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Experience of nurses using the basic nursing science in performing nursing care for patients at RSUD Dr. Soedomo Trenggalek, Indonesia

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Abstract

Introduction: The provision of humanistic and professional nursing care services needs to be carried out comprehensively, and it must cover patients' bio-psycho-socio-spiritual aspects. This indicates nurses have to integrate all the basic nursing science, including physiology, anatomy, pharmacology, and pathophysiology, while carrying out their duties. This integration helps to provide the best care for their patients, but they often uncertain about the basic science approach to use. Therefore, this study aims to explore the experience of nurses using basic nursing science in caring for patients with chronic diseases.

Design and Methods: In-depth interviews were conducted with 5 nurses working in chronic disease wards for at least 5 years. Each respondent was then interviewed using a self-constructed questionnaire.

Results: All respondents agreed that basic nursing science is important in providing quality healthcare services. Furthermore, six themes were identified using the thematic analysis, namely (1) the process of collecting patient data, which was more focused and organized; (2) required for establishing the nursing diagnosis; (3) useful for determining the nursing care plan; (4) it is a basis for implementing nursing actions; (5) provides a basis for monitoring and follow-up; (6) and teamwork between health personnel is more effective.

Conclusions: Based on the interview results, nurses need knowledge and skills in basic nursing science while caring for patients with chronic diseases. Furthermore, basic nursing sciences lay the foundation for nurses while assessing patients, diagnosing, planning the care, implementing nursing actions, evaluating patients' condition, and collaborating with other health personnel.

essential for all health professions.³ Therefore, nurses need basic nursing knowledge, including physiology, anatomy, pharmacology, pathophysiology to increase the quality of healthcare services they provide. The knowledge is also essential for evidence-based practice that is carried out by nurses.⁴

Physiology is a crucial element of bioscience in the nursing care process, but there is still a lack of clarity about the boundaries. Furthermore, lack of knowledge about human physiology has a direct impact on nursing practice, hence, it is necessary to ensure that physiology and biosciences can support the development and skills of nurses.⁵ Human anatomy is also a key component of the basic nursing science used in preparing competent professionals for clinical practice, but it is considered a challenge.⁶ Meanwhile, nurses play an integral role in administering medication to patients, consequently, they also require knowledge and skill about pharmacology.⁷ They must also be able to think logically and critically while studying and identifying human response phenomena, which provides better understanding of common diseases pathophysiological basis.⁸ Despite the importance of basic nursing science in the nursing practice, basic nursing science understanding is still considered a challenge by most nurses.

Nurses are often uncertain about the basic science approaches they can use while carrying out their duties, specifically in Indonesia. Some nurses think it is important to integrate basic nursing science with the technology used in nursing practice to improve the quality of the healthcare services provided. However, in reality, it is often seen as an empirical influence of medical planning, which obscures their main activities in terms of caring.⁹ Knowledge and understanding of basic nursing science are believed to support the provision of holistic and quality healthcare service. Therefore, this study aims to explore the experience of nurses using basic nursing science while performing their duties.

Introduction

Nursing is the act of providing care to sick and healthy individuals, families, groups, or communities. Furthermore, it is a professional occupation, which is an integral part of health services and based on nursing knowledge and tips.¹ The humanistic and professional nursing care services need to be provided comprehensively, and cover the bio-psycho-socio-spiritual aspects of patients.² The basic knowledge, attitudes, and skills are very

Design and Methods

The sample population consists of five nurses working in the chronic diseases ward at Dr. Soedomo Hospital, Trenggalek. The inclusion criteria include samples with a diploma or bachelor's degree in nursing, using basic nursing science in performing healthcare duties, and have been caring for patients with chronic diseases for at least 5 years. Subsequently, in-depth interviews

Significance for public health

Basic nursing science knowledge is required by nurses while providing quality health care to their patients. However, the idea of integrating it into nursing care is still low, and some nurses often carry out their duties without proper knowledge of the basis or rationale behind the services they render. This study describes nurses' experience on integrating basic nursing science in nursing care.

were conducted using a 6 items self-constructed questionnaire. The questions were used as a guide, and significant things discussed by respondents were further explored in detail. The interview of each respondent lasted for 35-45 minutes, and the data collected was then analyzed using Interpretative Phenomenology Analysis (IPA). This study was granted ethical and risk assessment approval by the Ethical Research Committee of the Faculty of Medicine, Universitas Brawijaya on 08/04/2020.

