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Meningitis and Nursing Care According to the Model of Nursing Based on Activities of Living: a Case Report

Zapalenie opon mózgowo-rdzeniowych i opieka pielęgniarska zgodnie z modelem opieki opartej na czynnościach życiowych — opis przypadku

Şengül Korkmaz Binay[1], **Umut Devrim Binay**[2], **Ebru Yıldız Karadeniz**[3]

❶ Erzincan Binali Yıldırım University, Faculty of Health Sciences, Nursing Department, Erzincan, Turkey
❷ Erzincan Binali Yıldırım University, Faculty of Medicine, Department of Infectious Disease and Clinical Microbiology, Erzincan, Turkey
❸ Mersin University, Faculty of Nursing, Department of Fundamentals of Nursing, Mersin, Turkey

Abstract

Introduction. Meningitis is an infectious disease that seriously affects the health of the individual, can cause mortality and can be treated with emergency intervention.
Aim. The aim of this study is to evaluate the holistic and systematic nursing care process of the patient with the diagnosis of meningitis on the basis of the described case, in line with the nursing model.
Case Report. This is the case study of a male patient who was treated with the diagnosis of meningitis in the infectious diseases and clinical microbiology clinic. Nursing problems were determined and a care plan was created by interviewing the patient and his physician, observing and assessment with Model of Nursing Based on Activities of Living.
Results. The patient, who has fever, chills, nausea, headache, neck stiffness and left ear discharge, was admitted to the Infectious Diseases and Clinical Microbiology clinic and treated. NANDA-I (North American Nursing Diagnosis Association-International) nursing diagnoses determined specifically for the patient by using the Activities of Living Model developed by Roper, Logan and Tierney are acute pain, fever, nausea, lack of knowledge, fatigue, sleep pattern disruption and risk of falling.
Conclusions. Accurate and complete data were collected using the nursing model/theory. Nursing interventions applied specifically to the patient were found to be effective. The patient's problems were improved. Thanks to the interdisciplinary collaboration, a medical diagnosis of meningitis was made and appropriate medical treatment and nursing care was administered. The patient was discharged with recommendations for outpatient control. **(JNNN 2022;11(3):130–136)**
Key Words: meningitis, nursing care, nursing model/theory

Streszczenie

Wstęp. Zapalenie opon mózgowych jest chorobą zakaźną, która poważnie wpływa na zdrowie jednostki, może powodować śmiertelność i może być leczona w trybie nagłym.
Cel. Celem pracy jest ocena całościowego i systematycznego procesu opieki pielęgniarskiej nad pacjentem z rozpoznaniem zapalenia opon mózgowo-rdzeniowych na podstawie opisywanego przypadku, zgodnie z modelem pielęgniarskim.
Opis przypadku. Jest to studium przypadku pacjenta płci męskiej leczonego z rozpoznaniem zapalenia opon mózgowo-rdzeniowych w poradni chorób zakaźnych i kliniki mikrobiologii klinicznej. Określono problemy pielęgniarskie i stworzono plan opieki poprzez przeprowadzenie wywiadu z pacjentem i jego lekarzem, obserwację i ocenę Model of Nursing Based on Activities of Living.

Wyniki. Pacjent z gorączką, dreszczami, nudnościami, bólem głowy, sztywnością karku i wydzieliną z ucha lewego został przyjęty do Kliniki Chorób Zakaźnych i Mikrobiologii Klinicznej i leczony. NANDA-I (North American Nursing Diagnosis Association-International) diagnozy pielęgniarskie określone specjalnie dla pacjenta za pomocą Activities of Living Model opracowanego przez Ropera, Logana i Tierneya to ostry ból, gorączka, nudności, brak wiedzy, zmęczenie, zaburzenia snu i ryzyko upadku.
Wnioski. Dokładne i kompletne dane zostały zebrane przy użyciu modelu/teorii pielęgniarskiej. Stwierdzono, że interwencje pielęgniarskie zastosowane specjalnie do pacjenta okazały się skuteczne. Problemy pacjenta uległy poprawie. Dzięki interdyscyplinarnej współpracy postawiono diagnozę medyczną zapalenia opon mózgowo-rdzeniowych oraz udzielono odpowiedniego leczenia i opieki pielęgniarskiej. Pacjent został wypisany z zaleceniami kontroli ambulatoryjnej. **(PNN 2022;11(3):130–136)**
Słowa kluczowe: zapalenie opon mózgowych, opieka pielęgniarska, model/teoria pielęgniarstwa

Introduction

Meningitis is a serious infection of the meninges. Disease can be caused by many different pathogens, including bacteria, fungi or viruses. Bacteria that cause meningitis are transmitted by droplets from carriers. The most common symptoms of meningitis are neck stiffness, fever, photophobia, confusion, headache and vomiting. Bacterial meningitis can cause brain damage, hearing loss or learning difficulties [1,2].

