their special sensitivity, so the purpose of this study was to apply Roy's adaptation model in children with COVID-19.

Roy nursing model

Roy's nursing model considers the goal of nursing actions to promote adaptive responses in each of the four dimensions of Physiological Mode, Self-Concept Mode, Independence and Interdependence Mode, and Role Function Model (10). Three key concepts based on this model, focal stimuli, contextual stimuli and residual stimuli that affect adaptation. The nurse's role is to identify the increase in the range of adaptation and intervene in these stimuli that affect the behavior (10,11).

Methods

The present study was a case study that was conducted in a child with corona in the children's department of Hajar Shahrekord Hospital in 2022. Written inform consent was obtained from parents. Institutional Review Board approval was obtained from Shahrekord University of Medical Sciences (IR.SKUMS.REC.1402.028). The data were collected using observation, interview and patient documentation and were analyzed in four dimensions, based on the steps of the nursing process in Roy's adaptation model.

Case Report

A 2-year-old girl of Persian ethnicity develops febrile seizures following COVID-19. He weighed 10 kg. He had a history of complete vaccination and a history of close contact with a patient with respiratory signs and symptoms. Main symptoms of the patient was a seizure and the fever had started the day before. In the interview with the parents, the patient had no history of taking any special medication. There was no history of any special disease in the child. The child's parents are covered by rural insurance. Parents are very anxious and worried. Parents do not mention any history of specific diseases in the family. Relevant past interventions and their outcomes was assessment. The parents stated after the seizure and cyanosis, the parents went to the nearest clinic to their home, where the child received oxygen and diazepam, and after the child's condition stabilized, the child was taken to the emergency department of Hajar Hospital by ambulance. The patient recently had chills for several minutes, cyanosis, and tachycardia. The patient was admitted for further evaluation. The focus was on the Roy dimensions in the initial assessment.

Table 1. Result of laboratory tests

Variables	Results
Variables	Results
WBC	$12.80 \times 10^3/\mu L$
Lymphocyte	28%
Plt	$346 \times 10^3/\mu L$
ESR	104 mm/h
CRP	3+
Hgb	10.1 g/dL
Urea	21
Cr	0.78
K	4.5
Na	136
Blood culture	Negative

Clinical finding

Due to seizure, EEG was done, which showed normal signs. Laboratory findings showed an inflammatory condition (Table 1). High-resolution computed tomography (HRCT) of the chest showed peripheral involvement, but a chest X-ray was normal. In addition, based on paraclinical findings, we further evaluated the patient for SARS-CoV-2 infection. After thorough evaluation, based on polymerase chain reaction (PCR), using nasopharyngeal and oropharyngeal swabs and chest HRCT, the patient was diagnosed as a positive case of COVID-19. In this way, the patient was treated and cared for and discharged after five days of hospitalization with normal vital signs.

Diagnostic assessment and therapeutic intervention (Nursing care)

The mentioned patient was hospitalized in the children's ward for 5 days and was followed up by the researcher by phone for a week after discharge. Roy's nursing adaptation model was applied based on the nursing process. The nursing process based on Roy's adaptability model includes 6 components: behavior review, stimulus review, nursing diagnosis, goal setting, nursing interventions, and evaluation.

The first level (behavior assessment): collecting objective and subjective information about the person's behavior in each of the dimensions of adaptation and the investigation is about whether these behaviors are compatible or not.

The second level (determining the stimuli): determining the factors that influence the behavior and classifying them as focal, contextual and residual. By obtaining this information, the nurse can determine the cause of the problem. The third level (nursing diagnosis): analyzing information and expressing sentences that show the person's compatibility in each dimension. The fourth level (nursing goal): setting goals in order to promote

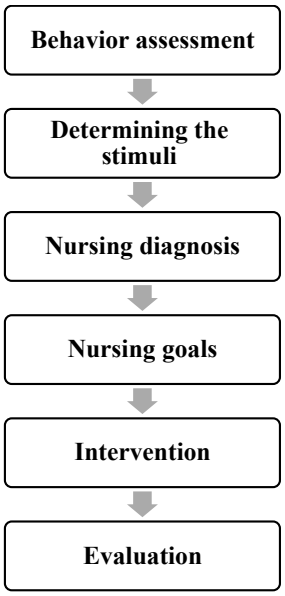

Figure 1. Roy's adaptation model steps

adaptive modes. The fifth level (nursing interventions): Manipulation of primary and ground stimuli in order to achieve goals. The sixth level (evaluation): judging the effectiveness of nursing interventions (Figure 1, Table 2).

