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Research Article

A Quantitative Analysis of the Nursing Students' Level of Confidence in Their Knowledge of Basic Science Concepts

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ABSTRACT

The study aims to determine the first-year nursing students' level of confidence with their knowledge in basic science concepts. A total of fifty nursing students enrolled in Pamantasan ng Lungsod ng Marikina for the academic year 2021-2022 were involved in the research. Among the participants, 52% (n=26) took a STEM program in Senior High School. Results revealed that the respondents are confident with their knowledge in basic science and agreed with the information associated with self-confidence. The students' confidence was influenced by the strand they took in senior high school, followed by the method of teaching used in the subject, and the experience in laboratory. Meanwhile, their monthly family income is the least important factor influencing their confidence. Therefore, nursing students, regardless of the strand they took in senior high, need more engagement in basic science concepts because it significantly contributes to their level of confidence and knowledge in nursing field.

Keywords: *Basic Science Concepts, Level of Confidence, Nursing Education*

Introduction

The competence of a nurse is largely influenced by the scientific knowledge they have. Hence, knowledge in the nursing profession is reflected in the way they provide treatment and care to their patients. In addition to this, nursing students' confidence levels in displaying their knowledge and understanding of the basic science concepts shows how competent they are in their field of specialization. Self-confidence is one of the skills nurses should have in rendering nursing care and it should be a goal of the curriculum of schools that offer this course to develop self-confidence among nursing students. Della Ratta (2016) revealed that working with little confidence in the first year

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of clinical practice contributes to hesitation in the minds of novice nurses if they have the potential to become a good nurse.

A nursing student who has a high confidence level on knowledge in basic science concepts impacts one's willingness to achieve a good academic performance. Thus, it is significant to identify nursing students' confidence level in their knowledge as that might be a contributing factor influencing their performance level in school and in clinical deployment. Nursing students' awareness with regards to the knowledge that is essential and common in nursing practice greatly motivates students to enhance their retention and expound their knowledge about science concepts that was first introduced while in secondary education. It is significant because nurses are able to deliver the best quality of care if they are well informed about basic science concepts that deal with the human body. Hence, confidence will result to a competent student which is the most important element to make pertinent decisions in patient care.

A study conducted by Sadera et al., (2020), identified the major challenges of junior high school learners in understanding science concepts. The respondents were from four government-owned secondary schools in Zambales, Philippines with a total of 123 learners of science in junior high school. Based on the results of the study, junior high school learners in general encounter not many challenges across all aspects in learning science. However, the qualitative data revealed that students' motivation, cognitive ability, teachers' characteristics, learning environment, medium of instruction, curriculum and parental support were the challenges students encountered in the subject. In addition, based on the t-test comparison, male students face more challenges with regards to instructional resources and parental support compared to female students.

Nonetheless, there is inadequate knowledge about nursing students' level of confidence in their knowledge of basic science concepts. With this in mind, researchers were prompted to find out the level of confidence nursing students have in their knowledge of understanding basic science concepts. This study could inform students on their level of confidence and how they are going to better understand and retain science concepts. In addition, it could also contribute to the science educators regarding the factors that might have affected the students' level of confidence and how they can respond to these challenges towards attaining a quality science education in the Philippines.

Purpose of the Study

The study aims to determine the students' level of confidence of their knowledge in basic Science concepts. Specifically, it seeks to find answers to the following questions:

1. What is the demographic profile of students in terms of:
   1.1 Age
   1.2 Sex
   1.3 Monthly Family Income
2. How confident are nursing students in their knowledge of:
   2.1 basic process skills in science?
   2.2 basic cell biology?
   2.3 basic concepts in zoology
   2.4 basic concepts in botany?
3. What are the factors the nursing students thought that might have affected their confidence in their knowledge of science concepts in terms of:
   3.1 their interest in the subject?
   3.2 their strand in Senior High School?
   3.3 their training in Senior High School?

Literature Review

There has been an increasing investigation of the role of personal and interpersonal confidence in the development of competence in nursing students. In the professional context under discussion, confidence is defined as the capability to take knowledge and skill and move it into motion and behavior (Center & Adams, 2013). Confidence is beneficial, both in its part in developing competence along with a terminal measure of conveying competence (Cohen et al., 2013). Within nursing, competence generally refers to demonstrating knowledge, skills, and attitudes that enable rendering quality care, displaying appropriate behaviors, and making sound clinical judgments (Pijl-Zieber et al., 2014). In addition to this, academic performance is an intricate

student behavior in which learners try to recall the facts and express such knowledge acquired either verbally or in writing (Silverrajoo & Hassan, 2018).

In order to have academic confidence, one should have a sufficient background in education. Education is defined as a crucial issue for the progress of the individuals, the development, survival, and thriving of communities and nations as all individuals need to generate their awareness and escalate their educational skills continuously. So, it is important to understand the factors that contribute to the academic performance of the nursing students to improve their knowledge and clinical performance (Serdyukov, 2017).