Meningitis is diagnosed by analysis of cerebrospinal fluid (CSF), which includes white blood cell count, glucose, protein, culture, and in some cases polymerase chain reaction (PCR). CSF is obtained via lumbar puncture (LP). Antibiotics and supportive care are critical in all cases of bacterial meningitis [1].

Diagnosis, treatment, care and follow-up of the disease should be with a multidisciplinary approach. The nurse has many roles in this approach [3]. The nurse should plan the signs and symptoms of meningitis, it's treatment, the side effects of the treatment, complications and individualized care to solve the problems that arise [4–6]. A model/theory should also be used for an effective diagnosis [3].

This article aims to show the importance of individualized care of a patient with Roper, Logan, Thierney's Nursing Model, through a case study.

Case Report

Ş.G. is a 20-year-old male patient. He has no contagious disease and no known allergy. He does not use alcohol and smoke. He applied to the otorhinolaryngology outpatient clinic with increasing complaints of left ear pain and ear discharge, which had been present for about 2 years. Amoxicillin-clavulanic acid 2×1 gr PO (Per oral) has been prescribed empirically to the patient. Two days later, he presented to the emergency room with fever, chills, nausea and headache. Physical examination in the emergency room revealed neck stiffness and discharge in the left ear. No features were found in other system examinations. In his vital signs; fever: 38.7°C, blood pressure: 120/80 mm/Hg, heart rate: 90/min, respiration rate: 12/min. In laboratory tests performed in the emergency department; WBC (White blood cell count): 14800/mm³, Neutrophil percentage: 91%, PLT (Platelet count): 156000, Hemoglobin (Hgb): 14 gr/dL, CRP (C-Reactive Protein): 234 mg/dL, SARS-CoV-2 PCR (*Severe Acute Respiratory Syndrome Coronavirus 2* Polymerase Chain Reaction) was negative. Chest X-ray, Cranial and Thorax CT (Computed Tomography) radiological imaging were performed and it was seen that there was left mastoiditis in the cranial CT. The patient was admitted to the infectious diseases inpatient clinic with a preliminary diagnosis of "acute bacterial meningitis" and medical diagnoses of "chronic mastoiditis". Two sets of blood cultures were taken because the patient had fever. After obtaining the patient's consent, a lumbar puncture (LP) was performed. In the CSF (Cerebral Spinal Fluid) sample taken with LP; glucose 47 mg/dl, protein 87 mg/dl, leukocyte count 2400 mm³, and no microorganisms were seen in gram staining. Concurrent blood glucose is 110 mg/dL. CSF culture was sent. The patient was treated with Ceftriaxone 2×2 gr IV (Intravenous), Vancomycin 2×1 gr IV, Metronidazole 4×500 mg IV, Paracetemol 1 gr IV LH, Pantoprozole 1×40 mg IV, Dexamethasone 4×4 mg IV, Dexketoprofen 1×50 mg IV, Metoclopramide 2×10 mg. However, the patient's fever did not decrease, and the severity of ear discharge and headache did not decrease. Since Amoxicillin had used clavulanic acid before, there was no growth in CSF culture and blood cultures. Contrast-enhanced cranial MRI (Magnetic Resonance Imaging) was performed on the patient. Cranial MRI revealed an appearance consistent with left mastoiditis, cholesteatoma in the left ear, and venous thrombosis in the left transfer sinus. In line with these findings, it was decided to perform surgical intervention on the patient. The patient, whose preoperative preparations were completed, underwent mastoidectomy on the 7th day of hospitalization and tissue culture was taken. After the operation, the patient was transferred to the infectious diseases inpatient clinic. In addition, Ceftriaxone 2×2 gr IV was stopped and Meropenem 3×2 gr IV and Low

Enoxaparin sodium 2×0.6 ml SC (Subcutaneous) were started in the treatment. *Enterococcus faecalis* and *Pseudomonas aeruginosa* were grown in tissue culture. After the current treatment was continued for 21 days, he was discharged with full recovery and outpatient control was planned.

