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Case Report:
Implementing Johnson's Behavioral System Model in a Patient With Heart Failure: A Case Study

Leila Ghanbari Afra[1], **Mahsa Haji Mohammad Hoseini**[2*]

1. Faculty of Nursing and Midwifery, Kashan University of Medical Sciences, Kashan, Iran.
2. Department of Emergency Medicine, Faculty of Paramedicine, Qom University of Medical Sciences, Qom, Iran.

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ABSTRACT

Background and Aim: Patients with heart failure encounter numerous problems. The current study aimed to explore the effects of Johnson's behavioral system model (JBSM) on the care of patients with heart failure, considering all aspects of their behaviors.

Case Presentation: This case report study was performed in 2020 in a hospital affiliated with Qom University of Medical Sciences, Qom City, Iran. A patient with coronavirus disease 2019 (COVID-19) was examined and received JBSM. Based on the assessment form of JBSM, the relevant interviews and evaluations of subsystems were performed. The required data were collected using JBSM's assessment checklist by observing, interviewing, and conducting physical examinations. Data sources included the client and her medical records, physicians, and nurses. The researcher followed up the patient for two months. In total, three face-to-face interviews were conducted with the patient. After the patient was discharged from the hospital, her condition was followed up via phone calls.

Conclusion: The patient presented unstable behaviors concerning aggressive protective, ingestive, eliminative, and sexual subsystems. After performing nursing care according to JBSM, her erratic behaviors decreased. Applying nursing models in the patient care process can alleviate unstable behaviors and promote sustainable behaviors in patients with heart failure.

*** Corresponding Author:**
Mahsa Haji Mohammad Hoseini, PhD.
Address: *Department of Emergency Medicine, Faculty of Paramedicine, Qom University of Medical Sciences, Qom, Iran.*
Phone: *+98 (912) 8548438*
E-mail: *mahsa.nmsprg@gmail.com*

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1. Introduction

Implementing nursing models in the client care process can provide a framework for reflection. Dorothy E. Johnson, a nursing theorist, considers man as a behavioral system whose consequences of actions are visible. As per this theory, nursing facilitates effective behavioral practices in the patient before, during, and after the disease course [1]. According to Johnson's Behavioral System Model (JBSM) (1980), there are 7 subsystems of behavior (achievement, attachment-affiliative, aggressive protective, dependency, ingestive, eliminative, and sexual) [2]. Auger (1976) added a storage subsystem to 7-item JBSM [3].

Johnson believed that nursing care should be independent of medical care and goes beyond the recovery from illness or acceptable health practices [4]. From the nurse's perspective, a behavioral system, i.e., threatened by disorders and illnesses, is central to care. The goal of a nurse is to maintain or restore balance and stability of the individual's behavioral system or help the patient achieve a level of balance and optimal performance [5]. A large body of literature supports the application of Johnson's theory in clinical practice [2]. For example, Payamani et al. studied a 37-year-old woman with multiple sclerosis, and Ghanbari examined an 11-year-old girl with acute lymphocytic leukemia. The beneficial impacts of this model have been suggested in research, education, management, and nursing practice [6].

Heart failure is among the most common chronic diseases worldwide that impose a high economic burden on healthcare systems [7]. In total, 26 million individuals suffer from this disease globally, and its prevalence is on the rise in Iran [8]. Patients with heart failure, due to deficiencies in blood flow, encounter various signs and symptoms, such as shortness of breath, dizziness, angina, edema, and ascites [9]. These patients experience a longer-term disability than patients with cancer [10]. This condition can also affect individuals' quality of life [8]. Studies have often focused on one dimension of these patients' lives, and few have examined biopsychosocial dimensions in patients with heart failure. Therefore, using nursing models can create a common understanding of individuals' health-related requirements [5]. Rahmani et al. examined 150 patients with heart failure based on JBSM. Accordingly, they found a significant improvement in achievement, attachment-affiliative, aggressive protective, ingestive, and eliminative subsystems [5]. An approach that provides an opportunity for nurses to implement nursing models is case studies because case studies provide a care program based on the needs of the patient and their family using creative thinking and problem-solving methods. Therefore, the present study findings can improve sustained behaviors and reduce unstable behaviors by a care program based on JBSM.