Results and Discussions

Five respondents, which consist of three male and two female nurses were used for this study. Furthermore, their age ranged between 27-38 years old, and two respondents have a bachelor's degree, while others have a diploma degree in nursing, as shown in Table 1. All respondents agreed that basic nursing science is important in nursing practice. The transcript verbatim was then analyzed, and several sub-themes were obtained, which were used to form six different themes, as shown in Table 2.

Theme 1: The process of collecting patient data is more focused and organized

Theme 1 consists of four sub-themes, namely i) serves as a guide during assessment; ii) directs the physical examination; iii) well organized; and iv) facilitates the observation of patients' condition.

Sub-theme 1: Serve as a guide during assessment

Respondents agreed that basic nursing science helps nurses to obtain diseases' anamnesis data easily, because it serves as a guide while exploring patients' condition, as expressed below:

“Basic nursing science can become a guide for us in the anamnesis process, we will learn something (about patients' condition) we did not know before” (P2).

Sub-theme 2: Validate data through physical examination

Physical examination is a series of activities carried out by examining patients from head to toe. Furthermore, it helps to determine the presence of abnormal physical symptoms and supports the diagnosis. According to respondents, basic nursing science is very essential in validating data collected through physical examination, as stated below:

“We can distinguish the findings during physical examination, whether it is normal or abnormal, (we obtained relevant information from the subjects we studied back then in the college so that we can determine whether patients' condition is normal or not. That's the importance of the basic nursing science).” (P4)

Sub-theme 3: Well organized

Physical examination in the chronic disease ward of Dr. Soedomo Trenggalek Hospital needs to be carried out systemically (B1-B6). Respondents stated that with the basic nursing science, the data obtained during the assessment can be well organized, as stated below:

“If we did not learn basic nursing science during college, it is

Table 1. Characteristic of respondents.

Code	Sex	Age (y.o)	Education	Years of experience
P1	Male	32	Diploma	7
P2	Male	27	Bachelor of Nursing	5
P3	Female	29	Bachelor of Nursing	8
P4	Male	38	Diploma	11
P5	Female	35	Diploma	10

Table 2. Themes and sub-themes.

No	Theme	Sub-theme
1	The process of collecting patient data is more focused and organize	serve as a guide during assessment directing the physical examination well organized facilitate the observation of patients' condition
2	Required for establishing the nursing diagnosis	think critically analyzing patient cases determining nursing diagnoses determining the priority of the problem
3	Useful for determining the nursing care plan	determining goals and expected outcomes planning the intervention
4	As a basis for implementing nursing actions	basis for giving education to patients administering medication appropriately collaborate with other medical staffs
5	Provides a basis for monitoring and follow-up	basis for monitoring patients' condition basis for evaluating the implementation of nursing intervention and follow-up plans
6	Teamwork between health personnel is more effective	effective communication and coordination problem solving

possible that we will not be able to carry out physical examination sequentially, so we missed a lot.” (P3)

Sub-theme 4: Facilitate the observation of the patient's condition

Respondents argued in their statement that the basic nursing science taught in college enables nurses to recognize the disease manifestations, which makes patients' condition observation easier, as stated below:

“Even though we do not know patients' full examination data, it can be seen from the clinical symptoms alone.” (P1)

Data collection in nursing assessment is very important to explore complaints and conditions experienced by patients with chronic diseases. Furthermore, the methods used to collect data during the assessment include anamnesis, physical examination, and laboratory data.¹⁰ By using the basic nursing science, nurses can collect and organized data comprehensively as well as identify patients' data easily.

