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APPLICATION OF PHYSIOLOGICAL KNOWLEDGE IN NURSING PRACTICE: A STUDY ON EDUCATIONAL PERCEPTIONS

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ABSTRACT:

Introduction: Nursing practice requires comprehensive knowledge of the body's functioning, making the study of human physiology essential during undergraduate education. The nursing process, a tool for systematic, dynamic, and timely professional practice based on the scientific method, forms the organizing axis of the nursing curriculum at many universities, including those in Pakistan.

Objective: To identify students and teachers of core nursing courses' perception of applying physiological knowledge gained during practical work in the Physiology class at different stages of the nursing process.

Method: A descriptive, observational, cross-sectional study was conducted. An anonymous questionnaire was randomly administered to students and teachers. The questionnaire included a double-entry table describing the contents of each practical work and the phases of the nursing process.

Results: The questionnaire was answered by 24 teachers (39%) and 38 students (61%). Both groups most frequently applied physiology knowledge in the assessment and diagnosis phases of the nursing process. Perceptions of applying physiological knowledge in each practical work varied between teachers and students, with teachers more frequently recognizing the use of physiology in nursing.

Conclusions: Structuring practical physiology activities around the nursing process appears to be a valid didactic strategy. Both teachers and students perceive that they apply the knowledge gained during the course in various stages of the nursing process, particularly in assessment and diagnosis. The higher perception among teachers suggests better nursing process management due to their higher level of knowledge and professional practice.

KEYWORDS: Nursing practice**,** Human physiology**,** Undergraduate Education**,** Nursing process**,** Systematic practice**,** Dynamic practice**,** Professional practice**,** Scientific method.

INTRODUCTION

As a science, physiology is multiform about developing the discipline to which it contributes. Nursing requires comprehensive knowledge of the functioning of the human body. For this reason, human physiology constitutes, within the training process of health professionals in general and in nursing careers in particular, one of the primary subjects considered essential within the biological sciences. This learning process also contributes to developing transversal and specific competencies. In the case of nursing, it helps to increase the capacity for analysis and synthesis, to develop critical thinking and inquisitive thinking (necessary for research), and to use knowledge rationally, among other transversal competencies. Within the specific ones, it contributes to providing comprehensive care to the individual in health and illness (Dai, Wu et al. 2024).

Studies on nursing students' perception of dictation and performance in basic sciences, anatomy, and physiology show that 73% recognize its relevance; However, this percentage drops to 59.6% when they refer to learning difficulties. It has been suggested that different strategies in teaching physiology to achieve the best performance be applied, such as flipped classes, practice-based classes, and specific courses for each topic. On the other hand, the nursing process presents difficulties in its implementation due to the lack of records in all its stages or the lack of infrastructure, especially in low-resource countries (Shin, Jung, et al. 2024).

In Argentina, nursing careers completed their first accreditation process in 2017, after completing an enriched process, first of discussion to establish national standards and, then, the necessary self-evaluation. , curricular updating, and accreditation. Regarding the Bachelor's Degree in Nursing at the National University of the Northeast, in the self-evaluation process within the framework of the accreditation processes, it was agreed that the nursing process (PE), also called the nursing process or nursing care process, would continue to be the structure and organizer of the curriculum (Berchtenbreiter, Innes, et al. 2024).

Consequently, the PE was identified as a systematic, dynamic, and timely tool for professional practice that, based on the scientific method, guides nursing care logically, sequentially, and evaluable—actual or potential health problems. The Career lasts five years and is divided into two school cycles: the first, three years long, grants the intermediate title of nurse or nurse, which qualifies for professional performance. The second cycle confers, upon completion, the degree of Bachelor of Nursing (Gutiérrez-Fernández, Fernández-Llamas, et al. 2024).

