

2023

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Recommended Citation

Damiao, J. (2023). Covid-19 Impact on NBCOT Passing Rates. *Journal of Occupational Therapy Education*, 7 (3). <https://doi.org/10.26681/jote.2023.070306>

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Covid-19 Impact on NBCOT Passing Rates

Abstract

The COVID-19 pandemic changed the delivery of education as many occupational therapy (OT) programs temporarily transitioned to remote learning. The purpose of this article is to describe the impact of the COVID-19 pandemic on the National Board for Certification in Occupational Therapy (NBCOT) pass rates. A mixed methods research design was used consisting of quantitative data from all 35 OT programs from New York (NY), New Jersey (NJ), Connecticut (CT), and California (CA). Qualitative data was gathered from NY OT program graduates with fourteen convenience sampled graduate students who completed the qualitative survey. NBCOT exam scores from 2019-2021 were gathered for OT programs in NY, NJ, CT, and CA. A repeated-measures ANOVA and t-test were conducted to compare OT program performance on NBCOT exam. A qualitative survey was distributed via email to OT students who graduated in May of 2020. Results suggest a significant effect was found ($F(3,99) = 2.946, p = .037$). The decrease in passing scores occurred during the height of the pandemic in 2020 ($M = 95.21, SD = 7.032$), compared to the pre-pandemic period of 2019 ($M = 97.41, SD = 3.016$), and 'post-pandemic' period of 2021 ($M = 97.44, SD = 3.661$). The COVID-19 pandemic and the transition to online learning had a direct impact on OT student performance on the NBCOT exam. This study describes how pandemics, such as COVID-19, can affect student preparation for entry-level practice, while highlighting the need for institutional preparedness for future events.

Keywords

Covid-19, NBCOT, student success, remote learning

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Acknowledgements

The author would like to acknowledge the following: Gina Marcellino, Sarah Kang, Suzanne Burke, Estela Rodriguez Cervantes, and Taylor Chrisman.

JOTE

Journal of Occupational
Therapy Education

Volume 7, Issue 3

COVID-19 Impact on NBCOT Passing Rates

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ABSTRACT

The COVID-19 pandemic changed the delivery of education as many occupational therapy (OT) programs temporarily transitioned to remote learning. The purpose of this article is to describe the impact of the COVID-19 pandemic on the National Board for Certification in Occupational Therapy (NBCOT) pass rates. A mixed methods research design was used consisting of quantitative data from all 35 OT programs from New York (NY), New Jersey (NJ), Connecticut (CT), and California (CA). Qualitative data was gathered from NY OT program graduates with fourteen convenience sampled graduate students who completed the qualitative survey. NBCOT exam scores from 2019-2021 were gathered for OT programs in NY, NJ, CT, and CA. A repeated-measures ANOVA and t-test were conducted to compare OT program performance on NBCOT exam. A qualitative survey was distributed via email to OT students who graduated in May of 2020. Results suggest a significant effect was found ($F(3,99) = 2.946, p = .037$). The decrease in passing scores occurred during the height of the pandemic in 2020 ($M = 95.21, SD = 7.032$), compared to the pre-pandemic period of 2019 ($M = 97.41, SD = 3.016$), and 'post-pandemic' period of 2021 ($M = 97.44, SD = 3.661$). The COVID-19 pandemic and the transition to online learning had a direct impact on OT student performance on the NBCOT exam. This study describes how pandemics, such as COVID-19, can affect student preparation for entry-level practice, while highlighting the need for institutional preparedness for future events.

Coronavirus is an infectious disease that was first discovered in Wuhan China in December of 2019. It is a respiratory disease that is caused by a strain of Severe Acute Respiratory Syndrome Coronavirus 2 (SARS-Cov-2) (Islam & Iqbal, 2020). According to the Centers for Disease Control (CDC), the first few COVID cases in the United States (U.S.) were reported in mid-January 2020 (Jordan et al., 2020). By March 11, 2020, the World Health Organization (WHO) declared the outbreak a global pandemic (Cucinotta & Vanelli, 2020).