When educating nursing students, they need equilibration between the knowledge obtained in the classroom, applying and transferring these theories in the clinical setting, and dealing with the actual circumstances (Bifftu et al., 2018). It was also explained that student nurses worldwide have offered nursing science formulations that, implicitly or explicitly, require nursing frameworks or theories to constitute the substantive sine qua non-substance of definitions (Barrett, 2017).

A good science education in the different education levels promotes scientific literacy and presumes to encourage learners to study the qualified science courses offered at universities (Zengele & Alemayehu, 2016). The goal is to impart and invigorate each learner with the skills and expertise needed to solve the learner and community's dilemmas. This defies the traditional school of thought curriculum which is molded only to train learners how to read and write (Eyisi, 2016).

Based on the study conducted by Parse (2015), it is stated that the "science of nursing rarely includes conceptualization within a nursing framework or theory" while "nursing science describes frameworks and theories of the discipline". Barrett (2017), also stated that for the past 30 years, Nursing Science Quarterly has only published content that speaks to the collected substance of this form of nursing knowledge.

In addition, according to the study that Schneid et al., (2019) conducted, the essence of the content learned in the medical practice is crucial for the overall evaluation of the curriculum. Medical educators should be more aware of the significant amount of forgetting that commonly occurs during the training and retention exams of the medical students. They recommended introducing other teaching practices and curricular changes that will help students in long-term retention effectively and precisely. Rather, with this intervention, there's more chance for the students to retain more basic science concepts. The learning process from the higher level will be more efficient. The students will rely less on outside resources to overcome their loss of knowledge. As well as the previous factors which affected students' academic performance that can influence their academic achievement include, school or social variables, academic motivation, competition, social power, affiliation, social concern, praise, and previous academic achievements can influence their academic achievement (Izuchi & Onyekuru, 2017).

Whereas non-school-related determinants are poverty, low educational level or illiterate parents, weakness, and poor nutritional status of the students (Alos, Caranto, & David, 2015). The students' performance is also influenced by various factors relating to social, psychological, economic, environmental, and personal factors. These factors may vary from person to person and across the country. The study aimed to assess the factors affecting academic performance among nursing students. Findings revealed that all the factors have an impact on academic performance whereas in this study two factors which are student-related factors and teacher-related factors have a very high impact as they both got the highest rank (Ravi, 2019). This result was consistent with a study done by Olufemi et al., (2018) who showed that teacher-related factors were considered to be the most consequential category of factors that posed an impact on student nurses' academic performance.

Based on the research Mylopoulos and Woods (2014) conducted, participants who received basic science instruction showed better learning of novel-related content than those who only received clinically focused instruction. These findings are coherent based on

previous studies about how basic science instruction allows students to develop a logic.

Methods

The study utilized a descriptive research design. The purpose was to have a thorough analysis about nursing student's level of confidence in their knowledge of basic science concepts. For the research instrument, an online survey questionnaire was used to collect information from the respondents to provide a numeric description. A purposive sampling strategy was used, wherein participants were sought out based on questions arising from the ongoing analysis of the data. The sampling strategy led to inclusion of participants from a variety of ages, monthly income, and Senior High School strand.

The study included 50 nursing students in their first year of study at Pamantasan ng Lungsod ng Marikina in the School Year 2021-2022. Online survey questionnaires were distributed to the respondents in order to collect necessary information for the study.

The Nursing Students' Level of Confidence Assessment was developed by the researchers served as the main instrument in gathering data. The researcher-made instrument was validated by experts in the related field and made use of the triangulation method of validation. It is composed of two parts. The first part consists of the demographic profile of the participants. The profile of the students includes, sex, family monthly income, and strand in Senior High School. The second part is the respondents' confidence level in Science and the factors that might have affected their confidence level which includes, student's interest and training in High School. It contains scale-item questions. Likert-scale questions were used that required the respondents to include the answers according to the predetermined list or scale. With a scale rating of (1) Strongly Disagree, (2) Disagree, (3) Agree, and (4) Strongly Agree that will be used to provide accurate and precise information that will be used to answer research questions.

Descriptive statistics were mainly used to interpret the participants' demographic profiles, nursing students' perceived level of confidence, and factors associated with confidence level. Data were treated statistically with frequency, percentage, and weighted mean. Results of the analysis were presented using tables and graphs.

Results and Discussions

Table 1 below highlights the frequency of the demographic profile of the respondents in terms of sex, age and monthly family income.

Table I. Demographic Profile according to sex, age and monthly family income.