2. Case Presentation

In 2020, a descriptive case study was performed in a hospital affiliated with the Qom University of Medical Sciences, Qom City, Iran. The patient's heart failure was established based on diagnostic tests and a cardiologist's approval. The patient presented no mental health illnesses or cancer. Accordingly, the JBSM was performed on the case. The researcher observed all health and hygiene protocols when meeting the patient and explained the purpose and procedure of the study to the patient. A written informed consent form was obtained from the examined case. The patient was evaluated concerning the subsystems of the JBSM.

The source of information was the client, the treating physician, the patient's medical record, and the field observation nurse. The patient was reassured about the confidentiality of her information. Ethical principles were followed per the guidelines of the Helsinki Declaration, and the extent of the achieved objectives was assessed.

The patient was a 50-year-old married woman with two children, a housewife with a diploma living in Qom City, Iran. Her economic status was average and was covered by social security insurance. The time of data collection was performed on October 12, 2020. She presented the symptoms of shortness of breath, weakness, and lethargy one day before the examination, i.e., intensified over time.

Thirty minutes later, she developed cold sweats and chest pain radiating to the left arm. The patient had consumed two nitroglycerin pearls and called the emergency services (115). In the emergency room, the patient was given a sitting position with her legs dangling; oxygen therapy was performed, and an intravenous injection was established. Upon entering the triage ward of one of the hospitals of Qom University of Medical Sciences, the patient was admitted with a definite diagnosis of pulmonary edema. She presented restlessness, 83% O_2 saturation, weakness, lethargy, and nausea. She used the respiratory sub-muscles. Her blood pressure was measured as 65/100 mm Hg, heart rate of 110-130 beats/minute, tachypnea (RR=20-25 breaths/minute), and a temperature of 36.5°C.

The cardiac monitoring illustrated tachycardia sinus. Pharmacotherapy was initiated in the acute phase (oxygen therapy, nitroglycerin infusion, Lasix, and morphine sulfate). She reported a history of heart failure in the last seven years. During this time, she has been hospitalized five times. She presented no history of other underlying diseases. On echocardiography, there was a 25% discharge fraction, with moderate systolic dysfunction, anterior wall, and apex hypokinesis, as well as mild mitral valve insufficiency. Other heart valves were intact. The airway was open, and the chip was placed in the midline. No periodontitis was detected. Jugular vein pressure was prominent. No heart murmur was present. The lungs' sound was normal. The abdomen was normal and without rigidity, guarding, and tenderness. On examination, there was no movement restriction, tenderness, redness, and swelling. Ankles, fingers, and nails were healthy. No clubbing and hyperkeratosis were detected. The condition of the patient's skin and hair was normal. Her family history of heart disease was positive. The detailed examination of the subsystems is presented in Table 1. The study of structural and functional needs based on the behavioral and structural subsystems of JBSM are reported in tables 2 and 3.

Based on the unstable behaviors identified in the previous step, nursing diagnoses, goals, nursing interventions, and evaluation were prioritized as follows:

1. Nursing diagnosis: Shortness of breath respecting the reduction of the discharge fraction and the cardiac output, i.e., characterized by the patient's statements and signs and symptoms.

Purpose: Do not present shortness of breath.

Nursing interventions: Providing training on consuming prescribed medications on time, balancing activity and rest, not going uphill, and using more pillows during sleep.

Evaluation: The patient should take the prescribed medications on time. The patient does not wake up at night due to shortness of breath.

2. Nursing diagnosis: Inefficiency in physical mobility respecting shortness of breath, i.e., determined by the patient's statement of shortness of breath and physical weakness (inefficiency in the aggressive-protective subsystem).

Objective: Maintaining physical activity.