In this study, to measure quantitative variables, including temperature degree was taken from a thermometer, blood pressure, respiration and pulse were taken from a vital sign monitoring device, and a calibrated scale and meter were used to measure weight and height.

Paraclinical variables, including potassium, sodium, hematocrit etc, were recorded based on the laboratory results in the patient's file. In order to measure the qualitative variables, the interview method was used.

Follow up and outcomes

Findings were presented based on six stages of the nursing process based on the Roy compatibility model (Tables 3-6).

Table 2. Timeline of diagnostic methods

T = 0	T = 1	T = 2
Initial visit time	**Daily visit time**	**Follow up time**
Diagnostic methods: Examining the patient's medical record Taking history and interview	Diagnostic methods: Examining the patient's medical record Taking history and interview	Diagnostic methods: Taking history and interview
Obtain consent	Checking the change in the patient's condition	Follow-up of the patient's condition after discharge
Taking a history	Implementation of the nursing process	Implementation of the nursing process
Checking the patient's condition	Conducting 5 face-to-face interviews and 3 telephone interviews	Conducting 2 face-to-face visits and 3 telephone interviews
Implementation of nursing care in 6 stages: (behavior examination, stimuli examination, nursing diagnosis, setting goals, intervention, evaluation)	Implementation of nursing care in 6 stages: (behavior examination, stimuli examination, nursing diagnosis, setting goals, intervention, evaluation)	Implementation of nursing care in 6 stages: (behavior examination, stimuli examination, nursing diagnosis, setting goals, intervention, evaluation)
• Challenges: Existence of financial problems • Introduction of parents to social support	Challenges: • Having financial problems to pay hospital fees • Introduction of parents to hospital support	Challenges: • Worry about getting medicines due to lack of medicines • Searching for medicine in different pharmacies • introducing parents to the pharmacy

Table 3. Physiological dimension of the nursing process based on Roy's adaptation model

Level	Nursing Process	Key Characteristic
Level 1 Level 2	Assessment of behavior and Assessment of stimuli	Expressing restlessness due to change in breathing pattern and increase in body temperature Contextual stimuli: Having a fear of seeing a seizure Residual stimuli: Patient's misconceptions about seizures
Level 3	Nursing diagnosis	1-Hyperthermia related to infection in the form of a change in body temperature 2-The risk of damage related to the type of attack 3-The risk of lack of fluid volume in connection with the decrease in consumption and increase in fluid excretion due to fever and NPO in the child in the form of dehydration symptoms
Level 4	Goal setting	1-Decreasing the temperature of the patient during 4 hours 2-Increasing parents' knowledge 3-Maintaining the balance of body fluids
Level 5	Intervention	Parent education to remove the child's clothes - control the temperature every 2-4 hours - prescribe acetaminophen according to the order 1-Prescribing anticonvulsant drugs according to the order – 2-Teaching how to take drugs and prevent seizures 3-Removing the child from dangerous situations 4-Serum therapy according to the doctor's order, checking dehydration symptoms, daily weighing and IO control
Level 6	Evaluation	The temperature remained within the normal range. The child was not injured. The child will maintain the balance of body fluids. Seizures did not occur.

Table 4. Self-concept dimension of the nursing process based on Roy's adaptation

Level	Nursing Process	Key Characteristic
Level 1 Level 2	Assessment of behavior and assessment of stimuli	Disturbance in the body image (Disturbance in physical self, personal self, and interpersonal self) on the current situation. Contextual stimuli: Having experience observing seizures in others. Residual stimuli: Patient's misconceptions about seizures.
Level 3	Nursing diagnosis	1-Disturbed body image related to a sudden situational change as evidenced by the temporary presence of tube, dressing, or attached equipment in the body.
Level 4	Goal setting	2- Increasing parents interaction with child. 3- provide parent and child support.
Level 5	Intervention	Encouraging the patient and parents to express their concerns and fears about the existing conditions. Encourage parents to interact with the child.
Level 6	Evaluation	Improve body image. Parent-child interaction increased.