Analysis of the Individual with Meningitis in Accordance with Roper, Logan, Tierney's Nursing Model

Model of Nursing Based on Activities of Living consists of 5 meaningful components that are interrelated and influencing each other. These components are; life span, activities of living, factors influencing activities of living, dependence-independence continuum and individualized nursing care [7,8].

1 — The Life Span

Life span, which is one of the components of the model, is the element that makes up the whole process from fertilization to death, and every individual needs nursing care at any stage of this period [7,9,10]. Meningitis is a serious infection that can be seen in almost all age groups. However, it mainly affects infants, preschool children and young people [1]. The individual is in the adult stage of life span.

2 — Activities of Living

Although individual differences are important in this part of the model, the effect of the disease on activities of daily living in individuals with meningitis was evaluated.

Maintaining a Safe Environment

Establishing and maintaining a safe environment after admission to the hospital is very important for the individual to perform all aspects of life in a healthy way [7,9]. Surgical interventions in providing and maintaining a safe environment can cause many problems as they negatively affect the safety of the individual. In terms of the possible risk of infection that may develop due to the COVID-19 outbreak, LP, surgical operation, care was taken to ensure and maintain a safe environment, and to take the necessary isolation and security measures for the protection, support and observation of the patient. The patient stated that he had severe headache due to meningitis. He stated that the severity of headache during the follow-up period was 8 when evaluated with the VAS (Visual Analogue Scale). The patient stated that he did not have headache on the 10th day of hospitalization and on the day of discharge after antibiotic therapy, supportive treatment and masteidectomy surgery.

Communication

The patient has ear discharge, but it did not affect the patient's communication. The patient stated that he was afraid and worried due to reasons such as meningitis, the COVID-19 pandemic, surgical operation, and the restriction of companions and visitors. In this whole process, a relevant and reassuring environment was created by using professional communication skills in communication with the patient, and no problems were encountered that would hinder communication activity in this process. He stated that his fear of the patient decreased in the postoperative period and he felt peaceful.

Breathing

When the respiratory activity of the patient was evaluated in the preoperative and postoperative periods, the respiratory rate and depth were normal, and the respiratory rhythm was determined regularly. The SARS-CoV-2 PCR test result is negative. The healthcare team used personal protective equipment to prevent bacterial meningitis from being transmitted to healthcare professionals who were in contact with the patient during medical treatment and care. The individual is provided to wear a mask to protect against COVID-19 disease. No adverse events related to respiratory activity were observed.

Eating and Drinking

The patient, who did not have any dietary restrictions, weighed 80 kg and was 178 cm long, and stated that there was no recent change when the nutritional activity of the period before the patient was diagnosed. The patient also had nausea due to meningitis. There was no complaint of nausea after the care and treatment. No problems affecting oral nutrition were encountered.

Eliminating

The patient stated that his normal defecation habit was once a day. Most recently, he stated that it happened during the day. In the postoperative period, gastrointestinal and urinary system functions are affected

due to anesthetic drugs and surgical stress [11]. In the pre- and postoperative physical examination of the patient, bowel sounds were normal, gas was present, and there was no abdominal distension. The patient stated that there was no problem in his urinary excretion habit, that he vomited 5–6 times a day, and that he did not wake up at night to urinate. During the follow-up period in the infectious disease inpatient clinic, no problems were observed regarding excretory activity.

Personal Cleaning and Dressing

The patient had no problems in performing personal cleaning and dressing activities during the inpatient treatment. In the diagnosis of the individual, it was determined that he dressed appropriately for the season and the clothes looked clean. Due to the discharge in his left ear due to meningitis, he was able to provide ear hygiene while doing his daily self-care. However, when the severity of pain and fever were high, ear care was performed and followed up by the nurse. He stated that he has the habit of taking a shower every day. It was determined that the skin turgor was normal and moist. When the individual's mouth was evaluated, it was seen that the oral mucosa was pink in color and there was no dryness or other problem on the lips.

Controlling Body Temperature

The patient, who applied to the hospital with the complaint of fever, had a fever of 38.7°C on the day of his admission to the infectious disease inpatient clinic and the high fever continued for 7 days. As a result of the care and treatment applied to the patient, fever did not occur.

Mobilising

The patient stated that he did not exercise regularly at the time before hospitalization and led a more sedentary life. Movement activity of the patient who was hospitalized for meningitis was restricted. During the follow-up period in the infectious disease inpatient clinic, the patient was able to independently maintain his range of motion and reported that he did not want to get out of bed due to fever, weakness, and headache. The patient stated that he felt better after his fever subsided.