Nursing interventions: Encouragement to continue daily exercises, such as walking and yoga, the timely use of medications recommended by the treating physician, balance between activity and rest, and the training of pursed-lip breathing or oxygen consumption in case of shortness of breath.

Evaluation: The patient performed daily exercises to increase motor endurance; she practiced yoga exercises twice a week. She used the prescribed medications according to the physician's instructions. She rested between activities. She used oxygen before leaving the bed. If shortness of breath occurred during activity, pursed-lip breathing was practiced.

3. Nursing diagnosis: Fatigue related to impaired cardiac output, i.e., determined by the client's statement on fatigue in performing household chores (difference in the storage subsystem).

Objective: The client should not feel tired by performing activities.

Nursing interventions: Energy conservation training with a break between daily activities, discontinuing work before extreme fatigue, not conducting activities and heavy duties, the division of daily chores within 24 hours, the timely use of medications prescribed by the physician.

Evaluation: The patient attempted to have rest periods during the activity. She divided her daily activities. She consumed medication prescribed by a physician to relieve fatigue.

4. Nursing diagnosis: The risk of falls due to weakness and lethargy while walking (inefficiency in the protective-aggressive subsystem).

Objective: Not to fall while walking and performing daily living activities.

Nursing interventions: Providing training in the use of aiding devices when walking, like walkers or the support of others, rest before and between activities, providing training to get out of bed safely, the training and monitoring of medications consumptions and the non-interference of drugs that reduce blood pressure and heart rate.

Evaluation: When walking, she used a walker with the support of her husband or children to maintain balance, rest before getting out of bed and between activities. Before leaving the bed, she sat on the edge of the bed for 5 minutes and checked her blood pressure in case of weakness and lethargy. Blood pressure and heart rate medications were consumed at appropriate intervals.

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Table 1. Exploring the JBSM's Subsystems

Subsystems	Assessment	Stable Behaviors	Unstable Behaviors
Achievement	Performs personal tasks independently, Walks for 20-30 minutes daily	Uses the support of others and walking aids, Performing movement exercises while sitting on a bed or chair	
Attachment and affiliative	Has a good relationship with the family members, Has a husband and two children with a good relationship with the family and husband	A sense of belonging to the family	
Aggressive/Protective	Uses a walker and nurse support while walking, Complaining of weakness and lethargy	Using walking aids	Risk of falls due to gait imbalance
Dependency	Looks for help from the nurse, family, and physician to make care decisions, Using a walking aid, Giving help from the nurse in the hospital and the spouse at home with personal tasks, like bathing	Receiving help from the treatment staff if needed, Using a walking aid, Receiving help from her spouse to perform personal chores	
Eliminative	Due to the use of diuretics, the volume of urine and the number of bathroom requirements were high.	Use a Foley catheter, Regular use of constipation medications	Constipation due to low mobility and low fluid intake, The odds of generating urinary tract infection
Ingestive	Having intact oral mucosa, Eating five small meals a day, Consuming her medication on time, Body mass index: 24 kg/m2 (within normal range)	Uses boiled and steamed foods, Not using ready meals, Consuming enough fluids, Avoids salt and fat, Takes medicine according to the physician's prescription	
Restorative	Usually sleeps at 10 PM, Wakes up at 3 or 4 AM due to shortness of breath and at 3 AM and 6 AM to go to the bathroom, Feels tired in the daytime	Sleeps at 10 PM, Half-Sitting position while sleeping, Half an hour of sleep at noon	Feeling exhausted, The intolerance of activity, Shortness of breath
Sexual	Has two children, After the disease onset, having inadequate sexual desire and drives	Has two children, Receiving training provided by nurses	The intolerance of sexual relationships

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Besides, heart rate and blood pressure were monitored before each use.

5. Nursing diagnosis: Constipation is associated with inactivity, i.e., characterized by the patient who reported having defecation twice a week (the dysfunction of the excretory subsystem).

Objective: The client should defecate at least once a day.

Nursing interventions: Providing training in the use of laxative foods, increasing the consumption of fluids to 6-8 glasses per day, drinking a glass of fasting water, walking for 30 minutes daily, and using laxatives according to the physician's instructions.