The systematic data collection process is a form of nurse professionalism, which provides wholehearted care and improved services to patients.¹¹ Nursing care cannot be separated from the importance of nursing assessment.¹² In the process of collecting assessment data, the difficult basic nursing science for students became very useful in the practice.¹³

Theme 2: Required for establishing the nursing diagnosis

Diagnosing is the process of determining the medical problem faced by patients. Furthermore, the diagnosis is established based on the results of anamnesis, physical examination, and laboratory tests. Theme 2 was formed from four sub-themes including i) thinking critically; ii) analyzing patient cases; iii) determining nursing diagnoses; and iv) determining the priority of the problem.

Sub-theme 1: Think critically

Critical thinking is the ability to think clearly and rationally about what to do or believe. Furthermore, it is often used to make decisions by nurses caring for patients with chronic diseases, as stated below:

“One benefit (of using basic nursing science) is that it helps us think critically about chronic diseases, so we know if there is an abnormal condition in patients.” (P2)

Sub-theme 2: Analyzing the patient cases

Case analysis is very important while determining nursing diagnoses based on patients data. It is supported by subjective and objective data, which further supports the disease etiology until nursing problems developed. Respondents think that basic nursing science helps nurses to analyze the data collected during assessment, as stated below:

“Basic nursing science is one of the subjects that I found difficult to study during college, but despite the difficulty, basic nursing science enables us to have the ability to analyze the data, so we feel like we are losing if we did not really learn it before.” (P5)

Sub-theme 3: Determining nursing diagnoses

Nursing diagnoses are clinical decisions about individual, family, and community responses to actual or potential health problems. Basic nursing science helps nurses to determine nursing problems and diagnoses found in patients, but they need to differentiate the diagnoses, as stated below:

“There are several approaches and examination that should be done before we establish nursing diagnoses, we cannot make it up, and that is the importance of basic science nursing.” (P3)

Sub-theme 4: Determining the priority of the problem

After conducting a nursing assessment, it is important to identify the problem and set priority for it. Physiology is one of the basic nursing science that is considered useful while setting nursing diagnoses priority, as expressed below:

“Understanding the medical basis (physiology) is also one of the important considerations when determining the priority of nursing problems.” (P1)

Nursing diagnoses are determined based on the analysis and interpretation of data obtained from assessment.¹⁴ After conducting an assessment, nurses are required to determine the diagnoses based on the data collected, which is very important because it affects the nursing process.¹⁵ Basic nursing science is required by nurses while analyzing data, establishing diagnoses, and setting priority of the problem.

Theme 3: Useful for determining the nursing care plan

Theme 3 was developed from two sub-themes, namely i) determining goals and expected outcomes; and ii) planning the intervention.

Sub-theme 1: Determining goals and expected outcome

Respondents believed that basic nursing science is required and useful for determining goals and expected outcome because the process needs knowledge, critical thinking, and clinical judgment from nurses, as stated below:

“To determine the goals and expected outcomes, for sure, we need to think critically and use our judgment to ensure that the goals and expected outcomes are achievable and realistic. To do so, we need to understand the basic nursing science.” (P1)

Another respondent stated that nurses have to consider the patient's condition, which helps to make the expected outcomes more realistic:

“Working as a nurse in a hospital is different from studying in college. Patients' condition is always changing. Determining patients' expected outcome, sure, we need to consider their condition.” (P5)

Sub-theme 2: Planning the intervention

Respondents stated that the planning phase of the nursing process also requires knowledge about basic nursing science. This is because nurses must pay attention to the clinical symptoms shown by patients to determine the best intervention, as expressed below:

“Patients' problem should be resolved completely. We have to select the best intervention to resolve their problem.” (P5)

