

## Case Study

# Designing Nursing Care Program Based on Johnson Behavioral Model in Children with Acute Lymphoblastic Leukemia: A Case Study

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### Abstract

**Background:** Johnson behavioral model can be easily implemented in clinic and the nurses can easily design and implement an appropriate care plan using this pattern for patients.

**Aim:** this paper has been developed aiming to investigate clinical function of Johnson behavioral model in the child suffering from Acute Lymphoblastic Leukemia (ALL) in an environment.

**Methodology:** this paper is a case study one in which nursing process has been used according to Johnson behavioral model in the child suffering from ALL.

**Result:** in this paper after implementing care pan based on Johnson model, we have reached the considered goals easily.

**Conclusion:** The child who has been studied in this paper shows the application of nursing process based on Johnson behavioral theory in a clinic in a more expanded environment. Johnson behavioral theory is related to clinical environments and can be used in hospitals as a framework for diagnosing the problems of patient and proposing and evaluating comprehensive nursing care.

**Keywords:** clinical skill, Johnson behavioral model, nursing process, theory-clinical gap

### Introduction

One of the persistent problems in nursing is the existence of weak clinical observations and very little relationship of assumption concept in clinical environments. There are few studies about the function of theories in nursing clinical skills. Moreover, it is imagined that nursing theories are abstract and have a limited function in practice (Rolfe, 1993). Using theoretical researches as a clinical witness for critical thinking and decision-making, Nurses will increase their professional ability. When the nurses use theory and the evidences based on theory in order to form their skills, it will lead to improving the quality of taking care of patient (Younas Ahtisham et al, 2015). Implementing nursing skills in clinical environment help the students and nurses to

promote their critical thinking and analysis skills (Meleis, 2012; Fawcett, 2006). A care plan has been designed in this paper according to Johnson behavioral model in order to take care of the child suffering from ALL.

### Introduction to leukemia in children

Leukemia is an expanded word which refers to a big group of malignant disease of the bone marrow and lymphatic system. Leukemia means unlimited proliferation of immature white blood cells in the blood-producing tissue. Two types of leukemia have been known in children: Acute Lymphoblastic Leukemia and Acute Myeloid Leukemia. Acute Lymphoblastic Leukemia (ALL) in children is of the most frequent childhood cancers. The peak age of onset of this disease is

within 2 to 5 years old. Three main consequences of this disease include infections, fever and bleeding. The most common symptoms of leukemia in children are fever, paleness, fatigue, anorexia, bleeding and bone and joint pain. One of challenging situations in nursing cares is taking care of children with cancer (Wong, 2015).

### **Johnson Behavioral System Model**

Johnson behavioral theory is affected by Nightingale's opinion. He believed that the aim of nursing is helping people to prevent or ameliorate diseases or injuries. The science and art of nursing should be concentrate on a patient not on certain patients. For theorizing, Johnson has used the principles of behaviorists in psychology and sociology. Behavioral system theory is very similar to biologic system theory in which human has been introduced as a biologic system including biological sections and disease is considered resulting from the disruption of biological systems (Ghanbari, 2004). Main presumptions of Johnson theory include individual, nursing, environment and health. Johnson considers individual as a behavioral system with purposeful, repetitive and patterned ways that causes his relationship with the environment. Environment includes all factors in which a part is related to individual's behavioral system and affects system as well. He categorizes the environment into two groups of internal and external environment.

Health includes adequate and effective performance of systems and their behavioral stability and balance. As an external force, nursing causes organizing the behavior of patient. Nursing activities aren't dependent on physician but they are as complementary for Physician's measures (Marlain, 2015). The main concepts of Johnson behavioral model include: behavior, system, behavioral system, subsystems, balance and individual (Koshyar, 2008). The components of behavioral system are called subsystems. Subsystems conduct specialized tasks leading to whole integration of behavioral system and manage the relationship between system and environment. Johnson has defined seven subsystems in his theory but according to Grubbs model, there are eight subsystems for operationalizing Johnson behavioral model which

include Eliminate, Dependency, Aggressive/Protective, Affiliative, Achievement, Restorative, Ingestive and sexual. Each subsystem has at least four structural components which involve goal, set, choice and action (Marlain, 2015; Alligood, 2014).