Evaluation: The patient had a bowel movement once a day. She consumed plenty of laxatives and fluids and walked for 30 minutes a day.

Table 2. The structural needs based on JBSM's subsystems

Structural Needs Subsystems	Goal	Set	Choice	Action
Achievement	Helping the client become independent in conducting personal affairs	The patient's desire to independently perform personal chores	Accepting aid from spouse and nurse and using walking aids, The acceptance of performing exercises	The patient takes a bath alone, gets dressed, and does other personal chores.
Attachment and affiliative	Preventing hospitalization and being away from family	The spouse's desire to help reduce the patient's symptoms	Accepting prescribed treatment approaches and nursing education	Takes medications on time and listens to nurses' advice.
Aggressive/Protective	Preventing the patient from falling	The desire to maintain the safety	Using a cane when walking	The patient does not fall or become unbalanced while walking.
Dependency	Avoid feeling frustrated and upset	Tendency to establish an intimate relationship with the patient to develop appropriate behaviors	Accepting training and guidance from medical treatment staff and family support	The patient receives guidance from the treatment staff and implements the provided training.
Eliminative	Preventing constipation and the recurrence of pain and shortness of breath	Tendency to control defecation status	Accepting the provided training	The patient defecates daily.
Ingestive	Preventing digestive disorders and weight gain	Tendency to maintain weight in the normal range and nutrition with minimal adverse effects	Implementing the provided training	Eat five small meals a day. Body mass index: 24 kg/m^2.
Restorative	Preventing orthopnea and fatigue by controlling the patient's sleep	Willingness to receive nursing education and timely use of medications	She uses two pillows to sleep at night. She takes medications on time	The patient's shortness of breath is reduced.
Sexual	Help motivate and enhance sexual drive.	The desire to have sex	Taking medications on time and performing nursing training.	The patient has sex once or twice a month.

6. Nursing diagnosis: Sexual dysfunction related to the complications of the disease and disability, i.e., determined by the client's statement of the lack of desire and sexual ability toward the spouse (inefficiency in the sexual subsystem).

Objective: To express the problems in having sexual relations with the spouse.

Nursing interventions: Educating the client concerning verbal and non-verbal communication with the spouse, facilitating consultation with a clinical psychologist, counseling with the spouse, starting sexual activity at least four weeks after the onset of heart attack symptoms, reporting symptoms and heart problems to the physician to adjust medications, adjusting the room temperature before sexual activity. The patient should be in a comfortable position during the sexual activity, and his spouse should be more active. Maintaining a healthy weight, engaging in sexual activity for ≥3 hours after consuming a heavy meal and bathing, having intercourse after resting and preferably in the morning and after sleeping at night, training to increase foreplay to prepare the spouse.

Evaluation: The patient expressed the problems in having sexual relations with the spouse. The pain and shortness of breath during sex were reduced, and she endured sex once or twice a month.

3. Discussion

Based on the study results, the patient's unstable behaviors in aggressive protective, eliminative, ingestive, and sexual subsystems, extensively eliminated by nursing measures following JBSM. In this regard, Paymani et al. examined the JBSM-based nursing process in a client with multiple sclerosis. Their study, in line with the present investigation, highlighted the beneficial influence of JBSM on modulating unstable behaviors. In their

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Table 3. The functional needs based on JBSM's subsystems