Table 5. Role-playing dimension (primary and secondary) of the nursing process based on Roy's adaptation model

Level	Nursing Process	Key Characteristic
Level 1 Level 2	Assessment of behavior and Assessment of stimuli	Failure to play an effective role related to hospitalization. Focal stimuli: Hospitalization of child and Inability to fulfill primary role due to age Contextual stimuli: Physical weakness and shortness of breath. Residual stimuli: Patient's misconceptions about seizures.
Level 3	Nursing diagnosis	1-Disturbed body image related to a sudden situational change as evidenced by the temporary presence of tube, dressing, or attached equipment in the body.
Level 4	Goal setting	2-primary role: Carrying out and starting the child's activities by reducing fatigue. 3- Secondary role: Participation to interact with peers with less fear.
Level 5	Intervention	Encouraging the child Walking in the department, play with toys and peers. Noise reduction. Playing music.
Level 6	Evaluation	Fatigue and weakness are removed

Table 6. The independence-dependency dimension of nursing process based on Roy's adaptation model

Level	Nursing Process	Key Characteristic
Level 1 Level 2	Assessment of behavior and Assessment of stimuli	Expressing aggression due to hospitalization and inability to perform routine activities due to hospitalization. Impairment of child independence Contextual stimuli: Hospitalization. focal stimuli: Separation from family and friends.
Level 3	Nursing diagnosis	Disruption of social interactions associated with hospitalization.
Level 4	Goal setting	Increase social interactions.
Level 5	Intervention	Meeting father. Meeting family members or video calling them. Video call with friends.
Level 6	Evaluation	Social interactions improved.

Discussion

This study was conducted by applying the nursing process based on Roy's adaptation model in a child with COVID-19 in the pediatric department. From the point of view of Roy's adaptation model, human health is established when it continuously adapts to stimuli by using effective coping mechanisms. When coping mechanisms are ineffective, disease occurs.

More than 60% of children infected with COVID-19 need hospitalization (13). The incidence of fever convulsions is higher in omicron variant (14). Although the etiology of convulsions is unknown, several factors such as viral infections, increased body temperature, and genetic factors are effective in its occurrence. However, a seizure is an emotionally stressful experience for the family (15). Therefore, it is very important to pay attention to the nursing care of these children with a comprehensive approach (13).

The results of the present study showed that the use of Roy's adaptation model by providing nursing interventions in 4 physiological dimensions, self-concept, role playing, and independence can improve nursing care. In confirmation of our results, the results of a case study in 2020 showed that the use of Roy's adaptation model in adults with covid 19 led to the improvement of incompatible behaviors (16). Caring for a child with COVID-19 is a new experience for nurses because these children need intensive care and respiratory monitoring and emotional and psychological support (17).

Conclusion

The results of the present study showed that the use of Roy's adaptation model can improved nursing care with emphasis on providing nursing interventions in 4 physiological dimensions, self-concept, role playing, and independence can improve nursing care. Although this is a case study and the number of samples was small, it is recommended that researchers can use this model in children's nursing care in future experimental studies.

Patient perspective

The results of our study showed that the use of Roy's adaptation model with emphasis on physical and mental dimensions in children improved nursing care. Therefore, the nursing model is based on a comprehensive approach that it is recommended that nurses can use this model in order to improve the quality of nursing services in children with COVID-19.

Acknowledgments

This article was derived from a research project approved by the Research and Technology Deputy of the Shahrekord University of Medical Sciences (approval no. 6907). Hereby, the researchers gratefully thank the patients who participated in this study.

Data Availability Statement

Data were generated at Shahrekord University of Medical Sciences. Derived data supporting the findings of this study are available from the corresponding author (Haydeh Heidari) on request.

Competing Interests

The author declare that she has no conflict of interest.

Ethical Approval

Ethical considerations in this study included obtaining permission from the Ethics Committee of Shahrekord University of Medical Sciences (IR.SKUMS.REC.1402.028) and obtaining written consent to participate in the study from the participants.

Funding

None.

Inform consent

Written informed consent of parents was obtained from the patient's legal guardian for publication of this case report and any accompanying images. A copy of the written consent is available for review by the Editor-in-Chief of this journal.