Variables		Frequency	%
Sex	Female	33	66%
	Male	17	34%
		n=50	**100%**
Age	18 yrs old	10	20%
	19 yrs old	24	48%
	20 yrs old	10	20%
	21 yrs old	2	4%
	22 yrs old	3	6%
	23 yrs old	1	2%
		n=50	**100%**
Monthly family income	Php 10,000 and below	20	40%
	Php10,000-Php20,000	22	44%
	Php20,000-Php30,000	3	6%
	Php30,000-Php40,000	4	8%
	Php40,000 and above	1	2%
		n=50	**100%**

Results showed that there were 50 complete responses. Female participants represented 66% (n=33), while male respondents represented 34% (n=17). A majority of the participants, 48% (n=44), were 19 years old; 6% (n=3), were 22 years of age; 20% (n=10), were 18 and 20 years of age. Most participants, 44% (n=22), has a monthly family income ranges from ten thousand to twenty thousand pesos, while 40% (n=20) has a monthly family income ranges from ten thousand pesos and below; only 2% (1) has a monthly family income of forty thousand and above. Among the participants, 52% (n=26) took STEM; students who took ABM and HUMSS equally got 14% (n=7) and 6% (n=3) took GAS.

Table 2 below highlights the weighted mean of the students' confidence level on basic science concepts.

Table 2. Students' confidence level on basic science concepts.

Student's Confidence	Mean	Verbal Interpretation
1. I can understand science topics clearly in class.	3.08	Agree
2. I am confident in my knowledge about basic process skills in science.	3.04	Agree
3. I am confident in my knowledge in basic cell biology concepts.	2.98	Agree
4. I am confident in my knowledge in basic zoology concepts.	2.76	Agree
5. I am confident in my knowledge in basic concepts of botany.	2.64	Agree
6. I feel confident with my inferring skills.	2.94	Agree
7. I feel confident with my communication skills.	2.76	Agree
8. I feel confident with my observational skills as it is part of basic process skills in science.	3.16	Agree
9. I feel confident in performing my skills in measuring quantities as it is part of the basic process skills in science.	2.84	Agree
10. I feel confident in my basic skill in science because it was enhanced when I was in high school.	2.98	Agree
	2.92	**Agree**

Data elicited from the self-confidence scale indicated overall high levels of self-confidence on their knowledge on basic science concepts. Participants indicated that they are confident with their knowledge on basic science. (Mean is 2.64 to 3.16). It is indicated by the participants, who were particularly confident they were able to retain science concepts from their Senior High School. In addition, respondents agreed that they are particularly confident with their knowledge on basic process skills in science (inferring, communication, measuring quantities, and observational skills).

Table 3. Factors that affect the students' confidence in terms of students' interest and training in high school.

Factors Affecting Students' Confidence	Mean	Verbal interpretation
1.1 Students' interest		
1. I like studying science concepts.	3.08	Agree
2. I like to watch videos about Science on social media.	3.14	Agree
3. I can direct my own learning progress.	2.98	Agree
4. I re-read the instructional materials based on my needs.	3.12	Agree
5. I like to read science discoveries.	3.04	Agree

Factors Affecting Students' Confidence	Mean	Verbal interpretation
1.2 Training in High School		
1. My Senior High School strand constantly includes science in the curriculum.	3.32	Agree
2. My experience in the laboratory made me confident with my knowledge.	2.88	Agree
3. I joined in science culminating activities in school.	2.64	Agree
4. My teachers use effective teaching methods in engaging students during discussion.	3.16	Agree
5. Inadequacy of laboratory facilities and science equipment affects my confidence level in science concepts.	3.02	Agree
	3.04	**Agree**

Result shows the factors encountered by the nursing students. The inclusion of science concepts learned in science subjects greatly affects the students' confidence level (M=3.32); followed by effective teaching methods (M= 3.16); and students' interest in watching videos about science on social media (M= 3.14). This implies that students generally are confident with their knowledge on basic science concepts given that they are constantly exposed to science concepts, teachers use appropriate teaching methods and the students interest with the subject. Factors with low mean suggests that these factors are not much of a contribution to the students' confidence level.

Conclusion and Recommendations

Nursing students agreed with the statements related to self-confidence, their knowledge and understanding of basic science concepts. It speaks about how compassionate they are in their field of study. Science is included in most of curricula, the basic science concepts are taught from junior high until senior high, depending on the strand students take and the teachers' method used in educating them, these factors can affect student confidence level.

After a thorough analysis, almost all the respondents agreed that they were confident with their knowledge in science. The following are the factors that greatly affect students' confidence in the basic science concepts: the strand they took in senior high school; effective teaching methods; their interest to watch videos about science.

Meanwhile, their monthly family income is the least important factor influencing their confidence. It was evident that several factors had influenced nursing students' confidence in basic science concepts. It is recommended that regardless of the strand they took in senior high school, more exposure to basic science concepts is necessary because it significantly contributes to their level of confidence and in their knowledge. Students should be aware about the importance of becoming proficient and knowledgeable about basic science concepts in order to be more confident with their field of study. Consequently, the researchers recommend to junior high school students to take the strand that offers enough science subjects if they plan to take the nursing course in college.

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