With the implementation of social distancing suggestions on the federal level, and requirements at the state level brought on by the global outbreak starting in March of 2020, in general occupational therapy (OT) students throughout the nation began experiencing prolonged school closures and transitions of education to virtual or remote delivery platforms. These transitions which were initially concentrated in metropolitan areas, quickly spread throughout the country. The first schools closed in Washington state on March 5th and quickly compounded thereafter. By March 12th, 16 states experienced state-wide school closures. By March 16th, more than half of all students in the U.S. were no longer attending in person classes. Finally, on March 25th all public schools in the U.S. were physically closed to in-person attendance, which lasted throughout the remainder of the academic year (EducationWeek, 2020).

While recently emerging research has shown that COVID-19 has harmed academic performance at the individual student level (Gaffney et al., 2021), there is limited literature on the national cohort-level impacts, particularly in OT. Furthermore, for an OT graduate program to maintain its accreditation status, it must achieve an average passing rate of 80% over a three-year period (ACOTE, 2022) on the National Board for Certification in Occupational Therapy (NBCOT) exam. If the average passing rate falls below 80% in any consecutive three-year period, the school's accreditation status may be revoked if not remediated. Hence, not only has the pandemic posed a threat to student success; program faculty may experience immense pressure as well to ensure that the passing rates are maintained, and programs remain in compliance.

The purpose of the present study was to determine how COVID-19 impacted the passing rate of new graduates taking the NBCOT exam. Prior to the COVID-19 pandemic, students relied heavily on the experiential learning opportunities of laboratory and clinical hours for synthesis of content and concepts (Gaffney et al., 2021). Without these experiences, students, in general, might have a hard time grasping new information and demonstrating entry-level readiness and preparedness for the NBCOT exam.

The following research question guided the present study: *Did the COVID-19 pandemic and transition to virtual learning have an effect on OT students' passing rates on the NBCOT exam?* The independent variable was the sudden transition to virtual learning, while the dependent variable was student passing rates on the NBCOT exam. The author hypothesized that COVID-19 negatively affected OT graduate students' performance on the NBCOT exam. Furthermore, the following qualitative query guided the present study: *What are the lived experiences of OT graduates preparing for the NBCOT exam during the COVID-19 pandemic?* If the quantitative results suggested that there was an effect on NBCOT passing rates, then the qualitative query would focus on exploring and gaining a deeper understanding of the participants' lived experiences as OT graduates who were experiencing these challenges during the pandemic.

Results from this study help to illustrate how the forced transition to remote learning affected student learning and entry-level preparedness for practice and the NBCOT exam. This highlights the increased urgency of institutional preparedness for potential future events, as well as investigation into effective and efficient means of transitions to remote learning platforms.

Methodology

The present study used a mixed-methods explanatory research design. This explanatory mixed methods design helps to identify *if* the pandemic had an impact on NBCOT test performance through quantitative data, and *how*, through test-taker perspectives. The qualitative component of the present study was approved through the Pace University Institutional Review Board (IRB) and performed in accordance with the principles stated in the Declaration of Helsinki (World Medical Association, 2013). Quantitative data consisted of overall NBCOT exam pass rates for OT programs from areas deemed by the author as highly impacted during the early stages of the COVID-19 pandemic. This data was made up of entry-level master's only OT programs in the following states: New York ($n= 20$), New Jersey ($n= 4$), California ($n= 9$), and Connecticut ($n= 2$). Doctoral programs were excluded from this analysis as there were too few ($n= 3$) from these states to make any meaningful statistical inference.

Passing rates from these states from the years 2019 to 2021 was gathered from publicly available data on the NBCOT.org (2022) website. Passing rates were recorded from the three-year period to represent the following pandemic environment: pre-pandemic (2019), height of pandemic (2020), and 'post-pandemic' (2021). The present author does not intend to minimize the prolonged and on-going impact of the pandemic. Rather, the term 'post-pandemic' is merely being used as a descriptor to mark the period of adjustment following the initial impact of the pandemic on normal educational programming. These pass rates are presented on NBCOT.org (2022) in the form of percentage of test takers who passed the boards exam within one year of graduation, regardless of the number of attempts.