The different subjects are grouped in both cycles into three areas: Biological, Professional, and Sociohumanistic. As part of the Biological Area and as a subject within the training curriculum, human physiology is taught in the second quarter of the 1st year of the degree. Its contents are organized into two blocks: a) physiological bases of the processes that maintain or alter the homeostatic mechanisms that alter life and b) physiological relationships between organs, devices, and systems of the human organism (Shen, Zhu, et al. 2024).

From the teaching perspective, in the Bachelor's Degree in Nursing, the application of PE is used as a pedagogical tool and facilitator of learning since it addresses the person throughout the entire life cycle and allows articulate and integration the conceptual, philosophical, technical-scientific, and bioethical contents in the different subjects that are part of the fundamental and flexible core of the curriculum. Because it is a primary science subject and the strong imprint of practice with which the EP is associated (Afonso, Lopes, et al. 2024).

Table 1: Importance of Physiology in Nursing Education

Key Points	References
Physiology contributes to the comprehensive development of health professionals, particularly in nursing.	Dai, Wu et al. 2024
Essential for developing both transversal and specific competencies in nursing students.	Dai, Wu et al. 2024
Enhances capacity for analysis, synthesis, critical thinking, and interested thinking in nursing.	Dai, Wu et al. 2024
Contributes to providing comprehensive care to individuals in both health and illness.	Dai, Wu et al. 2024

Table 2: Perceptions and Challenges in Learning Physiology

Key Points	References
73% of nursing students recognize the relevance of anatomy and physiology.	Shin, Jung, et al. 2024
59.6% of students report difficulties in learning these subjects.	Shin, Jung, et al. 2024
I suggested teaching strategies: flipped classes, practice-based classes, and specific courses for each topic.	Shin, Jung, et al. 2024
Challenges in implementing the nursing process due to lack of records and infrastructure.	Shin, Jung, et al. 2024

Table 3: Nursing Education in Argentina

Key Points	References
The first accreditation process for nursing careers in Argentina was completed in 2017.	Berchtenbreiter, Innes, et al. 2024
The nursing process (PE) is identified as a systematic, dynamic, and timely tool for professional practice.	Berchtenbreiter, Innes, et al. 2024
Structure and organization of the curriculum around the nursing process.	Berchtenbreiter, Innes, et al. 2024
A Bachelor's Degree in Nursing at the National University of the Northeast follows this model.	Gutiérrez-Fernández, Fernández-Llamas, et al. 2024

Table 4: Curriculum Structure and Physiology Teaching

Key Points	References
A nursing degree lasts five years and is divided into two cycles: intermediate title and Bachelor's degree.	Gutiérrez-Fernández, Fernández-Llamas, et al. 2024
Subjects are grouped into three areas: Biological, Professional, and Sociohumanistic.	Shen, Zhu, et al. 2024
Human physiology was taught in the second quarter of the first year and is organized into two content blocks.	Shen, Zhu, et al. 2024
Application of the nursing process as a pedagogical tool in the curriculum.	Afonso, Lopes, et al. 2024

Table 5: Research Objective and Questions

Key Points	References
Objective: Identify students' and teachers' perceptions regarding applying physiological knowledge in practical work.	Gosak, Pruinelli, et al. 2024
Questions: Can the nursing process be used as a didactic strategy in Physiology? Do teachers and students perceive its application?	Gosak, Pruinelli, et al. 2024

Some questions arose within the department: can the EP be used as a didactic strategy? In the subject of Physiology? Do teachers and students perceive the application of knowledge of physiology content in the different stages or phases of PE? In this regard, the objective of this work was to identify the perception that students and teachers of core Nursing subjects had about the application or not of physiological knowledge developed in the practical work (TP) of the subject Physiology in the different stages of the PE (Gosak, Pruinelli, et al. 2024).

METHODOLOGY:

A descriptive, observational, and cross-sectional study was conducted using an anonymous survey that respected ethical aspects. This was distributed on paper to randomly selected students who had already regularized or passed the subject and to teachers of the course. The population was chosen randomly by stratified probability sampling, dividing it into two subgroups or strata: students and teachers (Bonato, Dezordi et al. 2024).