Expressing Sexuality

The patient, who was single when his sexual activity was diagnosed, stated that he was not sexually active. The individual stated that he did not have any problems with sexual activity. He chooses his clothes according to his gender.

Sleeping

He stated that his general sleep habit is 7–8 hours/day at night, he uses 1 pillow while sleeping and he does not sleep during the day. However, he stated that there were changes in sleep pattern and quality due to fever, nausea, vomiting, and headache during the hospitalization process, and that he could not sleep enough. The patient stated that he did not have any difficulty in falling asleep and felt better when the fever disappeared and the headache subsided.

Working and Playing

The patient stated that he is self-employed and spends time with his family and friends in his spare time. The symptoms of meningitis infection were evaluated in people with whom the patient lived and in close contact, and it was determined that they were absent.

3 — Factors Influencing Activities of Living

The above-written data of the patient were collected by considering the biophysiological, psychological, socio-cultural, environmental and politico-economic factors that influences the activities of li in the model [8].

4 — The Dependence-Independence Continuum

The patient was supported by nurses when he could not do his daily living activities independently due to problems related to meningitis.

5 — Individualizing Nursing

The factors causing meningitis and the evaluation of the responses to meningitis were made by taking into account the individuality [8]. NANDA-I (North American Nursing Diagnosis Association-International) nursing diagnoses which are determined individually as a result of grouping and interpreting the data obtained in line with the model/theory, are acute pain, fever, nausea,

lack of information, fatigue, sleep pattern disruption and risk of falling.

Problem 1: Acute Pain

Purpose of nursing care: Acute pain associated with meningitis, with a score of 8 out of 10 according to the painful facial expression and pain intensity scale.
Nursing interventions:

1. A comprehensive assessment will be made, including the location, characteristics, onset/duration, frequency, nature, intensity or severity of the pain, and factors that aggravate the pain.
2. The individual's cultural characteristics, values and beliefs will be taken into account in his response to pain.
3. Vital signs will be closely monitored.
4. The effectiveness of previously used pain control measures will be determined.
5. Psychological support will be provided to the patient.
6. Necessary explanations will be made to address the concerns.
7. Education will be given to the patient and his family in line with their needs.
8. Environmental factors (room temperature, lighting, noise/sound etc.) will be brought under control.
9. Analgesics will be administered in line with the physician's order [12–14].

Assessment: The individual will express that the pain is reduced or relieved. After the nursing interventions were applied, the patient stated that his pain decreased and the patient's pain scale score was evaluated as 2.

Problem 2: Fever

Purpose of nursing care: Fever associated with meningitis, which is found with a body temperature of 38.7°C and hot skin when touched.
Nursing interventions:

1. Body temperature and other vital signs will be monitored at regular intervals.
2. The patient is closely monitored in terms of cardiovascular and neurological aspects, the collected data will be compared with normal values.
3. The patient/relative will be informed about the following:
   a. Sufficient fluid and nutrient intake,
   b. Sufficient environmental safety (for example, appropriate dressing and ambient temperature),
   c. Balancing activity/exercise and rest periods.
4. Cold application will be made.
5. Antipyretic will be administered by physician order [12,13].

Assessment: Body temperature will be within normal limits. After nursing interventions, the patient's fever decreased, no chills or shivering occurred.

Problem 3: Nausea

Purpose of nursing care: Nausea associated with meningitis, which is found by expressing that he has nausea.
Nursing interventions:

1. The causes of nausea and how long it may last will be explained.
2. A safe and clean environment will be provided.
3. He will be told to eat small amounts and slowly at frequent intervals.
4. The individual is encouraged to choose the techniques of music, conversation, story, humorous images and distraction. If possible, the patient will be advised to practice the procrastination technique before the time needed.
5. Antiemetic will be applied according to the physician's order.
6. Hydration status will be closely monitored and fluid intake and output will be monitored [12,13].

Assessment: The individual will state that his nausea has decreased/absent. After the nursing interventions, the patient stated that his nausea decreased, no vomiting was observed and there was no deterioration in nutrition.

Problem 4: Lack of Knowledge

Purpose of nursing care: Lack of knowledge associated to meningitis treatment, which is found with inadequacy in information sources.
Nursing interventions:

1. The patient and his family will be informed about the signs and symptoms of meningitis, the treatment to be applied, and possible complications.
2. Targets will be developed in cooperation with the patient/relative.
3. Information will be given about the transmission through droplets.