Goal is the same reason and incentive of a subsystem's behaviors. Set is tendency which refers to the set of natural, regular and norm behaviors that an individual does to meet his needs. In Choice, among available options for achieving the goal, the individual chooses one. Action is a reaction that is shown by system against the incentive (Fawcett, 2006). Each one of subsystems has three equal functional needs which include stimulation, protection and nurturance. due to each subsystem maintain its stability, these functional needs should be met permanently by environment but at sickness or health threatening conditions, the nurse is a resource for providing these functional needs (Alligood, 2014).

Johnson considers nursing different from medicine because nursing sees patient as behavioral system and medicine sees patient as biological system (Marlain, 2015). Nursing process is used in Johnson behavioral model that is the emerge of disorder in behavior or sudden change in internal or external environment will lead to disorder in performance. Johnson believes that initial nursing investigation starts when pressure symptom or lack of balance is observed (Ghanbari, 2004). Johnson didn't emphasize on nursing process levels but he obviously considered the role of nurse as an external adjustment factor (Marlain, 2015). Nursing diagnoses are in four categories according to Johnson behavioral model which include: dominance, incompatibility, insufficiency and discrepancy. Nursing interventions are specified based on Johnson behavioral model with dominance, incompatibility, insufficiency and discrepancy. These interventions include providing subsystems by external mechanisms of Facilitate, Inhibit, Restrict and Defend (Meleis, 2012).

### **A case study**

The patient under study is an eleven-year-old girl named Zeinab. M, in first grade of secondary school who has been hospitalized in infection center because of fever since 29/10/2016.

According to her mother, she had nosebleeds two month ago and after a few days because of lower blood pressure and high fever, they referred to the hospital. She has been hospitalized for four days and as soon as she discharged from hospital, the fever started that used to be controlled with Acetaminophen. She referred to the hospital and has been hospitalized because of high fever since last week. The conducted experiments indicate low platelet and white blood cell. Considering the clinical results of experiments of the child, the first diagnosis was Acute Lymphoblastic Leukemia (ALL) and Zeinab has been hospitalized in blood section of 17<sup>th</sup> Sharivar Hospital. She has taken chemotherapy and antibiotics. In clinical examination, Zeinab's oral mucosa is fervent that is followed by anorexia and reluctance to food. Zeinab is tired and weak and doesn't want to leave her bed. Her mother says that she is injured in rectal area because of frequent diarrhea. In initial mental examination, Zeinab doesn't make eye contact but after some sessions with her, it was identified that she is worried about her vague future. She is aware of location, time and individual. She weighs 40 kg and is the third child of family. She doesn't mention the history of sickness in the family. She was born in normal vaginal delivery and the mother didn't have any particular issues in pregnancy and her other children are healthy. The child's vaccination was complete and had a normal procedure. According to Zeinab's mother, Zeinab's grandmother is taking care of other children while Zeinab is hospitalizing. The results of Zeinab's experiments have been shown in table 1. Investigating the subsystems has been indicated in the tables 2.

### Johnson behavioral model application

Nursing process in the child with ALL based on Johnson behavioral model is as follows:

**Nursing diagnosis 1:** Hyperthermia associated with infection (Insufficiency in protective and aggressive subsystem). the goal is reducing the child's fever to 37 degrees. The measures: 1- washing with cool water was used to reduce the fever (defend) 2. Training mother for reducing patient's clothing (inhibit) 3. Prescribing Acetaminophen with physician's order (defend)

