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3 **Health in environment: reduce surgical site infections by applying**

4 **Florence Nightingale's environmental theory**

5

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9

10 **Abstract**

11 Surgical site infection is one of the most common causes of readmission in
12 hospitals and it also leads to an overall increased burden. This can be decreased
13 by applying basic concepts of Nightingale (1860) "Environmental Theory"
14 while giving care to the patients. Keeping in view Nightingale's environmental
15 theory, this paper aims to discuss the case of a patient suffering from a surgical
16 site infection. It will help readers to understand the environmental factors which
17 affect the patients' health and provide a way to promote healing and fast
18 recovery by modifying their environment.

19 **Keywords:** Florence Nightingale, Environmental Theory, surgical site
20 infection.

21

22 **Introduction**

23 The word 'theory' is originated from the Greek "*theorein*", means "to look at"
24 and defined as "a belief, policy, or procedure proposed or followed as the basis
25 of action".⁽¹⁾ In the nursing profession, several theories have been developed
26 that are defined as "an organized framework of concepts and purposes designed
27 to guide the practice of nursing"^(2, 3). Nursing theories are used in nursing
28 education, research, and practice. Moreover, they serve as a basis for nursing

29 care, guide nursing practice, and provide a foundation for clinical decision-
30 making. Nowadays, as the healthcare system is becoming increasingly
31 technology-oriented, the use of nursing theories in practice is reducing ⁽⁴⁾.
32 However, to provide effective, efficient, and holistic care, nurses must rely on
33 sound theoretical principles to develop and implement the plan of care ⁽³⁾. It is
34 evident that theory-guided practice helps to promote the quality of nursing care
35 and also enables nurses to understand “what they do for the patients and why
36 they do it.”⁽⁵⁾ This paper aims to emphasize the implementation of Nightingale’s
37 “Environmental Theory” into practice and describe how it promotes the
38 patient’s health.

39 **Nightingale Environmental Theory:** Nightingale is considered the mother of
40 modern nursing. She was very compassionate towards the nursing profession
41 and contributed greatly towards this profession. She was the first nursing
42 theorist who presented “Environmental Theory” and wrote *Notes on Nursing:
43 What It Is and What It Is Not*. She highlighted 13 cannons that include
44 “ventilation and warming, health of houses, petty management, noise, variety,
45 food, bed and bedding, light, cleanliness of rooms and walls, personal
46 cleanliness, chattering hopes and advice, and observation of the sick”. The
47 concepts included in Nightingale's theory reflected the meta-paradigm of
48 modern nursing. The Nursing paradigm consists of the person, health, nursing,
49 and surrounding environment ⁽⁶⁾. Moreover, these concepts are interrelated with
50 each other. According to Selanders, “Environment is the umbrella concept in
51 Nightingale’s theory of nursing ⁽⁷⁾. She contended that the environment could be
52 altered to improve health conditions so that the natural laws would allow
53 healing to occur”.⁽⁸⁾ This theory is globally known and widely used in
54 practice.⁽⁹⁾

55 **Case Scenario**

56 A 65-year-old Asian man, who had undergone abdominal surgery (laparotomy)
57 15 days back at a government hospital, was seen during a home visit in a

58 community by the author. Upon entering the home, it was noticed that the
59 patient belonged to low socioeconomic status and a family of seven resided in a
60 two-room mud house. He was in a miserable condition, lying in a corner of a
61 dimly lit room looking pale and lethargic. He had been losing weight and had
62 lost appetite after surgery, according to his wife. The patient's wife was the one
63 who takes care of her husband. Moreover, on physical examination, an
64 unpleasant odor emanated from the wound and his body was warm to touch. His
65 vitals showed that he had a temperature of 102oF and was tachycardic (pulse of
66 105 beats per minute). On further examination, it was noticed that his dressing
67 was very dirty and on removal, there was swelling, redness, and purulent bloody
68 discharge leaking from it. Furthermore, he was wearing dirty clothes and his
69 surroundings were also unkempt, the air was dingy because there was no
70 window in the room, the bedsheet under him had blood stains and a dustbin full
71 of trash was present underneath his bed. On further inquiry from his wife, it was
72 learned that the dressing had not been changed since after surgery nor had he
73 been given a bath.

74

75 **Discussion and Analysis**

76 Upon analysis of the case, it was revealed that the patient's deteriorating health
77 condition could possibly be because of various factors that include low
78 immunity due to old age, poor living conditions, and poor hygiene.
79 Additionally, his caretaker did not know how to take care of the wound site that
80 includes its handling, changing dressing, and cleaning. His signs and symptoms
81 all pointed towards a possible surgical site infection. However, these
82 deteriorating factors can be analysed under the light of Nightingale's theory.

83 **Personal Cleanliness:** With regards to personal cleanliness, Nightingale stated:
84 "unwashed skin of a patient is like giving slow poison to the patient and if their
85 skin remains unwashed or their dirty clothes remained on them, it is interfering
86 injuriously with the natural processes of health."⁽⁸⁾ Nightingale also described

87 that if the patient's skin is washed and dried properly, it gives comfort and
88 relaxes the patient. But, in this case, the patient's cleanliness was badly
89 neglected. The dressing was leaking, and purulent discharge, along with blood,
90 was oozing during the patient's assessment, as his dressing had not been
91 changed since his surgery. Moreover, the patient was wearing blood-stained
92 clothes and had not taken a bath since he had surgery due to his fear of wound
93 infection and delayed recovery. The patient's situation signifies a lack of
94 awareness and negligence in personal hygiene and wound care. Here, the nurse
95 has a very important role, she should pay attention to the patient's condition and
96 address his problem. Firstly, dirty dressing should be changed and the wound
97 should be cleaned. Secondly, clean dressing should be applied under aseptic
98 measures. Thirdly, the patient should be given a sponge bath and his clothes
99 should also be changed.

