Academic Performance of Nursing Students in Anatomy and Physiology Before, During and After a Stability Period of COVID-19

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Research Gaps

- Both human anatomy and physiology are considered a cornerstone of health-related professional education and serve as pre-requisites for admission into the Bachelor of Nursing (BScN) and Bachelor of Psychiatric Nursing (BPN) programs at MacEwan University (Narnaware, Y. 2021; Narnaware and Neumeier, 2020).
- The teaching and learning of these subjects are influenced by several factors, including the COVID-19 pandemic (Narnaware and Neumeier, 2021; Syed et al., 2021). In early March of 2020, this pandemic caused the sudden pedagogical transformation of nursing curricula, forcing many educational institutions worldwide to switch from face-to-face classroom teaching to an online, virtual platform. This sudden transformation in teaching and learning forced students to adopt self-directed learning approaches.
- The impact of the shift from active learning strategies to self-directed learning strategies on academic performance in nursing students taking anatomy and physiology before, during and after a stability period of COVID-19 has not yet been investigated.

Study Objectives

- In this study, we seek to determine the impact of in-person teaching before COVID-19 (in-person), during COVID-19 (on-line) and during period of COVID-19 stability (Hybrid/Flex) on class average and grade point average (GPA) in anatomy and physiology courses for nursing students.

Methods

- Two sections of human anatomy comprising 65-80 students each were taught by didactic, passive teaching style in the Fall 2019 (before COVID-19).
- Two sections of human anatomy & one section physiology comprising 75-80 students each were taught using synchronous online teaching (during COVID-19) in Fall 2020 and Winter 2021.
- Two sections of anatomy and one physiology comprising 70-80 students each were taught after a stability period of COVID-19 a hybrid/flex mode of teaching (combination of online and in-person instruction) in Fall 2021. In Winter-2022, two sections of human anatomy and one human physiology were taught online until Feb. 28, 2022 and then in-person for the rest of the semester.
- Data pooled from multiple sections of human anatomy and human physiology from before, during and after a stability of period of COVID-19 were subjected to statistical evaluation using SPSS II (IBM Corp; Armonk, NY) to determine class average and GPA. Means were compared with 2-sample 't' tests. Differences were considered significant at P<0.05P<0.05.

Results

- The teaching of human anatomy with synchronous online instruction resulted in a significant increase in mean class average for mid-term#1, mid-term#2, mid-term#3, and the final examination (P<0.001) compared to those taught with didactic, passive and hybrid/flex teaching (Figure 1a).

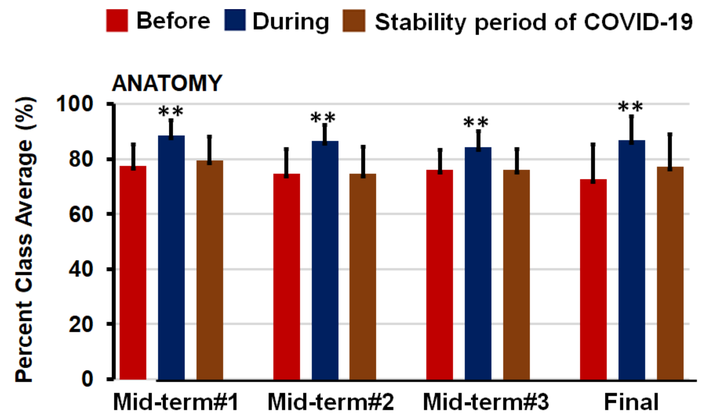

Figure 1a: The impact of teaching before, during and after a stability period of COVID-19 on the class average in anatomy. The results are expressed as mean ± SD and are converted into percent class average . *P<0.001 compared to in-person teaching.

- In the physiology course, the class average was significantly higher for mid-term#1 and mid-term#2, and the final exam (P<0.01) during synchronous online (during COVID-19) teaching compared to those taught before (in-person) COVID-19 and after a stability period of COVID-19 (hybrid/flex) (Figure 1b).
- However, the class average for the physiology students was not different for mid-term#1, mid-term#2 and the final exam before and after a stability period of the COVID-19 (Figure 1b).

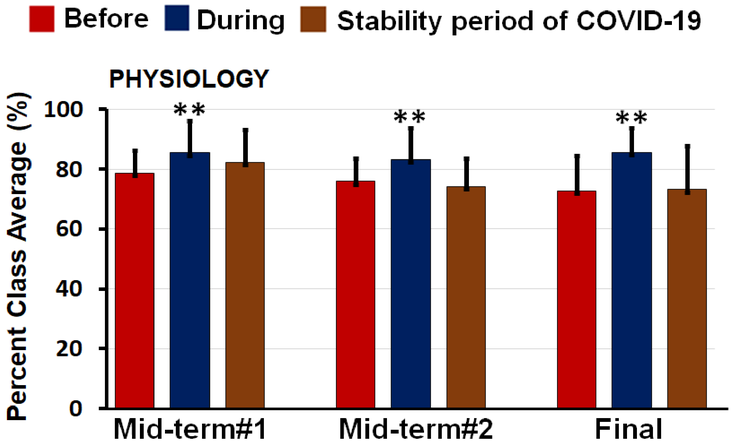

Figure 1b: The impact of teaching before, during and a stability period of the COVID-19 on the class average in physiology. The results are expressed as mean ± SD and are converted into percent class average. **P<0.001 compared to in-person teaching.

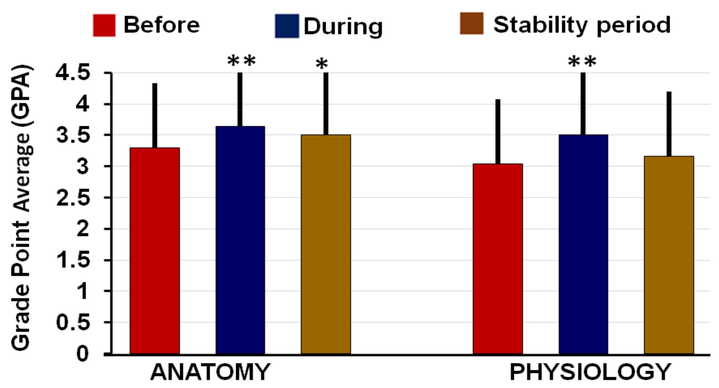

Figure 2: The impact of teaching before, during and after a stability period of the COVID-19 on GPA in human anatomy and human physiology. The results are expressed as mean ± SD and converted into GPA. *P<0.05, and P<0.001 compared to in-person teaching

- Synchronous on-line teaching during COVID-19 significantly (P<0.001) increased the GPA in both human anatomy and human physiology compared to before COVID-19 during and the stability period of COVID-19 (Figure 2).

Discussion & Conclusion

- The present study's findings demonstrate that synchronized online learning during COVID-19 period significantly increased the knowledge and understanding of anatomy and physiology compared to didactic, passive teaching and learning (before) and after a stability period (hybrid/flex) of COVID-19. This agrees with findings of Wall et al. (2021) in medical students.
- Improved academic performance may be due to students spending more time studying these subjects or to adopting self-directed online learning (Syed et al., 2021) due to a strict lockdown, self-isolation, and lack of social interactions. Students likely benefited from synchronized classes, help, and guidance from the instructor during virtual office hours over the COVID-19 period.
- Students may have taken advantage of unproctored online exams to access course material during the exams.
- Findings suggest that nursing students may have counterbalanced the missing active learning strategies of face-to-face learning and hybrid/flex and adopted self-directed learning during the COVID-19 period through synchronized learning (Ramnanan et al., 2021).

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