The survey questionnaire was designed as a double-entry table, in which, on one side, the thematic contents of the practical work (TP) developed in the subject were listed and, on the other, the stages of PE: assessment, diagnosis, planning, execution, and evaluation. The instruction was to indicate with Yes or No if they perceived that they applied the knowledge dictated in Physiology in each stage of the process mentioned above. The thematic contents of the TP were (Dantas, Santos, et al.):

- TP 1: body fluids: weight and height; calculation of the percentage of body water; calculation of extracellular, intravascular, and interstitial fluid; intracellular fluid.
- TP 2: contraction and relaxation of muscles; muscular tone; nervous mechanisms involved.
- TP 3: voluntary and involuntary movements; reflexes; functions of the spinal cord and the cranial nerves involved.
- TP 4: blood groups; antigen-antibody reaction (blood).
- TP 5: respiration-circulation; auscultation of heart sounds at rest and during exercise; Vital signs.
- TP 6: dynamic spiro m entry; total lung capacity and Tiffeneau index; volume ratio in cardiac minute; heart rate and cellular respiration.
- TP 7: urine: composition and characteristics of urine; renal blood flow-glomerular filtration relationship.
- TP 8: body mass index; healthy nutrition; digestion mechanism; the importance of digestive juice balance; physiological changes in feces.
- TP 9: glucose regulation; endocrine pancreas.
- TP 10: relationship of the female sexual cycle with the hypothalamic-pituitary-gonadal axis; differences with the male sex.

The methodology used in the TP consisted of the presentation of the relevant thematic content by the teachers, followed by the discussion of a case, such as, for example, three women, a pregnant woman, and an older woman, talking about the bodily changes presented by the younger. The students, guided by questions, had to resolve the physiological changes produced in the three women. Using a rubric, the students themselves evaluated the resolution of the case. The statistical analysis to obtain measures of central tendency and differences in proportions (chi-square) was conducted with the IBM SPSS version 21 statistical program (Yilmaz and Yüksel 2024).

RESULTS

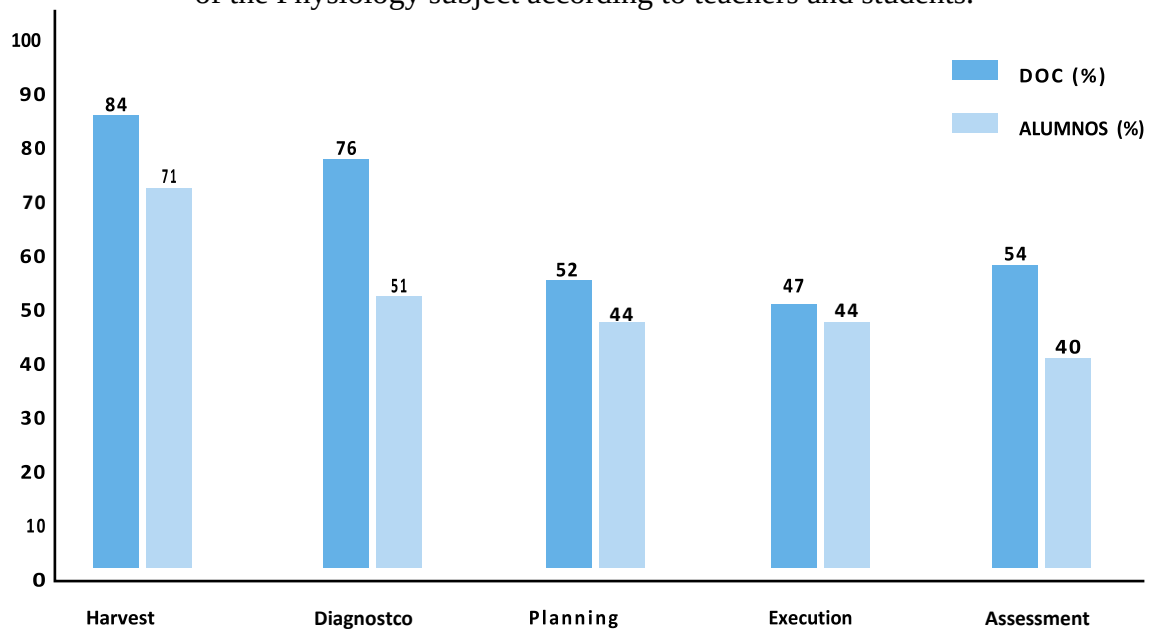
Regarding the teachers, the sample comprised 24 (39%), distributed among nursing graduates and professors of the five years of the Career in the core areas (basic nursing, Elderly Nursing, among others). The students were 38 (61%): 2 from the first year, 11 from the second, 14 from the third, 3 from the fourth, 4 from the fifth, one recent graduate, and three not registered, with 82% being female. , with an average age of 26.7 ± 8.89 years (Lee and Wang 2024).

