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Case Report

Health in Surroundings: Application of the Theory of Environment in Nursing Practice

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*Internal Medicine Intensive Care Unit, Aga Khan University Hospital, Pakistan***Abstract**

Nursing practices are guided by theoretical frameworks which provide functional basis to nursing care. This paper discusses the application of Nightingale's theory of environment in nursing practices. The theory highlights and explains 13 environmental cannons which include ventilation, cleanliness of walls/rooms, light, noise, personal cleanliness, bed and bedding, and taking food. Florence exquisitely explains the influence of environmental health on patients wellbeing. The application of the theory in nursing practices will help to understand and reflect the direct relation of environment on patients health.

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Keywords

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- Cannons
- Nursing practices
- Florence nightingale
- Application

ABBREVIATIONS

ICU: Intensive Care Unit; CBR: Chronic Bed Ridden; ARDS: Acute Respiratory Distress Syndrome; PEEP: Positive End Expiratory Pressure; CVC: Central Venous Catheter; CLABSI: Central Line Associated Blood Stream Infections

INTRODUCTION

Health and illness are a part of a continuum [1]. People are at the frailest of their health when they are sick. Hence, the fundamental role of nurses gains the limelight in the continuum. They help patients to regain the best of their physical and functional self. Nursing practices are sub-consciously pursued by various theories and theoretical frame works. One of these fundamental theories is the Florence's theory of environment which suggests that an individual's health is the outcome of his environmental alteration. Hence, health care professionals particularly nurses, need to modify the environment in favor of individual's wellbeing to promote faster recovery and health. This paper describes a clinical scenario in the light of the theory of environment and the significance of its implication into nursing practice.

CASE PRESENTATION

A 65 years old male patient was received in the Intensive care unit (ICU) of a tertiary care hospital. He was intubated for developing acute respiratory failure. The ventilator parameters on arrival of the patient were, Assist control mode with FiO₂ of 70, achieving positive end expiratory pressure (PEEP) of 12, with a respiratory rate of 12 breaths per minute. Even on such high parameters, he was desaturating on 85-86%. The chest x-ray had bilateral pulmonary infiltrates; showing acute respiratory

distress syndrome (ARDS). The PEEP was further increased to 16 and then to 20. The cardiac monitor showed blood pressure 90/50mmHg and heart rate 130 per minute. The patient exhibited to be progressing towards septic shock. On family encounter, the daughter verbalized that her father lives alone. He's been assigned a nurse who comes every morning and stays till late evening. He has been a patient of asthma, and was admitted in the ward with asthma exacerbation a week ago. He was planned to be discharged the next day. It was when he vomited post-meal which he aspirated, and developed shortness of breath. According to the daughter, the vomiting was induced due to the foul smell that the room had. The patient was obese and chronic bed ridden (CBR). He passed stool for which he was timely cleaned, but the dustbin was not changed. Instead, the nurse sprayed a room-freshener which triggered his asthma. Moreover, the windows were also closed; together leading to further deterioration and ultimately intubation.

At the ICU, the nurses worked hard for the whole night to save the patient's life. Since, the patient was in life threatening situation, i.e., maximum inotropic and vasopressors support with increasing ventilator's requirement; the lifesaving part became the priority. Towards the end of the ten hours shift, the nurse realized that the room appeared all messed and so does the patient. His mouth was stained with blood and yellow plaque like substance. The floor had dried pyodine splotch which splashed during catheterization, and also some dried blood drops. The bed sheets and linen were spattered with the yellowish seepage which probably was stool. The dressing of his central venous catheter (CVC), which was in placed in right femoral artery, was also soaked with that seepage. Somehow, she managed time to redress the patient and clean the room before the new shift

begun. In the next shift, the patient developed fever, and his pancreatic cultures were sent. The blood culture showed growth of some pseudomonas specie. Hence, the patient was put on contact isolation.

