CONCEPT ANALYSIS

Nurses Adaptation to Technology Towards Quality Care

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Abstract

Concept analysis on adaptation to technology was done to give emphasis to its use in the nursing profession towards quality care. The constant changing environment not to mention the sudden existence of COVID-19 surprised the world alongside with arising technology that led to the idea of adaptation of nurses to meet the patient and/or client's needs. The method used in the concept was the Walker and Avant's approach. This approach is achieved through eight phases: choosing a concept, determining the purpose of analysis, identifying all uses of the concept, defining attributes, identifying a model case, identifying borderline, related, and contrary cases, identifying antecedents and consequences, and defining empirical referents. The attributes of adaptation of nurses were successful interaction of nursing population with the technological environment and changes in function of the Nurse as to get used to daily routine and technology.

Keywords: *adaptation, nurses, technology, concept analysis, theory of adaptation, theory of technological competency*

Introduction

Adaptation awareness rise when Sister Callista Roy used her adaptation model to the patient aided by the nurse for the client's need and achieve homeostasis. In addition, the idea of adaptation also stimulated from the use of technological competency in nursing care by Rozzano Locsin, which aimed to complete the needs of the patient for their balance in health and to expect nurses to have a harmonious relationship with technology. Both theories designed to complete the needs of the patient, as well as, to maintain and to achieve equilibrium from an imbalance continuum of life. Adaptation of nurses to technology will give direction to them as to how they will become accustomed with the use of innovations to meet client's basic needs, attain their sense of balance with well-being but not losing the quality care rendered.

Adaptation in the science of caring means the thriving of the nurse in a changing environment that involves technology to meet clients need and achieve an equilibrium in health not sacrificing quality care. It is a process and outcome whereby thinking and feeling persons, as individuals or in groups, use conscious awareness and choice to create human and environmental integration (George, 2008; Roy & Andrews, 1999). Technological competency as caring in nursing is the only middle-range nursing theory that specifically addresses technological knowing within the harmonious coexistence of nursing, technology, and caring (Locsin & Purnell, 2015; Locsin 2005). Roy adaptation model (RAM) and technological competency as caring in nursing (TCCN) reflect to meet the needs and to achieve homeostatic milieu for patients. However, RAM and TCCN lack as to how nurses will bridge the gap to survive the existence of technologies to achieve quality of care to patients by corresponding well to them in meeting their needs and to achieve balance in their environment for optimum health.

In anthropology, adaptation is any variation that can increase one's biological fitness in a specific environment; more simply it is the successful interaction of a population with its environment (Human adaptations, n.d.). For science, adaptation is the adjustment of organisms to their environment in order to improve their chances at survival in that environment (Adaptation, 2021). Within the exercise

perspective, adaptations refer to exercise training defined by the changes in structure and function, which occur after repeated exposures to bouts of exercise, or training sessions (Lambert, 2016).

Other names of adaptation identified were biological plasticity (Human adaptations, n.d.), evolutionary adaptation (Adaptation, 2021) and phenotypic plasticity (Lambert, 2016). According to "Human Adaptations"(n.d.), humans have biological plasticity or an ability to adapt to the environment. Evolutionary adaptation or simply adaptation refers to the adaptation of organisms to their environment as how adaptation in science defined. For phenotypic plasticity, it is the ability of the cell to change its morphology and function in response to a changing environment (Lambert, 2016). These terms for adaptation described in the concept were different per discipline. Biologic plasticity for anthropology, evolutionary adaptation for science and phenotypic plasticity for exercise training. These concepts of adaptation differ where the concept occurs. In anthropology, it describes the way of living in humankind that is apt in their environment. Adaptation in anthropology relates to philosophical assumption flow of Roy: humanism and veritivity (George, 2008). Humanism assumes that individuals behave purposefully, possess intrinsic holism, realize the need for relationships, share in creative power, and strive to maintain integrity; veritivity complements humanism and affirms a common purposefulness of human existence (Jennings, 2017). For science, adaptation is the change of an organism to survive in their environment and for exercise training, adaptation is changes in function to adjust with the exercise work out with the particular muscle as it gets used to its daily routine in training. The extent of the concept with their similarity is that they talk about adaptation as adjustment or changes to become conducive in a changing surrounding or circumstance. The concept of adaptation borrowed as an example for nursing as they adapt to emerging technologies to meet their client's needs while balancing health with quality care.

Defining attributes

1. Successful interaction of nursing population with the technological environment.

2. Changes in function of the Nurse as to get used to daily routine and technology.

Successful interaction of Nurse Population with its environment

Nurses need to work positively together with the existence of technology. Successful interaction involves utilization of technologies to meet client's needs and achieve homeostasis with quality care to patients.