Assessment: The patient will be informed about treatment and care. After the nursing interventions were applied, the patient's lack of knowledge was eliminated.

Problem 5: Fatigue

Purpose of nursing care: Fatigue associated with the change in sleep pattern due to meningitis-related headache, hyperthermia, nausea-vomiting, which is detected by the patient's verbal expression and unrestful sleep pattern.
Nursing interventions:

1. The physiological and psychological state of the patient will be evaluated for activities that result in fatigue related to age, development, and stage of the disease.
2. The causes of fatigue will be explained to the individual.
3. He will be given the opportunity to express his feelings about the effects of his fatigue.
4. A plan will be made for him to carry out activities of living during periods of high energy.
5. Environmental regulations will be made for quality sleep **[12,13].**

Assessment: The patient will safely perform the activities of daily living without fatigue. He stated that his fatigue continued after the nursing interventions were applied.

Problem 6: Sleep Pattern Disruption

Purpose of nursing care: Disturbance in the sleep pattern associated with the hospital environment, headache, fever, nausea-vomiting, which is detected by the patient's statement that he is tired and does not sleep well at night, and a change in the normal sleep pattern.
Nursing interventions:

1. Individual, environmental and therapeutic risk factors will be prevented.
2. The individual's sleep patterns and habits will be determined.
3. A quiet environment will be prepared for sleeping.
4. Applications to relieve the patient's pain will be planned.
5. It will be recommended to perform eliminating activity before going to bed and avoid caffeinated beverages.
6. Measures will be taken to make it easier for the individual to sleep in line with their habits (relaxation exercises, etc.) **[12,13]**.

Assessment: The patient will express that the symptoms of insomnia have decreased, that he slept more and rested. After the nursing interventions were applied, the patient stated that he woke up at night intermittently due to headache.

Problem 7: Risk for Falling

Purpose of nursing care: The risk of falling, which is found when the patient states that he is tired, does not sleep well, and has undergone a surgical operation.
Nursing interventions:

1. Past health history, current/previous medical and nursing diagnoses and documents proving his treatment will be reviewed.
2. Data obtained from risk assessment criteria will be evaluated.
3. The patient's past and present functional level will be evaluated.
4. It will create a safe environment and bed borders will be used when necessary.
5. Behaviors and factors affecting the risk of falling will be determined.
6. Environmental factors will be removed **[12,13]**.

Assessment: The patient will not fall as long as he stays in the hospital. After the nursing interventions were applied, the patient did not fall as long as he stayed in the hospital.

Discussion

The case report includes informing health professionals about meningitis symptoms-signs and complications and planning nursing care with the model based on the Activities of Living Model.

Activities of Living are important vital functions necessary for a healthy or sick individual to survive **[8]**. In the case report, accurate and complete data about the patient were collected using the Activities of Living Model developed by Roper, Logan, and Tierney. Individualized nursing care was planned and implemented as this model formed a suitable basis for the nursing process **[6]**. The use of this model in meningitis, a contagious infectious disease, was beneficial in reducing and eliminating the symptoms and signs caused by the disease and the problems experienced by the patient.

It enabled the active participation of the patient in individualized care. Because the Activities of Living Model puts the individual in the care center with a humanist and holistic approach and foresees the participation of the individual in care. This model; It creates a structure that ensures the integration of nursing practices into all service areas of the health care system. Addressing the nursing process in line with the Activities of Living Model plays an important role in the angelization of nursing and the improvement of the quality of care **[6] [6,15]**.

Conclusions

Meningitis case was evaluated by using the Activities of Living Model developed by Roper, Logan and Tierney in order to emphasize the necessity of using the model/theory in the nursing care process and to enable it to be used in the field of practice. In order to meet the needs of the patient with a medical diagnosis of meningitis, the complications of meningitis were prevented by interdisciplinary cooperation and healing was achieved. The determined needs of the patient were met by using a model of the nursing process in patient-specific individualized care. At the same time, it is thought that the use of the model will increase the quality of care and will increase the patient's coping skills and quality of life.

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Corresponding Author:

Şengül Korkmaz Binay

Erzincan Binali Yıldırım University,
Faculty of Health Sciences,
Nursing Department
Başbağlar Mahallesi, 1404 Sok. No: 15/3
24030 Erzincan, Turkey
e-mail: skorkmazbinay@erzincan.edu.tr

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Author Contributions: Şengül Korkmaz Binay[A, B, E–H], Umut Devrim Binay[A, E–H], Ebru Yıldız Karadeniz[A, B, E, G, H]

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