**Nursing diagnosis 2:** the danger of bleeding related to patient's platelet decrease (Insufficiency in protective and aggressive subsystem), the goal is controlling bleeding. Measures: 1. Injecting intramuscular drugs should be avoided as much as possible (Restrict) 2. Controlling the degree of fever through rectal and using suppository should be avoided (Restrict) 3. The smallest needle should be used for intravenous injections (Restrict) 4. After finishing the injection, in order to stop bleeding, direct pressure should be imposed for 5 minutes (defend) 5. While the patient is walking or moving, she has to be taken care of (defend) 6. In case of need, a fence should be used beside protected bed (defend) 7. Training patient not to use hard toothbrush for teeth brushing (inhibit) 8. Severe coughing and blowing nose tightly should be avoided (inhibit) 9. The lips should be oily by softeners soluble in water during waking (inhibit)

**Nursing diagnosis 3:** infection associated with patient's white blood cells fall (Insufficiency in protective and aggressive subsystem), the goal is controlling infection. Measures: 1. Sterile gloves should be used in order to intravenous infusion (defend) 2. Daily care from IV location (defend) 3. Catheterization should be avoided except in necessity (defend) 4. The patient should be checked in terms of increasing fever, redness, heat, eye and ear pain, throat, skin, joints, abdomen as well as fever, chills and tachycardia and white rash in the mouth (defend)

**Nursing diagnosis 4:** disorder in skin integrity rectum in connection with the use of chemotherapy drugs (Insufficiency in eliminative subsystem), the goal is maintaining skin integrity rectum. Measures: training patient and her mother to clean around the rectum after each bowel movement and that cleaning perineum should be accomplished from front to the back (inhibit) 2. Training patient for doing seat bath and then drying perineum area to prevent flaking and scratches (inhibit)

**Nursing diagnosis 5:** exercise intolerance due to anemia and infection (Discrepancy in restorative and achievement subsystem), the goal is controlling the child's fatigue. Measures: training the child's mother to make the patient do physical activities and paly sports (inhibit) 2. Physiotherapy (facilitate) 3. Helping the patient to maintain a

balance between activity and rest and to prevent fatigue (defend) 4. Recommending to use stationary bicycle and sit ups (facilitate)

**Nursing diagnosis 6:** changes in less nutrition the body needs associated with increasing metabolism, anorexia, mucosal inflammation, pain (Insufficiency in ingestive subsystem), the goal is improving nutrition pattern. Measures: 1. Training mother and patient adequately to keep the mouth clean through gargling with salt water and not to use commercial mouthwash (inhibit) 2. Using soft toothbrush to keep the moth clean (inhibit) 3. Training to keep mouth clean before and after food (inhibit) 4. Recommending to use frequent food intake but with low volume, soft and gentle heat containing plenty of protein and vitamins (inhibit) 5. Training to avoid using vegetables and raw fruits or the ones whose skim cannot be peeled (inhibit) 6. Warning the patient to eat her food more slowly after using oral anesthetic to prevent aspiration and biting mucosa of the mouth and tongue (defend) 7. Prescribing diphenhydramine under the physician's order (defend)

**Nursing diagnosis 7:** the child's wrath because of falling behind the curriculum due to hospitalization (Insufficiency in achievement subsystem), the goal is controlling the child's wrath. Measures: 1. Training patient's mother to make an intimate relationship with her child (inhibit) 2. Creating a friendly atmosphere with the child and her mother by the personnel (defend) 3. Creating a space for patient to study and recommending mother to help her child with her lessons (facilitate)

### Evaluation

Expected consequences from care plan have been obtained successfully by the child and cooperation of her parents. At the end of 10-day period of caring, Zeinab makes relationship with parents and the medical team staff and her confidence has been

increased and she is more hopeful about the future. She is interested in field of Law and like to continue her education in this field. Zeinab does her homework, her appetite has been improved and there is no sign of aphthous, stomatitis and mouth pain, the rate of platelets and white blood cells has returned to the natural range and there is no symptom of bleeding, fever and infection. Zeinab can do daily routines at the tolerance level. She can do her favorite games. After care plan, the parents have felt more power and state necessary trainings about controlling fever, diet and disease procedure well.