Functional Needs Subsystems	Protection	Nurturance	Stimulation
Achievement	Helping the individual become independent in performing personal affairs	Spouse training in patient support for independence	Timely use of prescribed medications, The balance between activity and rest, The consumption of pearl trinitroglycerin or oxygen when encountering shortness of breath
Attachment and affiliative	Preventing hospitalization and being away from family	Educating the spouse to monitor and remind the use of drugs and monitor the process of treatment and recovery of the patient	Spending time with family daily, Have group fun activities with family, The family is in the process of treatment at work
Aggressive/Protective	Preventing the patient from falling	Educating the spouse in establishing safety facilities for the patient	Using the support of a nurse or spouse while walking, Using a walking aid, Using support fences in bathrooms and toilets.
Dependency	Avoiding feeling frustrated and upset	Educating the patient's spouse on establishing an intimate and friendly relationship with the patient for appropriate behaviors	Providing therapeutic training - care in the form of educational videos and pamphlets or booklets, Obtaining support from the spouse and nurse in personal matters
Eliminative	Preventing constipation and the recurrence of pain and shortness of breath	Constipation prevention training and treatment	Fiber consumption, Laxative consumption, Mobility in the range of motion and level of endurance, Taking walks with 30-min rest intervals
Ingestive	Preventing digestive disorders and weight gain	Teaching how to consume food	Preventing high-volume foods and bloating. Eating five small meals a day. Eating low-salt, low-fat foods, Consuming enough fluids. Not consuming fast foods and ready meals, Consuming boiled or steamed food
Restorative	Preventing orthopnea and fatigue by controlling the patient's sleep	Nursing training for proper sleep and timely use of medications	The patient takes the medication on time, Not taking diuretics or fluids after 6 PM, Avoid sleeping in the evening, Maintaining a balance between activity and rest
Sexual	Help motivate and enhance sexual drive	Providing sexual education with the least complications	Mostly practicing foreplay, Avoiding sexual activity for four weeks after a heart attack, Her sexual partner is most active during intercourse, so she consulted with a psychologist for five sessions and raised problems during the relationship. Informing the physician about the symptoms and problems experiencing during the relationship

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case study, the patient also manifested erratic behaviors in similar subsystems as our reported case, which improved after two months of receiving nursing care based on JBSM [6].

In a clinical trial, Rahmani et al. performed a 2-week JBSM-based care program among patients with heart failure. Accordingly, the patient indicated a significant recovery in the achievement, aggressive protective, dependency, ingestive, and eliminative subsystems. However, no significant improvement was observed in the sexual and attachment-affiliative subsystems [5]. Their study results, in general, were in line with those of the present research, suggesting the effectiveness of JBSM on improving the therapeutic outcomes of patients with heart failure. However, in subsystems, there was data discrepancy between these investigations. In Rahmani's study, the patient's sexual subsystem demonstrated an unstable behavior that did not improve with care based on this model. This lack of modification could be attributed to the high mean age of their intervention group (62 years) compared to the present study participants (50 years). Studies revealed that patients with heart failure encounter multiple sexual disorders; there is a direct relationship between age and sexual dysfunction [5].

Similarly, Ghanbari et al. designed a care protocol based on JBSM for a child with lymphoblastic leukemia. They stated that providing ten days of care according to JBSM was helpful for the patient and could be used as a framework for diagnosis, associated problems, planning, and evaluating nursing care in children [4]. Accordingly, this model seems to be effective in different age groups. Sheila et al. also assessed caregivers to patients with Alzheimer disease. They concluded that the model was successful in group situations, like support groups in this population. According to them, the most common involved subsystems were aggression-protection, dependency, and achievement, i.e., enhanced by JBSM [11]. One limitation of this study was its method (case study) that restricts the number of discussions that can be considered. Besides, only one case of heart failure was studied, limiting the generalizability of the obtained data. Therefore, to investigate the consequences of implementing the nursing process based on JBSM, it is suggested that further studies be performed on larger sample size and followed up for a more extended period.

4. Conclusion

The current study results signified that using a nursing process based on JBSM could help correct or modify unstable behaviors and promote sustainable behaviors in a client with heart failure. By using nursing models in client care, it can be hoped that care standards will improve, and the quality of care and client satisfaction will enhance, consequently. Therefore, it is suggested that the JBSM nursing process be used in clinical settings and other chronic diseases.

Ethical Considerations

Compliance with ethical guidelines

There were no ethical considerations to be considered in this research.

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Authors' contributions

Both authors equally contributed to preparing this article.

Conflict of interest

The authors declared no conflicts of interest.

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