It can be seen in Table 1 and Figure 1 that both teachers and students perceived a higher percentage of the application of physiology knowledge in the first two stages of PE: assessment and diagnosis. These reflected proportions were obtained by taking as 100% of the entire sample of students on the one hand and teachers on the other (Caloca-Amber, Mauriz, et al. 2024).

Table 1. Proportion of positive perception of the contents of each practical work of the subject Physiology in the stages of the nursing process according to teachers and students (Al Hadhrami, Al Sawafi et al. 2024)

	TP1	TP2	TP3	TP4	TP5	TP6	TP7	TP8	TP9	TP10	Total
Teachers	100	71	71	96	88	92	96	75	88	79	84
Students	87	74	72	74	74	69	72	54	77	72	71
Teachers	83	71	71	54	83	83	79	92	79	71	76
Students	49	46	46	33	64	51	56	49	56	56	51
Teachers	67	33	50	21	79	63	63	58	50	50	52
Students	38	41	41	31	49	46	49	49	49	46	44
Dozens	58	33	46	29	79	33	54	46	58	42	47
Students	44	38	44	31	62	41	44	51	49	33	44
Teachers	63	50	58	50	63	38	67	63	46	54	54
Students	41	46	46	26	46	41	38	38	36	46	40

Figure 1. Positive perception in each phase of the nursing process of contents of the practical work of the Physiology subject according to teachers and students.



The analysis of the total positive perceptions about the application of physiological knowledge developed in the TP, distributed according to the stages of the EP, showed statistically significant differences (chi-square test) between teachers and students. ($p < 0.04$), which implies that these are indeed two different population groups. In all stages and concerning all PDs, the positive perception was more excellent in teachers than in students. Likewise, this positive perception was highest in all

phases of the PE in TP 1 (Body Fluids), followed by TP5 (Circulatory) in both teachers and students (see Table 1 and Figure 1) (Lee, Nolan et al. 2024).

DISCUSSION: In the research, it was observed that both teachers and students, in greater or lesser proportions, perceive that the contents of the Physiology TP are applied in the different stages of the PE. However, it is in the two first phases, collection, and diagnosis, where they were most identified. This should not be surprising, given that in the last stages (planning, execution, and evaluation), these data are systematized into an action plan, which requires knowledge and concrete thinking (Zhou, Li et al. 2024).

In the following phases of the EP, knowledge of physiology was recognized in a lower percentage. This is probably due not to the fact that they are of minor importance but to the fact that in these stages, both the teachers and the students intervene and evaluate what has been done based on the specific data obtained, from which they plan, develop strategies, execute them and assess the results; and to plan, develop strategies and evaluate results they require something more than having knowledge and applying concrete thinking (Kılıç, Günaydın, et al. 2024):

They need, to a greater extent, to have advanced clinical judgment development, which will fundamentally depend on the development of critical thinking. This generic competence is developed throughout life, and it is supposed to evolve more in those who have years of professional practice. The lower perception that students have in the planning, execution, and assessment phases probably depends on the level reached in the development of critical thinking and clinical judgment competence is lower (Aydin, Serpici, et al. 2024).