### Result

through designing care plan based on Johnson behavioral model, at the end of 10-day period of hospitalization of Zeinab, increasing confidence, improving rational skills, improving the appetite, life daily routines, no fatigue, fever, bleeding and infestation have been obtained. The existing problems in Zeinab are the sign of instability in behavioral system which need nursing intervention. In this paper, the researcher has designed nursing interventions based on the needs of each subsystem and these needs are well provided at the end of these 10 days. The child who has been studied in this paper shows the application of nursing process based on Johnson behavioral theory in a clinic in a more expanded environment. Johnson behavioral theory is related to clinical environments and can be used in hospitals as a framework for diagnosing the problems of patient and proposing and evaluating comprehensive nursing care. Moreover, this theory can be implemented in clinical environments and it has been investigated especially on kids very little. It can also help experienced nurses to collect comprehensive and trustable information about the health status of the patient and as the result cause increasing the quality of nursing cares for patients.

**Table 1- The results of Zeinab's experimental tests**

Lab tests	Normal range	Zeinab's reading
Hemoglobin	Woman:12-15.5gr/dL	11.4 gr/dL
Platelet count	150,000-450,000 plateletes/mcl	98000plateletes/mcl
BUN	mg/dL	5 mg/dL
Creatinine	Woman:88-128ml/min	0.5 ml/min
WBC	Mill/mm <sup>3</sup>	1300 Mill/mm <sup>3</sup>
Na	135-145mEq/L	4.5mEq/L
Ka	3.5-5.2mEq/L	140 mEq/L
FBS	70-110mmol/L	98mmol/L
CRP		positive

**Table 2- Investigating subsystems**

Subsystems	Instable behaviors	Stable behaviors
<p><b>Aggressive/Protective</b>  <b>Goal:</b> To protect self or others from real or imagined threatening objects, person or ideas  <b>Function:</b> To recognize biological, environmental, or health systems that are potential threats to self or others</p>	<p>Zeinab had 38.5 degrees of fever and her skin is warm. she is vulnerable to infection because of severe leukopenia</p>	<p>The neurological examination, skin, hair, eyes, ears and musculoskeletal system are normal.</p>
<p><b>Achievement</b>  <b>Goal:</b> Mastery or control of self or the environment  <b>Function:</b> To set appropriate goals</p>	<p>Because of disease and hospitalization in hospital as well as falling behind the curriculum is angry and sad so she has frustrated and has a disorder in this subsystem</p>	<p>-----</p>
<p><b>Affiliative</b>  <b>Goal:</b> To relate or belong to someone or something other than oneself  <b>Function:</b> To form cooperative and interdependent role relationship within human social systems</p>	<p>It is identified in checking Zeinab that because of executing offensive procedure and the disease process, she gets angry and avoid making relationship with family and is experiencing withdrawal.</p>	<p>-----</p>
<p><b>Dependency</b>  <b>Goal:</b> To obtain focused attention,approval,nurturance and physical assistance  <b>Function:</b>To obtain approval, reassurance about self                      To make others aware of self</p>	<p>Because ofweakness caused by the disease and side effects of chemotherapy, such as fatigue, Zeinab cannot do ADLs alone and to meet her needs such as putting on clothes, going to the</p>	<p>-----</p>

	bathroom and so on gets help from her mother.	
<b>Eliminative</b> <b>Goal:</b> To expel biological wastes <b>Function:</b> To recognize and interpret input from the biological system that signals readiness for wastes excretion	Because of injuries in rectum caused by chemotherapy drugs, Zeinab suffers frequent diarrheas and skin damage at rectal area and has painful bowel movement and she cries when she is defecating.	Renal and pulmonary system don't have any problems and experimental results of these systems are normal. Her spirometry testing is satisfying which are all of stable behaviors. Zeinab can urinate without problem.
<b>Ingestive</b> <b>Goal:</b> To take in needed resources from the environment to maintain integrity of the organism or to achieve a state of pleasure <b>Function:</b> To sustain life through nutritive intake	Zeinab has thrombocytopenia and is vulnerable to bleeding. She cannot use enough liquid using moth and gets anorexia.	Stable behaviors of Zeinab include normal heartbeats, cardiovascular examination and her lack of oxygen supply disruption.
<b>restorative</b> <b>Goal:</b> To redistribute energy <b>Function:</b> To maintain or return to physiological homeostasis	Because of tiredness and lack of activity tolerance, Zeinab cannot restore energy and has a problem.	-----
<b>sexual</b> <b>Goal:</b> To procreate <b>Function:</b> To develop a self-concept or self-identity based on gender	Because she is still single and has not reached puberty, this subsystem cannot be investigated in her.	