DISCUSSION

The environmental theory explains seven important assumptions. These are "Nursing is a calling; natural laws; nursing is achieved through environmental alteration; mankind can achieve perfection; nursing is an art and a science; nursing is distinct and separate from medicine and nursing requires a specific educational base" [2]. According to Florence, the disease occurrence i.e., asthma exacerbation is a natural law. This could have been prevented with her another assumption i.e., environmental alteration. Nightingale believes that a nurse can do her right (calling) by manipulating the environment in harmony with the natural laws to achieve healing by attaining perfection in health [2]. In the scenario, nurses could have facilitated in the patient's prompt recovery. The nurse used her knowledge of medicine education in keeping patient alive and out of danger in the ICU. Yet, she left the aesthetic part of nursing which distinguishes the profession from medicine [3]. At ICU though, the nurse made out time and provide hygiene care to the patient, she somehow got late. By the time, the patient developed infection in his body. In the situation, both the ward and ICU nurses kept using their reflective and critical skills to help the patient.

The theory also talks about four key concepts. These are "environment, person, health and nursing" [2]. Environment is the major concept in the theory. Person and health are defined under its shadow. In reference to the scenario, both the nurses and patient can be understood in the concept of a person. Patient being an individual has his own psycho-physical determinants of health care. However, nurses as a different entity have their own factors for analyzing and managing the surroundings. In ICU, lifesaving activities always gain priority. Since the nurses are expected to manage acute life and death situations in shorter time periods, their focus on environment and hygiene care fades. Even in the low dependency setups, the increased work demand dwindles their focus on environment modifications.

Nightingale also explored 13 cannons, also known as the sub concepts, in her theory which can be related to the aforesaid scenario. These are "Ventilation and warming, Light, Cleanliness of rooms and walls, Health of houses, Noise, Bed and bedding, Personal cleanliness, Variety, Chattering hopes and advices, Taking food, What food, Petty management and Observation of the sick" [4].

There were many drawbacks in the environment which worsened the patient's health. Reflecting the scenario, it was found that the problems were started, in the ward, prior to the patient's collapse. Florence nicely explains the status quo in her theory through the canons. Firstly, ventilation being the integral component was overlooked in both the ICU and the ward. In the ward, though the patient was cleaned for stool timely but the dustbin was not changed. Instead, a room freshener was used. The nurse could have used her observational skills and knowledge. She could have either opened the windows or

removed the dustbin. Since both were not done, asthma trigger due to improper ventilation alongside the vomiting deteriorated the patient's condition. Similarly, ICU being a closed setup not only hindered ventilation but also warmth (sunlight). There are isolated rooms for every patient with only a door to enter and exit. Thus, there remains no access to direct sunlight. There is only a central air conditioner which serves for ventilation. Moreover, the former facts also reflect the diminished concept of cleanliness of room and walls in both the settings. As discussed in the scenario, the presence of the soiled dustbin in the ward contaminated the air and ultimately the environment. Likewise, in the ICU the room was again polluted due to the liquid seepage of stool, the pyodine splash, and the blood drops specks. Florence summarized this as "a pool of polluted air" [4]. The idea is further supported by the germ theory of diseases. It says that environmental contamination gives birth to microorganisms [5] which harm health. The similar happened in the scenario. The soiled and tainted environment led to the growth of pseudomonas specie giving another blow to the patient's health and also prolonging his hospital stay. Moreover, in ICU patients have many invasive lines including arterial lines, swan-ganz catheters and central venous catheters (CVCs) etc. Reflecting to the scenario, growth of pseudomonas could also was also a possible consequence of the fecal seepage in the CVC since the dressing was soaked. The scenario also highlights that bed and bedding was neglected too. Persistent dampness [6] and friction due to crinkled bed-sheets irritate skin integrity and result in the development of pressure sores [7]. Therefore, in the long run patient could also have developed an ulcer. The scenario also describes the violation of another important canon, personal hygiene. ICU patients are completely dependent upon nurses for care [8]. The scenario meticulously describes the patient's poor hygiene and its consequence on him. Besides, studies also suggest that poor mouth care and dental hygiene in ventilated patients can also result in ventilator associated pneumonia (VAP) [9]. This can also be related with the canon of ventilation. Poor oral hygiene also causes contamination of the ventilator circuit (filters) hence, tainting the ventilator associated breaths and causing polluted ventilation [10]. The other important cannon petty management was also omitted in the scenario. It covers a wide variety of notions. With the increasing demand of work, it is not possible for a nurse to be all the time with her patients. Yet, this should not be an excuse for any damage to the patients' health. According to the Nightingale, a devoted nurse has an "art of multiplying herself" [11]. In the scenario, when the patient was in the ward, the nurse cleaned the patient and left. The soiled dustbin was not removed. The windows were not opened. According to petty management, when the nurse left the room she must have considered removing the dustbin, opening the window, and ensuring that her patient is comfortable once she leaves, and the care continuity is maintained. This would have prevented the beginning of the avoidable harms to him. Nightingale also highlighted the actual meaning and signification of observation of sick in her notes of nursing [11]. In reference to the scenario, the nurse could have kept a close eye on the patient in the ward. Besides, if she would have known that spray might aggravate asthma's effects the situation wouldn't have deteriorated. Additionally, it is usually thought that the patients near discharge are comparatively stable. The ward nurse might have thought this and the negligence occurred. Instead, if she