References

1. Cardel MI, Dean N, Montoya-Williams D. Preventing a secondary epidemic of lost early career scientists. Effects of COVID-19 pandemic on women with children. Ann Am Thorac Soc. 2020;17(11):1366-70. doi: 10.1513/AnnalsATS.202006-589IP.
2. Wimalawansa SJ. Global epidemic of coronavirus--COVID-19: what can we do to minimize risks. Eur J Biomed Pharm Sci. 2020;7(3):432-8.
3. Cai W, Lian B, Song X, Hou T, Deng G, Li H. A cross-sectional study on mental health among health care workers during the outbreak of corona virus disease 2019. Asian J Psychiatr. 2020;51:102111. doi: 10.1016/j.ajp.2020.102111.
4. Mohammadi SM, Abdi R, Karimi Z, Mortazavi F. Guillain-Barré/Miller Fisher overlap syndrome in a patient after coronavirus disease-2019 infection: a case report. J Med Case Rep. 2022;16(1):63. doi: 10.1186/s13256-021-03245-y.
5. Panchal N, Kamal R, Cox C, Garfield R, Chidambaram P. Mental Health and Substance Use Considerations Among Children During the COVID-19 Pandemic. San Francisco: Kaiser Family Foundation; 2021.
6. Tagarro A, Epalza C, Santos M, Sanz-Santaeufemia FJ, Otheo E, Moraleda C, et al. Screening and severity of coronavirus disease 2019 (COVID-19) in children in Madrid, Spain. JAMA Pediatr. 2021;175(3):316-7. doi: 10.1001/jamapediatrics.2020.1346.
7. Zhou MY, Xie XL, Peng YG, Wu MJ, Deng XZ, Wu Y, et al. From SARS to COVID-19: what we have learned about children infected with COVID-19. Int J Infect Dis. 2020;96:710-4. doi: 10.1016/j.ijid.2020.04.090.
8. Mudd A, Feo R, Conroy T, Kitson A. Where and how does fundamental care fit within seminal nursing theories: a narrative review and synthesis of key nursing concepts. J Clin Nurs. 2020;29(19-20):3652-66. doi: 10.1111/jocn.15420.
9. Geçkil E, Sabetsarvestani R, Hadianshirazi Z. A systematic review of nursing theories in pediatrics settings. J Qual Res Health Sci. 2022;11(3):206-17. doi: 10.34172/jqr.2022.08.
10. Zhang J, Guo L, Mao J, Qi X, Chen L, Huang H, et al. The effects of nursing of Roy adaptation model on the elderly hypertensive: a randomised control study. Ann Palliat Med. 2021;10(12):12149-58. doi: 10.21037/apm-21-2803.
11. Mansouri A, Baraz S, Elahi N, Malehi AS, Saberipour B. The effect of an educational program based on Roy's adaptation model on the quality of life of patients suffering from heart failure: a clinical trial study. Jpn J Nurs Sci. 2019;16(4):459-67. doi: 10.1111/jjns.12255.
12. Nobahar M, Saffari M, Babamohamadi H, Sotodehasl N, Mirmohammadkhani M. The effect of a care plan based on the Roy adaptation model on general health in hemodialysis patients; a randomized controlled clinical trial. J Renal Inj Prev. 2020;9(2):e11. doi: 10.34172/jrip.2020.11.
13. Efendi D, Hasan F, Natalia R, Utami AR, Sonko I, Asmarini TA, et al. Nursing care recommendation for pediatric COVID-19 patients in the hospital setting: a brief scoping review. PLoS One. 2022;17(2):e0263267. doi: 10.1371/journal.pone.0263267.
14. Han MJ, Heo JH, Hwang JS, Jang YT, Lee M, Kim SJ. Incidence of febrile seizures in children with COVID-19. J Clin Med. 2023;12(3):1076. doi: 10.3390/jcm12031076.
15. Cadet K, Boegner J, Ceneviva GD, Thomas NJ, Krawiec C. Evaluation of febrile seizure diagnoses associated with COVID-19. J Child Neurol. 2022;37(5):410-5. doi: 10.1177/08830738221086863.
16. Ghanbari-Afra L, Adib-Hajbaghery M. Roy adaptation model in patient with COVID-19. Nurs Midwifery J. 2020;18(5):387-97. [Persian].
17. Rahkar Farshi M, Jabraeili M, Moharrami N, Malakouti J. Nursing care in a child with coronavirus disease 2019: a case study. Hormozgan Med J. 2020;24(4):108040. doi: 10.5812/hmj.108040.