100 **Improper Bedding Leads to Fever:** In *Notes on Nursing*, she stated,
101 "Feverishness is generally supposed to be a symptom of fever — in nine cases
102 out of ten, it is a symptom of improper bedding".⁽⁸⁾ In the stated scenario, the
103 patient's body felt very warm, and on checking body temperature the patient had
104 102° F fever. It was noticed that the bedsheet was gathered under the patient
105 which produced heat and the patient got febrile. Bed and bedding also have a
106 great role in the patient's recovery. According to Nightingale, "The patients
107 who are on bed rest deposit their harmful florae on the bed and if the bedding is
108 not changed frequently, it becomes saturated with these florae, which re-enter
109 the patient's body causing more harm"⁽⁸⁾. In this scenario, it was the contributing
110 factor in the worsening of the patient's condition. Furthermore, persistent
111 wetness and friction due to the wrinkled bed-sheet irritate the patient's skin
112 which puts the patient at potential risk of developing pressure sores as well. ^{(10,}
113 ¹¹⁾

114 **Foul Smell:** Regarding foul smell, she explained, "The human body, even when
115 in health, is far more injured by the influence of foul air. Therefore, to keep the

116 air pure, the room should have windows that are opened for ventilation”⁽⁸⁾. As
117 mentioned in the current case, the presence of soiled dustbin and dirty dressing
118 of the patient produced a foul smell that contaminated the air and environment.
119 Additionally, it is also supported by the germ theory of the disease that says that
120 environmental contamination gives birth to microorganisms that are harmful to
121 health⁽¹²⁾. Similarly, in this case, the contaminated environment delayed the
122 patient’s recovery.

123 **Petty Management:** Petty management refers to the continuity of care when
124 nurses do not pay attention or are not involved in patient care, as then the
125 continuity of care is breached. Concerning this scenario, the nurse did not pay
126 attention to the patient's surroundings like a dustbin full of garbage, closed
127 window, and the presence of smell; therefore, cannon of petty management was
128 missed. Nurses must manage the patient’s environment by removing the soiled
129 dustbin from the room, open the window, and ensure the patient’s comfort. This
130 would help to prevent further harm to the patient. However, with the increased
131 workload on nurses, it is difficult to pay attention to the patient's needs except
132 for their presenting complaint. But it should not be the reason to neglect the
133 patient's needs. Florence described that a devoted nurse has an art of
134 multiplying herself.⁽⁸⁾ So, nurses should have this art to provide holistic care to
135 the patient.

136 **Healthy Food:** Nightingale had also highlighted the importance of healthy food
137 and food preferences. In a patient’s recovery, one of the most important and
138 most neglected element is food. In the stated scenario, this important element
139 was also neglected. Upon further investigation, it was discovered that the patient
140 was complaining of nausea, and was unable to eat and hence was losing weight.
141 Also, his wife explained that the patient refused to eat because he thought it
142 interferes with his healing process. However, the cause of his weight loss could
143 be infection and poor immunity. It is the nurse’s responsibility to address this
144 issue and explain its importance to the patient and his family. Additionally, the

145 patient's food preferences should be considered and it must be ensured that the
146 patient has some food or drink according to his/her health status. ⁽⁸⁾

147 **Discharge Teaching:** Discharge teaching is a vital element of patient recovery.
148 Since this patient was discharged from the hospital after surgery, probably no
149 discharge teaching was provided to the patient and his family. Nobody told
150 them about wound care, changing the dressing after three days, touching the
151 wound after washing hands, and when to come for follow up. This led to
152 prolonged healing and worsening of the patient's condition. ⁽¹³⁾ At this point, the
153 nurse should play her role by providing discharge teaching or health education
154 to the patient and family. It leads to decreased readmission, saves healthcare
155 resources, and promotes patient's well-being.

156 This situation revealed that many basic elements, that are essential for a normal
157 life and are required to help in the recovery of a sick person, were missing.
158 Proper sunlight, fresh air, food, healthy house, and good personal cleanliness, as
159 well as tidy surroundings, are basic human needs. When a person becomes sick,
160 he also requires all these basic elements to become healthy. Although the
161 disease itself has a natural way of progression, if these basic elements are not
162 accessible, it worsens the patient's condition. Moreover, if all these elements are
163 accessible it helps to provide vital energy to fight against the disease. ⁽⁸⁾

164

165 **Conclusion**

166 It was concluded that despite the new technology growing trend and its usage in
167 health care, the importance of Nightingale's theory could not be neglected. A
168 nurse can make a huge contribution to the patient's recovery by applying this
169 theory concepts into her practice while giving care to the patients. Moreover, as
170 mentioned by Florence Nightingale in her *Notes on Nursing*, ⁽⁸⁾ nurse's duty is
171 not only to give medications but also to deal with patients in terms of holistic
172 care.

173

174 **Recommendation**

175 Hospitals should have a written policy of discharge teaching for patients
176 regarding their medication, diet, time for dressing change, and follow up visit.
177 In addition to this, nurses should train patients and their family members to
178 perform wound care with hygienic measures and also properly explain its
179 importance. Hospitals should have a discharge checklist that can be completed
180 by a patient assigned nurse. It would help the patients and their families to
181 understand further care processes. There should be a system to check
182 compliance of health care professionals with hospital policies.

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187

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