Changes in function of the Nurse to get used to daily routine and technology

Nurses need to add to their task with the use of technology in their daily care. Continuous learning and using such technology in every shift to their assigned unit or area may improve its effective utilization towards quality care.

The Antecedent

As cited by Baiardi et al., (2012) from Walker and Avant (2005) defines antecedent as the events or attributes that must arise prior to a concept's occurrence. In order for adaptation to occur, nurses need to apply existing theories, the multiple patterns of knowing to know the patient and to possess technological knowledge and technological skills to meet needs and homeostasis of the client with quality care.

The response of the patient to adaptation will be determined by the existing theories. Adaptation of the nursing profession uses quality of work with the code of ethics alongside with self-awareness to know patients as its basis. The adjustment of the nurse is a need in their environment in order to improve their chances at survival in that environment. Modern society is continuously emerging and to advance chances of survival in the hospital premises with the innovations, it is important to learn about them continuously in order to effectively meet client's needs, balance health and environment of patient without sacrificing quality care. Hence, innovation is a prerequisite in order for the concept to occur. Nurses' code of ethics and self-awareness guide for nurses invite them to focus on the patient and not on technology. These two will lead to reduce overusing technology to know the patient. Such code of ethics, ethical utilization of technology, and self-awareness will also balance the therapeutic use of self, guide human-to-human interaction and the use of machineries in nursing to meet patient's needs and homeostasis with quality care. Alongside with nurse code of ethics and self-awareness, the nurse needs to have soft skills such as communication, critical thinking and problem solving, time management and stamina, ethics and confidentiality, and teamwork and dependability ("Indeed", 2020). Aside from abovementioned antecedents, the nurse also needs to become passionate about the ten nursing values which include human dignity, privacy, justice, autonomy in decision making, precision and accuracy in caring, commitment, human relationship, sympathy, honesty, individual and professional competency (Abbaszadeh et al., 2013).

Though patients are unique, nurses can also know them through continuity of care and continuous exposure to them. For technological adaptation of nurses, they need to adjust with the changing environment and make the most of their understanding gained from incessant experience to use the

necessary equipment to allow them to thrive in their new environment. To acquire this experience, the nurse needs to have technological skills firsthand by undergoing rigorous training on how to operate such innovations to improve quality care that will be rendered to patients. Surveillance by trained nurses or supervisors in the application of technologies in nursing is also needed for the successful utilization of all the emerging innovation in the nursing practice. Moreover, well-designed technology allows nurses to focus on caregiving functions and promoting health of patients (Cope et al., 2008).

In conclusion, to make use of existing technologies in health care, the nurse must first apply the multiple patterns of knowing indicated by Barbara Carper to know the patient and to avoid focusing more on technology.

The Consequences

As cited by Baiardi et al. (2011) from Walker and Avant (2005) consequences are those events or incidents that can occur because of the occurrence of a concept and that can often stimulate new ideas or avenues for research pertaining to certain concepts.

Adaptation of Nurses with the use of technology to quality care toward meeting clients' needs to achieve homeostasis will initially result to patient safety, avoidance of errors, usefulness, competence and device satisfaction. Long-term results are nurse satisfaction, competency and goal accomplishment thereby making these initial and long-term results contribute to health care quality. According to the Office of Disease Prevention and Health Promotion (2021) quality health care is a care that is safe, effective, patient-centered, timely, efficient, and equitable.

Model Case

Emergency Room (ER) nurses stabilized a patient's signs and symptoms upon admission due to acute respiratory distress syndrome (ARDS). The intensive care unit (ICU) nurse who is working for one month in the area was updated that she will have an admission. Before the patient arrived, she checked if the cardiac monitor is functioning. When the patient came via wheelchair, the ER nurse endorsed to the ICU nurse for the continuity of care. From the nurse's previous trainings, seminars and rigorous skill enhancement, she confidently hooked the patient to the cardiac monitor and it revealed the vital signs of the patient with continuous electrocardiogram result monitoring, as well as, the oxygen saturation. The nurse had a "successful interaction in that technological environment". While assessing the patient, the nurse knows that she will be helping the patient to adapt in the environment with the existence of technology. She does not have enough experience yet in the area but from her months of training with the surveillance of the head nurse in