Planning is the fourth phase of the nursing process, which involves problem-solving. Nurses have to establish the goals, expected outcomes, and interventions to hasten the resolution of patient's problem.¹⁰ Basic nursing knowledge also serves as a determinant in the care planning process.¹⁶ Meanwhile, anatomy, physiology, pathophysiology, and pharmacology are used as a guideline to identify patients' need. When nurses fail to understand these basic nursing sciences, they tend to carry out their duties without using critical thinking, which prevents the optimal improvement of the patient's condition.¹⁷

Theme 4: As a basis for implementing nursing actions

Nursing implementation is a part of the nursing plan that is determined during the planning phase. Theme 4 was formed from

three sub-themes, namely i) basis for giving education to the patients; ii) administering medication appropriately; and iii) collaborating with other medical staff.

Sub-theme 1: Basis for giving education to patients

Respondents agreed that nurses have to understand the basic nursing science to implement their duties appropriately. Nurses can educate patients effectively when they understand the basic science related to their problem, as stated below:

“We need to understand the pathophysiology if we want to identify the cause of their symptoms.” (P3)

Sub-theme 2: Administering medication correctly

While providing therapy to patients, including administering medication, nurses must also observe their condition after they are given the medication, as stated below:

“Because of my pharmacological knowledge, I am able to observe my patient (condition) after taking medication, and I will make sure there is no severe adverse effect.” (P4)

Sub-theme 3: Effectively collaborate with other medical staff

Respondents often collaborate and discuss patients' condition as well as their treatment with other medical staff. Furthermore, they are more critical while discussing the conditions and treatment, as stated below:

“When my team found medical or nursing treatment that was not suitable with patients' condition, they will inform and discuss it with other nurses or other medical staffs.” (P4)

During the implementation phase, nurses need to involve patients in every action as well as to provide opportunities for clients to express their feelings. They also need to use intellectual knowledge, human relations, and technical nursing skills while carrying out their duties.^{18,19} Generally, there are three categories of nursing implementation, namely i) cognitive implementations, such as education, making strategies for clients with communication dysfunction, and providing feedback; ii) interpersonal implementations, such as therapeutic communication, setting personal schedules, providing spiritual support, giving advocacy; and iii) technical implementations, such as providing skin hygiene care, carrying out routine nursing activities, finding changes, organizing abnormal responses, performing independent nursing actions, collaboration, and referrals.^{20,21} Based on these theories, which are consistent with this study, nurses must have adequate knowledge and skills to educate patients and families. They also need the knowledge and skills while administering medication and engaging in collaborative actions. Furthermore, nurses need to understand all the necessary actions that patients require. The function of basic nursing science is to serve as a guide while carrying out duties related to patients' needs, such as nutrition, rest, and therapy.

Theme 5: Provides a basis for monitoring and follow-up

Nursing evaluation is an ongoing assessment, which helps to assess the effectiveness of nursing intervention. It also helps to determine whether the nursing plan is continued, modified, or discontinued. Theme 5 was developed from two sub-themes, namely (1) basis for monitoring the patient's condition; and (2) basis for evaluating the implementation of nursing intervention and follow-up plans.

Sub-theme 1: Basis for monitoring the patient's condition

One of respondents stated that basic nursing science is required in monitoring patients' condition:

“To evaluate whether the expected goals are achieved, we should monitor patients' condition regularly, and this (action) surely needs basic nursing knowledge.” (P2)

Sub-theme 2: Basis for evaluating the implementation of nursing intervention and follow-up plan

After implementing the nursing actions, nurses need to evaluate whether the intervention was effective in addressing patients' problem. They also need to compare the condition before and after the intervention, and these activities require basic nursing knowledge, as stated below:

“We do check patients' condition before and after any treatment given. This is to know whether the treatment was effective or not. When we found that the treatment is less effective, we may change or modify the treatment.” (P1)

Professional nurses also use their critical thinking skills for various purposes aside from implementing nursing actions. Critical thinking is also used while evaluating the patient's condition after the treatment. This evaluation ability is closely related to the knowledge about basic nursing science. Therefore, nurses must be able to identify patients' body response to determine whether the intervention was successful or need to be changed. They also need to understand basic nursing science, which improves their knowledge about the disease pathology as well as patients' response to the therapy.^{22,23}

Theme 6: Teamwork between health personnel is more effective

A form of collaborative relationships between health personnel was illustrated in the interprofessional collaboration. Theme 6 was developed from two sub-themes, namely i) effective communication and coordination; and ii) problem-solving.