That of the teachers. This only reflects, in part, the differences between the novice and the expert since the former has linear, causal thinking based on acquired knowledge. In contrast, the latter has a higher level of expertise, but throughout his professional practice, he has been developing a different intellectual organization in cognitive networks and pattern recognition patents. Critical thinking is a complex construct that enables reasoning, analysis of options, inference, interpretation, evaluation of the steps to follow, and verification of what is reasoned (Zhai, Li et al. 2024).

It includes a series of skills that do not grasp how they are integrated into everyday practice. However, it appears when there is a need to solve a problem or interact with others, and thus, by making it possible to evaluate information based on prior knowledge, it enables decision-making. Its development requires metacognition, that is, each person's knowledge or awareness of how they learn. On the other hand, critical thinking is a process and, at the same time, a result of the learning process, its consequence being clinical reasoning, which leads to clinical judgment (essential for sick actions) (Thomson, Lesser, et al. 2024).

They are based on values, systems, cognition, and learning processes) Therefore, it is a skill that can be used for continuous growth during the degree and professional practice. Its development is related to problem-solving, decision-making, and creative thinking and is essential to providing nursing care at all stages of the EP. Furthermore, critical thinking cannot be effectively taught without being integrated into a specific professional or academic area. From teaching, it is developed through different models: case analysis; recognition of models of inductive reasoning (comparison); decision trees or rhythms; deductive hypothetical reasoning; exhaustive method of approximation to results, which seeks clinical data and compares them with known standards to determine diagnoses, among others (Ismail 2024).

In any of the models, the standards to consider are the systems of the human body and their functioning under physiological conditions, which is why the contents of the subject provide different elements in the various stages. Of the EP, especially in the evaluation. Physiology content does more than offer knowledge or knowledge to care. They contribute to the development of critical thinking. This competence is developed in and from education, but that is independent of the specifics of the profession and integrated practice, which makes it possible to perform in different areas (Alshyyab, Ebbini et al. 2024).

Of life and in one's professional practice in an integrated and interrelated way. Being a generic, transversal competence, it invades what we do in different life spaces and directly corresponds with

professional practice; therefore, it is related to but does not determine specific competencies. In nursing, critical thinking is directed by professional standards and ethical-legal codes corresponding to the profession, based on EP, problem-solving, and the scientific method (Keles and Eroğlu 2024). In light of the results obtained, we think that the answer to the research question is whether PE can be used as a teaching strategy in physiology. Do teachers and students perceive the application of knowledge from the contents of physiology in the phases of the EP? is affirmative since it was shown that both teachers and students, in greater or lesser proportions, recognize the contents of the TP of Physiology in the stages of the PE, being the collection and diagnosis phases in which they are most identified. These results can contribute to the entire teaching body of the Career and the students visualizing that physiology is a basic science with applications in all EP stages (Krel, Vrbnjak, et al. 2024).

Likewise, during the teaching-learning process, the Chair will manage to link each content with the phases of the PE in which they are applied, definitively incorporating the PE as a didactic strategy in all its stages. The nursing process constitutes a tool for professional practice based on scientific bases that allow identifying and acting on care needs. In that sense, physiology's contents contribute to the said process's development. The greatest strength of this work is its originality since no other publications evidence the implementation of PE in the teaching of basic sciences (Wilton, Sheffield et al. 2024).

CONCLUSIONS

Seeing the practical activity of the subject Physiology around PE seems to constitute a valid teaching strategy since both teachers and students who have already passed it perceive, to a greater or lesser extent, that they apply the knowledge worked on the subject at all stages of the EP, particularly in assessment and diagnosis. In all cases, the perception was more excellent among the teachers than among the students, which only shows that the teachers, based on their higher level of knowledge and professional practice, have a better management of PE.

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