the use of technology to care for her patient, she endured. She showed her patient soft skills such as communicating for assessment, planning and intervening like how she did when she was still in the medical ward, demonstrated intelligence by giving solution for unavoidable circumstances, time management and determination to know more of her patient and the involved technology in her environment to adjust and to improve her chances of survival in that environment. In addition, she kept in mind her nursing values, the code of ethics of Nurses and her nursing values and confidentiality, teamwork and dependability. Beforehand, the nurse routine in the ward is to have her rounds, assess the patient, assist in the doctor's rounds, planning and intervening. She handles less critical clients. However, in the ICU, the presence of technology gave her the aid of faster assessment in monitoring the patient every hour. From this constant exposure to technology to help her in her daily routine, she used this to her advantage to learn while incorporating her own findings and looked for the problem immediately once the technology will alarm for an abnormal outcome. In order for her to perform nursing interventions, she should be self-aware that the presence of technology will lighten her work while treating and assessing the patient first before looking into technological device if problems arise. This self-awareness and "changes in the function of the nurse made her get used to her daily routine" as she is being exposed to the use of technology. The usefulness of the equipment, competence and device satisfaction together with long-term results for nurse satisfaction, nurse competency, addressing immediate problems and goal attainment to achieve the need and homeostasis of the patient lead to quality care.

In order for the nurse to adapt, she needs to have a successful interaction of the environment by empirics through technological knowledge and skills that she acquired from rigorous trainings and seminars. For her adjustment to her environment in order to improve her chances at survival in that environment, she showed the use of fundamental patterns of knowing: empirics and aesthetics with her soft skills. Changes in function of the nurse to get used to daily routine is to be abreast with personal knowing and ethical knowing from Barbara Carper. From these attributes of adaptation, it gave an example of situation that can lead the patient in achieving quality care with the use of technology.

Borderline Case

Nurse B is an ICU Nurse who admitted a patient with ARDS. She called Nurse W, an Operating Room Nurse to assist with chest tube thoracotomy at ICU. Nurse W assessed and positioned the patient prior to the procedure then checked the patient's vital signs, as well as, the oxygen saturation via the cardiac monitor. Nurse W had a "successful interaction in her

technological environment" prioritizing safety then assessment. After the procedure, Nurse W recheck the patient's general status to include again her vital signs, which was in normal limits. Nurse W changed her scrubs prior to reentering her premises to avoid sacrificing quality care to her scheduled and emergency case patients.

Nurse W did not adjust in her technological environment because there was also no "change of function" but a "successful interaction with technology" that aid in her assessment. Nurse W reflected the situation of helping one unit for the survival of the patient, meeting his needs as well as homeostasis. Quality care was also given by the nurse through his OR skills. She had a "successful interaction in her technological environment" for utilizing technology to take the vital signs of the patient and confirming his oxygenation saturation by pulse oximeter.

Related Case

Nurse B, a hired additional nursing attendant in a hospital institution and a graduate of Bachelor Science in Nursing (BSN) was assigned in the ICU. Her usual routine as a nursing attendant is to do basic nursing skills such as bed bath, dressing the patient, taking vital signs, monitoring intake and output. As a hired nursing attendant, she was supervised and oriented by the head nurse. The nursing attendant took the vital signs of the patient and noted that the oxygen saturation of the patient is below 90% with the sound of an alarm. Moreover, the nursing attendant claimed that the patient appears drowsy. From the situation, the nursing attendant has a "successful interaction with the technological environment". She notified the nurse on duty and assessed the patient thoroughly. When the patient was asked to state his name, he was verbalizing days and time. The nurse on duty concluded that there is a decreased cerebral perfusion and relayed findings to the physician. The patient was prepared for intubation.

The nursing attendant had a "successful interaction with the technological environment". She is a hired nurse that learns from her head nurse through his orientation and supervision. There is no adjustment in her environment for her survival in that environment since she is a graduate of BSN and there is no "changes of function" since she is a hired nurse with the position of nursing attendant. She portrays learning with her daily routine and the use of technology. The situation also provoked an instance wherein the technology is advantageous to further assessment of the patient that required prompt intervention to his status.

Contrary Case

Nurse B, is an ICU nurse. She handles three critically ill patients per shift and they were hooked to cardiac monitors. Sometimes,

she has 7 days' straight work before day off. Her salary do not come on time and her benefits were not given. She also worked straight sixteen hours when her colleagues were absent. Occasionally, she will be granted a day off the following day but from time to time, she still needs to report at morning shift due to increased admissions. When she anticipated that there would be a surge of patients, she expected that the supervisor would assign a floater as an additional workforce. Opposed to her expectations, floaters will be assigned in the ward or in the emergency department. Nurse B felt burn out most of the time but she would encourage herself and would never gave up. She became stronger each day and positively conquered negative emotions through rest and spending time with her family.

From the given case, the Nurse became stronger. She developed resilience. In comparison with adaptation, it brought mainly by change, adjustments and interaction in an environment. To resilience, it conveyed by adversities presented from the scenario. The hardships that contributed to her growth of resilience are the injustice of nurse-patient ratio. Ideally, it should be one nurse to two critically ill patients (The importance of the optimal nurse-to-patient ratio, 2016). What is harsh about her situation include being overlooked given her working schedule for seven days, low salary that is not commensurate to her work load which neglects her benefits, sixteen hours' duty experience with a schedule of duty in the morning and lack of support for additional workforce in an overworked environment.

