

Physiological Knowledge Retention in Second-Year Bachelor of Science and Psychiatric Nursing Students

Raj Narnaware¹, Brandi Pawliuk¹, Melanie Neumeier¹, Sarah Cuschieri², Paul Chahal³

1. Dept. of Human Health and Science, Faculty of Nursing, MacEwan University, Alberta, Canada
2. Department of Anatomy, Faculty of Medicine & Surgery, University of Malta, Malta
3. Department of Allied Health and Human Performance, Faculty of Health and Community Studies, MacEwan University, Alberta, Canada



Introduction

There is growing concern that nursing, medical and allied health students do not retain enough anatomical knowledge to confidently and successfully apply it in future classroom and clinical settings (Doomernick et al., 2017; Narnaware, Y. 2021).

Evidence now shows that knowledge retention is impacted by many factors, including admission criteria, teaching hours (Narnaware and Neumeier, 2019), age, sex, ethnicity, prior knowledge of science/biology, a gap between high school and university, and health care discipline (McVicar et al., 2015).

In Canada, the discipline of nursing can be subdivided into three professional designations, each with different educational requirements; Registered Nurses, Licensed Practical Nurses, and Registered Psychiatric Nurses (Canadian Nurses Association, 2019).

Objectives

At MacEwan University, students in the Psychiatric Nursing (PN) Program and the Bachelor of Science in Nursing (BScN) Program take the same first-year physiology course.

With the understanding that discipline choice potentially impacts knowledge retention, this study aimed to determine the overall difference in physiological knowledge retention between second-year Psychiatric Nursing Program students and second-year BScN students and if there is a difference based on organ system.

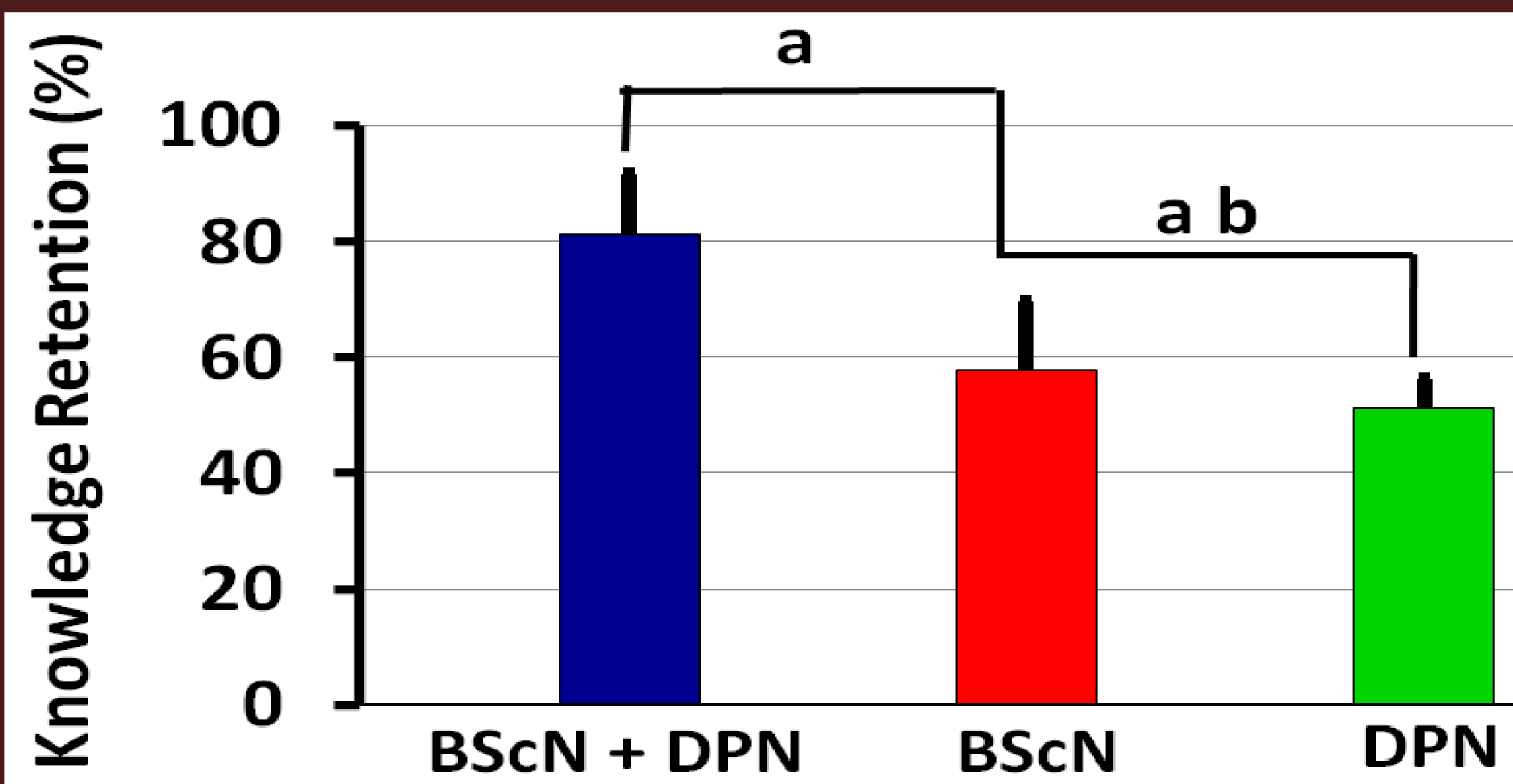
Methods

To address these questions, second-year Psychiatric Nursing Program and BScN students were quizzed on the knowledge covered in the physiology course.