Sub-theme 1: Effective communication and coordination

Respondents revealed that communication and coordination with other health personnel became more effective when nurses have knowledge in the related area, as stated below:

“Before giving therapies, we often discuss with the physician about the effectivity. So we could improve patients' condition.” (P4)

Sub-theme 3: Problem solving

Respondents were very concerned because caring for patients with chronic disease implies that they have to deal with various conditions, symptoms, and a higher rate of mortality. Therefore, nurses need to always use their critical thinking and problem-solving skills to address patients' needs, as stated below:

“We often treat patients with terminal illness with a tiny hope to recover, however, the treatment should continue, so we keep treating the patient and provide the best care as we could.” (P3)

Knowledge about basic nursing science provides a better understanding of patients' condition. Nurses with many experiences have better knowledge through the theoretical knowledge they have gained as well as their direct experience while providing healthcare services.^{24,25} Having knowledge about basic nursing sci-

ence encourages nurses to start a good and constructive discussion with other health personnel to resolve patients' problem. They also need to feel more confident while collaborating with other health personnel.

Nurses are professionals who devote themselves to working in hospitals with the risk of being exposed to various diseases. Nurses who have good basic knowledge of nursing will be able to work independently, competently, and confidently. Basic nursing science helps the nurses to understand the diseases they are dealing with, so they can give the best nursing care for the patients. We have started exploring the experience of nurses using the basic nursing science in performing nursing care for patients with chronic diseases. Based on our study, nurses consider basic nursing science as a challenging subject in college, but very useful when they meet real patients when they are working.

There are limitations of this study. First, the respondents of this

study were confined to one ward in one hospital. Second, this study explores the experience of nurses caring for patients with the chronic disease only. Further studies are needed to carry out with the larger respondents and with various settings.

Conclusions

Nurses need knowledge and skills in basic nursing science while caring for patients with chronic diseases. Furthermore, basic nursing sciences lay the foundation while assessing patients, making a nursing diagnosis, planning the care, implementing nursing actions, evaluating patients' condition, and collaborating with other health personnel.