Empirical Referents

Empirical referents as cited by de Guzman (2022, PJN vol. 92 (1); p.68) from Garnett et al., (2018; Walker and Avant, 2011) were classes or categories of actual phenomena that by their existence make evidence with the occurrence of the concept. The concept on adaptation of nurses to technology will lead to its betterment through the existence of empirical referents. Moreover, empirical referents relate openly to the defining attributes, indirectly to the concept itself, and possibly use to measure the defining attributes and give unintended evidence that proves a manifestation of the concept in a practice setting (Garnett et al. 2018; Walker and Avant, 2011

From the attributes identified with the concept on adaptation of nurses to technology which were successful interaction of nursing population with the technological environment and changes in function of the nurse as to get used to daily routine and technology can be measured through subjective experiences of nurses on utilizing new equipment on how they adapt and accept these innovations. This subjective experience can be achieved through comparison from their experience without the existence of technology, during their utilization and with the existence of technology. Furthermore, surveys on care satisfaction that will be done by patients can also reflect on how

to improve the use of technology by nurses in order to improve the existing way of care towards a better health care. Another tool for the adaptation of nurses to technology is the evaluation that can be done by head nurses and nurse supervisors in their respective units to further address any complicated problems that may arise in a nurse's work setting related to technology in achieving quality care.

Successful interaction of nursing population with the technological environment involves constant learning of technology. There was a long advocacy for the integration of technology to support the nursing profession, but it has comparatively few practitioners globally (Booth et al., 2021). Tabudlo et al., (2021, PJN vol. 91 (1); p.100) mentioned in their topic about telenursing that through training and education standards are met, as well as, competencies that will support the development of standards of practice. These issues raised from the successful interaction of nursing population with the technological environment were uplifted but solutions were also promised through acquisition of knowledge to such rising technologies in order to enhance health care and meet quality care.

Adjustment is required for the changes in function of the Nurse as to get used to daily routine and technology. As nurses adjust and embrace these changes, the awareness of applying fundamental patterns of knowing will aid with the continuous developing environment. Aside from that seen requirement for change in adaptation, nurses are called to be reasonable (Bernardino, 2020; PJN vol. 90 (3); p.76) which means that it should be innate to nurses to exercise this trait in every change that comes in the nursing profession. In order also to uphold the adaptation of nurses to technology, nursing leadership must advocate dynamically for, and invest resources in the profession that is both complemented and extended by digital technology (Booth et al., 2021).

Nursing Implication

Nurses' adaptation to technology is necessary to achieve quality health care without sacrificing human care to innovations toward nursing care. Supporters are arising not to mention nurses and health care. Inclusion of technologies are evident. Examples include the growing presence of artificial intelligence (AI) and robotic systems; society's reliance on mobile, internet, and social media; and increasing dependence on telehealth and other virtual models of care, particularly in response to the covid-19 pandemic (Booth et al., 2021). Possibilities in health care particularly the technological world are inevitable.

As healthcare technology evolves, nurses serve on the front lines of applying the latest advancements to serve their patients with increasing efficiency and effectiveness (Bailey, 2023).

Healthcare workers have frequently been called upon to become familiar with technological innovations that pervade every aspect of their profession, changing their working schedule, habits, and daily action (Barchielli et al., 2021). Technologies came to lighten the workload and meet a client's needs dynamically with nursing interventions. With the current circumstance and future in health care, nurses must apply patterns of knowing in nursing which include empirics, esthetics, personal and ethics in order to address the issue on technology replacing human care. Nurses in the future need to convince the changing world that humans and health care alongside with technological innovations are directing towards the betterment of quality health care and should not be seen as a replacement with the usual human care supported with knowledge, skills and attitude guided with ethics and professional competency.

Conclusion

Nursing care and majority of health goals aim to optimize well-being of patients and clients. Challenges of the nurse in caring are often set aside in directing the homeostasis of an individual despite the constant changing environment and emergent innovations toward quality health care. Technology is rising as humankind moves forward to the future affecting all aspects of health care. The concept of adaptation in nurses towards quality health care is important to understand nurses on how they will bridge the gap of knowing their patient's co-existent with the utilization of technology. Nurses' acceptance of change in a milieu is vital notwithstanding the crucial application of the fundamental patterns of knowing fueled with technological competency that is intended for the attainment of quality health care.

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> **It is not how much you do, but how much love you put in the doing.**
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> - Mother Teresa