Students were asked to answer nine to eleven knowledge and comprehension-level multiple-choice questions for each system.

The scores from these quizzes were compared to the first-year examination scores on the same content to determine overall knowledge retention.

Data were statistically analyzed using SPSS II, and means were compared using 2-sample t-tests and two-way ANOVA. The scores are described for each organ system by reporting the mean and standard deviation (SD). Statistical significance was set at $P \leq 0.05$ for all tests.



Physiological knowledge retention in Bachelor of Science (BScN) and Psychiatric Nursing (PN) second-year students. The data represents the overall percent (%) knowledge retention in BScN and BPN students compared to an overall % retention on the same organ systems in year 1. a, b $P < 0.001$ compared to year 1.

Second-Year Physiological Knowledge Retention in Nursing Students

Organ system	Year 1 (BScN)	Year 2 (BPN)	Knowledge lost (%)	Year 2 (BPN)	Knowledge lost (%)
Physiology	Mean ± SD	Mean ± SD		Mean ± SD	
Vascular	66.98 ± 23.3	52.2 ± 21.2	14.8%	65.9 ± 31.4	1.6%
Blood	59.82 ± 13.4	42.3 ± 13.7	17.5%	42.2 ± 23.6	29.5%
Defences	67.48 ± 20.8	37.2 ± 18.2	30.3%	42.8 ± 14.6	36.6%
Inflammation	73.67 ± 19.3	59.7 ± 28.8	13.9%	58.0 ± 24.8	21.3%
Respiration	46.29 ± 11.9	38.6 ± 21.9	7.7%	48.8 ± 17.6	-5.4%
Hormones	75.97 ± 17.7	55.4 ± 33.9	20.6%	58.2 ± 33.2	23.4%
Renal	54.67 ± 15.0	38.0 ± 16.2	16.7%	46.3 ± 15.1	13.4%
Fluid & Electrolyte	72.59 ± 17.2	63.0 ± 20.2	9.6%	56.3 ± 23.3	22.4%
Digestive	48.05 ± 22.4	45.4 ± 22.1	2.7%	48.9 ± 23.8	1.7%
Reproductive	63.36 ± 16.7	46.9 ± 27.2	16.5%	47.5 ± 26.6	25.0%

Second-Year Physiological Knowledge Retention in BScN vs. PN Nursing Students

Results

This equates to a 76.7% retention rate in BScN students and 70.4% retention rate in PN students. Compared to year 1, organ-specific knowledge retention levels varied between BScN students and PN students, however the highest retention and lowest retention were different between both cohorts.

The highest retention levels were seen in the digestive (89.7% BScN; 80.5% PND), respiratory (92.3% BScN; 105.4% PN), renal physiology (83.3% BScN; 86.6% PN).

Retention levels were lowest for the defenses (69.7% BScN; 63.4% PN) and hormones (83.3% BScN; 76.6.8% PN) (Table 1).

Whereas other organ systems such as vascular, blood, inflammation, fluid and electrolyte and reproductive physiology have higher and lower retention in both cohorts.

Discussion and Conclusion

Retention levels in the second year were organ-system and cohort-specific. This demonstrates a significant decrease in knowledge retention in BScN and PN students over one year.

PND students demonstrated a significantly lower overall retention rate; however, had higher level retention in the low-scoring blood and less variance in retention levels between systems compared to BScN students.

Physiological knowledge retention in both cohorts is significantly higher than anatomical knowledge in the second year (Narnaware and Neumeier, 2020).

The results from the present study demonstrated that length of degree/diploma programs, admission criteria and prior background in science in high school (McVicar et al., 2014; 2015) are some of the factors that could impact anatomical knowledge in PN and BScN students.

Stronger interventional strategies, therefore, need to develop and improve physiological knowledge retention in PN students.

Doomernick DE, Perez J, Linderhom T. 2017. Distributed retrieval practice promotes superior recall of anatomy information. *Anat Sci Educ* 10:339-347.

Narnaware Y, & Neumeier M. 2019. Second-year nursing students' gross anatomical knowledge. *Anat Sci Educ* 12:1-7.

Narnaware, Y. and Neumeier, M. (2020). Anatomical Knowledge Retention in Second-Year Bachelor of Science & Psychiatric Nursing Students. *The FASEB J*, 34 (S1), 5451. <https://doi.org/10.1096/fasebj.2020.34.s1.05451>.

Narnaware, Y. (2021). Never Heard That Before! Bioscience Knowledge Retention in Undergraduate Nursing Education-Current Topics. *Human Anatomy and Physiology Society Educator, HAPS Educator Journal*, 25 (2), 77-83.

McVicar A, Andrew S, Kemble R. 2015. The 'bioscience problem' for nursing students: An integrative review of published evaluations of year 1 bioscience, and proposed directions for curriculum development. *Nurse Educ Today* 35:500-509.



URL: <https://qrco.de/bdsRIB>