**Table 3- Subsystem and its components**

Structure Subsystem	goal	set	choice	action
Aggressive/Protective	Preventing fever, infection and bleeding	The tendency of Zeinab's mother to cure her child	Accepting given trainings about preventing fever, infection and bleeding	Zeinab's mother takes necessary measures to prevent fever, infection and bleeding
Affiliative	Preventing the child's wrath	An intimate relationship with Zainab Guiding her mother to have good behavior with her	Accepting given trainings about controlling Zeinab's wrath by mother	Zeinab's mother states and implements given trainings about controlling the wrath of Zeinab
Eliminative	Preventing damage to the rectal mucosa	Training mother about health of perineal area	Acceptance of given training about perineal health on behalf of Zainab and her mother	Zeinab implements given trainings about the health of perineal area
Ingestive	Preventing	Training mother	Acceptance of given	Zeinab and her mother

	anorexia, stomatitis and mucous membrane damage	about proper nutrition pattern and the prevention of mucous membranes damage and oral hygiene	trainings about proper nutrition, oral hygiene and the prevention of damage to the mucous membrane	implements given trainings about proper nutrition, oral hygiene and the prevention of damage to the mucous membrane
Restorative	Preventing fatigue	Training mother about Preventing fatigue and exercise intolerance, and advising to physiotherapy	Acceptance of given training on the Preventing fatigue and exercise intolerance	Zeinab and her mother implements given trainings about the Preventing fatigue and exercise intolerance
Achievement	Not falling behind curriculum	Willingness to learn	Acceptance of given training on not falling behind curriculum	The mother implements given trainings about not falling behind curriculum and has feedback
Sexual	_____	_____	Acceptance of given training about prevention of infection, fever and bleeding	_____

**Table 4- Functional needs of subsystems**

Functional needs subsystem	protection	nurturance	stimulation
Aggressive/Protective	Prevention of infection, fever and bleeding	nutrition: training mother about prevention of infection, fever and bleeding	Stimulation: avoiding unnecessary meeting or meeting people with colds, avoiding flowers or using raw vegetables and fruit, locating the child in an isolate room in case of severe reduction of leukocyte, prevention of doing a lot of activities and severe physical games, checking the child in terms of bleeding or petechial
Eliminative	Preventing rectal mucosa damage	Training mother and child in the field of perineal hygiene and bath seat	Providing health requirements in section to make the child able to clean perineal area after bowel movement with the help of her mother
Affiliative	Prevention of	An intimate relationship with	Creating a friendly space for the child and her family

	child's wrath	Zainab Guiding her mother to have good behavior with her	
Ingestive	Preventing anorexia, stomatitis and mucous membrane damage	Training about proper nutrition pattern and the prevention of mucous membranes damage	Providing the child's favorite food, doing moth washing for the child
Restorative	Preventing fatigue, prevention of exercise intolerance, and contribution for energy recovery	Training mother about Preventing fatigue and exercise intolerance	Helping the child to make balance between activity and rest, creating a proper place for child to sleep and prevention of noise and extra light
Achievement	Not falling behind curriculum	Helping the child and training mother for stability and going to school Success subsystem	Providing an environment for child to study in the sector
Sexual	Because Zeinab is still single and has not reached puberty, this subsystem cannot be investigated in her.		

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