References

1. Law of the Republic of Indonesia Number 38 of 2014 concerning Nursing. Law of the Republic of Indonesia Number 38 of 2014 concerning Nursing. 2014.
2. Estetika N, Noraliyatun J. Pelaksanaan Asuhan Keperawatan Spiritual di Suatu Rumah Sakit Banda Aceh. [Implementation of Spiritual Nursing Care in a Banda Aceh Hospital.] J Ilm Mhs Fak Keperawatan. 2016;1:1-9
3. Sharoff L. Holistic Nursing in the Genetic/Genomic Era. J Holist Nurs 2016;34:146–53.
4. Eggert J. Genetics and Genomics in Oncology Nursing: What Does Every Nurse Need to Know? Nurs Clin North Am 2017;52:1–25.
5. Wood AF, Chandler C, Connolly S, et al. Designing and developing core physiology learning outcomes for preregistration nursing education curriculum. Adv Physiol Educ 2020;44:464–74.
6. Romero-Reveron R. Human anatomy in the generation Z's medical studies. MOJ Anat Physiol 2020;7:12–3.
7. Madigan N. The importance of pharmacology in nursing. Health Times. 2021. Accessed 2021 Oct 15. Available from: <https://healthtimes.com.au/hub/pharmacology/71/guidance/nm/the-importance-of-pharmacology-in-nursing/2756>
8. Idemyor V. Genomic medicine: Health care issues and the unresolved ethical and social dilemmas. Am J Ther 2012;21:548–53.
9. Mazzotta CP. Biomedical approaches to care and their influence on point of care nurses: a scoping review. J Nurs Educ Pract 2016;6:93–101.
10. Berman A, Snyder S, Frandsen G. Kozier & Erb's Fundamental of Nursing Concepts, Process, and Practice. Tenth Edit. New Jersey: Pearson Education, Inc; 2016.
11. Islamy LOS, Sulima S. Kualitas Pelayanan Keperawatan di Rumah Sakit Umum Daerah (RSUD) Kota Baubau. [Quality of Nursing Services at the Regional General Hospital (RSUD) in Baubau City.] J Kesehat Manarang 2020;6:20.
12. Atania N. Pengkajian Data Sebagai Dasar Fondasi Proses Keperawatan. [Data Assessment as the Foundation of the Nursing Process - Preprint]. Open Science Framework. 2020. Accessed 2021 Oct 15. Available from: <https://doi.org/10.31219/osf.io/jk3h4>
13. de Barros JR, Herrerias GSP, Ramdeen M, et al. Nursing Process in a Patient with Crohn's Disease: Case Report. Open J Nurs 2021;11:258–65.
14. Apriyani H. Identifikasi Pengkajian Keperawatan Pada Pasien Di Ruang Paru Sebuah Rumah Sakit. [Identification of Nursing Studies in Patients in the Pulmonary Room of a

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- Hospital.] *J Keperawatan* 2018;XI:107–11.
15. Akhu-Zaheya L, Al-Maaitah R, Bany Hani S. Quality of nursing documentation: Paper-based health records versus electronic-based health records. *J Clin Nurs* 2018;27:e578–89.
 16. Wang J, Yue P, Huang J, et al. Nursing Intervention on the Compliance of Hemodialysis Patients with End-Stage Renal Disease: A Meta-Analysis. *Blood Purif* 2018;45:102–9.
 17. Roy C. Key Issues in Nursing Theory: Developments, Challenges, and Future Directions. *Nurs Res* 2018;67:81–92.
 18. Sulistyawati W, Susmiati S. The Implementation Of 3S (SDKI, SIKI, SLKI) to The Quality Of Nursing Care Documentation In Hospital's Inpatient Rooms. *Str J Ilm Kesehat* 2020;9:1323–8.
 19. Yildirim B, Ozkahraman S. Critical thinking in nursing process and education. *Int J Humanit Soc Sci* 2011;1:257–62.
 20. Luo J, Dong X, Hu J. Effect of nursing intervention via a chatting tool on the rehabilitation of patients after Total hip Arthroplasty. *J Orthop Surg Res* 2019;14:1–6.
 21. Naseri-Salahshour V, Sajadi M, Abedi A, et al. Reflexology as an adjunctive nursing intervention for management of nausea in hemodialysis patients: A randomized clinical trial. *Complement Ther Clin Pract* 2019;36:29–33.
 22. Cui C, Wang L-X, Li Q, et al. ting a Pain Management Nursing Protocol for Orthopaedic Surgical Patients: Results from a PAIN OUT Project. *J Clin Nurs* 2018;27:1684–91.
 23. Nursalam N, Widodo H, Wahyuni ED, et al. Development of perioperative care instruments based on SDKI SLKI SIKI in operating room. *Syst Rev Pharm* 2020;11:1029–35.
 24. Bastian ND, Munoz D, Ventura M. A Mixed-Methods Research Framework for Healthcare Process Improvement. *J Pediatr Nurs* 2016;31:e39–51.
 25. Hariyati RTS, Kobayashi N, Sahar J. Simplicity and Completeness of Nursing Process Satisfaction Using Nursing Management Information System at the Public Health Service “X” Indonesia. *Intertaional J caring Sci* 2018;11:1034–42.

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