would have thought that the patient is planned to be discharged the next day (not the same day), this wouldn't have happened. Delaying the discharge for a day meant that the sick (patient) required observation for one more day. Furthermore, the walls of the hospital wards were plain and painted white. Usually, there is also no variety in the routine of the patients being admitted in the ward. Nightingale gave a fine emphasis on reveling variety around patients to help them escape the psychological paroxysms of misery [11].

There are many psycho-socio and financial health determinants. One of the important social determinants highlighted in the scenario is the absence of support system. As verbalized by the daughter that the father lived alone at home. There is no family support at home knowing that the man is CBR and has asthma in known case. The home-nurse was also available during the daytime only. The absence of support system made it difficult for the patient to fight for health. Human, sick or well, being a socio-animal always needs a support system [12]. Age and obesity are important physical health determinants. The patient was old and obese which made him more dependent for care. Increase in age leads to gradual compromise in bodies' immunity, and obesity added increases the dependency level [13]. This increases the dependency on care givers and affects people's psychological well-being [14]. In the scenario, patient was also dependent on others even to get himself cleaned from stool. This lowered his self-esteem indirectly affecting his health. The occurrences of unanticipated problems led to prolong hospital stay, and increased cost of treatment hence, also increasing the financial burden.

PREPOSITIONS AND RECOMMENDATIONS

The case described in the scenario was avoidable, and occurred due to many negligence. Following are the prepositions based on the recommendations guided by the theory of environment to avoid the occurrences of preventable harms. (i) If every patient near discharge or not, is kept under strict observation, unanticipated mishaps will be prevented. (ii) If nurses are trained and capable enough to assess the level of criticality of their patient, it will rule out the risk factors before the occurrence of any disease. For example, in the scenario, the patient in the ward appeared healthy. Yet, he worsened on spraying the room-freshener. Moreover, nurses must be educated enough to identify the risk factors of diseases and ways to avoid them. (iii) Oral care with chlorhexidine, at least every two hourly, can reduce risk of VAP. Studies show that chlorhexidine mouthwash has some antibacterial effects which help to prevent nosocomial infections among ventilated patients [15]. (iv) Two hourly back massage with olive oil can prevent the development of pressure sores. Studies suggest that olive oil has various herbal products which prevent the potential occurrence of pressure ulcers [17]. (v) If hygiene care particularly perineal and Foley's catheter care is done, the risk of developing nosocomial infections are reduced [18]. (vi) If central venous catheters (CVCs) are covered with sterile drape sheets, it can decrease central line associated blood stream infections (CLABSI). Researches suggest that preventing CVCs' exposure to hospital environment reduces chances of infection [19]. (vii) CVC hub cleaning with cotton swabs soaked

with alcohol and chlorhexidine can reduce CLABSI rate. Recent studies prove that chlorhexidine has antimicrobial properties which helps in bacterial decolonization and CLABSI occurrences [21]. (viii) Nurse-based training programs to teach sterile dressing techniques increase nurses' education, confidence level while dealing with CVC, and reduce CLABSI [20]. (ix) Use of peppermint soaked balls for aromatherapy, instead of air fresheners, can reduce irritability among asthmatic patients. Studies have shown that peppermint has many anti-emetic and anti-inflammatory effects on patients [16].

CONCLUSION

With increase in the demand of work the management of acute situations gain priority. Unintentionally, in doing so other important caring domains are overlooked. The patient might have been discharged stable to home, if he was cared according to the environmental theory of care. The theory can easily be applied in the clinical settings to hasten patients' recovery and promote health. Nurses are the patrons for health promotion in patients.

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