Once the pass rate differences between overall scores prior to, during, and after the pandemic were analyzed, the author gathered qualitative data in the form of a survey which was used to ascertain the perceived impact of the pandemic on preparation for taking the NBCOT exam. The survey was created by the principal investigator, an OT professor specializing in research methodology. It was piloted on two early-stage OTs who graduated prior to the COVID-19 pandemic, and thus did not meet eligibility requirements to participate in the present study. Inclusion criteria required that participants had experienced both academic interruption in the form of a transition to online learning, as well as an attempt at the NBCOT exam between March and December of 2020. The survey consisted of open-ended questions regarding conditions and experiences before COVID-19 and how they believed COVID-19 affected their performance on the NBCOT exam, and transition to online learning. Some questions

were focused on gathering general baseline information and assuring eligibility for participation; while the open-ended questions were designed to explore the students' lived experiences in preparing for the NBCOT exam during the pandemic (see Appendix A).

Surveys were emailed to a convenience sample of students from one metropolitan school in NY who graduated during COVID-19 and took the NBCOT exam. The school, like so many other metropolitan schools, faced challenges through the sudden onset of the pandemic and transition to online learning. The survey was distributed to 20 students, to which fourteen responded. The participants consented to participate by clicking the link to the survey, as described in the introductory email letter.

Data Analysis

Quantitative data was initially analyzed through a one-way repeated measures ANOVA and Friedman's test calculation to determine statistically significant changes in pass rates between 2019-2021. Post-hoc analysis consisted of a paired t-test calculation to determine where the significant changes occurred. The present author set $\alpha = 0.1$, which seemed appropriate for an exploratory study of this type with a fairly small sample size, as a means to reduce the risk of creating a type II error.

The qualitative responses gathered from the survey were coded and themed by the author independently prior to meeting for a debriefing session with a qualitative research expert. The data was coded first and then categorized. In this debriefing session, the emerging categories were analyzed and sorted into themes (Fritz & Lysack, 2020).

Results

Quantitative Findings

Table 1 describes the results of a one-way repeated measures ANOVA and the non-parametric Friedman's test that was calculated comparing the passing rates in three different years: 2019, 2020, and 2021. A statistically significant effect was found both in the ANOVA ($F(3,99) = 2.946, p = .037$) and Friedman's Test ($p = .012$) suggesting scores did change overall for the 2019-2021 period among the OT programs in New York, New Jersey, California and Connecticut collectively.

Table 1*One-Way Repeated Measure ANOVA and Friedman Test for NBCOT Passing Rates*

			ANOVA	Friedman
	M	SD	Sig.	Sig.
Y19	97.41	3.016	.037*	.012*
Y20	95.21	7.036		
Y21	97.44	3.661		

Note. Mean, SD, ANOVA and Friedman Test results for the pass rates for programs between the years of 2019, 2020, and 2021. Both tests were statistically significant at the $\alpha = .05$; 2-tailed.

Table 2 presents a paired-samples t-test that revealed a significant decrease in the passing rates during the 2020 ($M = 95.21$, $SD = 7.032$) year period compared to 2019 ($M = 97.41$, $SD = 3.016$) and 2021 ($M = 97.44$, $SD = 3.661$). Analysis to determine differences between programs in urban and suburban locations showed no effect.

Table 2*Paired T-test and Descriptive Statistics for Comparisons by Year*

		Mean	N	SD	Std. Error Mean	p value (1-tailed)
Pair 1	Y19	97.41	34	3.016	.517	.027*
	Y20	95.21	34	7.036	1.207	
Pair 2	Y20	95.21	34	7.036	1.207	.045*
	Y21	97.44	34	3.661	.628	
Pair 3	Y19	97.41	34	3.016	.517	.483
	Y21	97.44	34	3.661	.628	

Note. * $p < .05$; one-tailed

Qualitative Findings

Qualitative analysis of the open-ended survey responses produced the following three themes: (a) *lack of a structured study environment*, (b) *impact on experiential learning and fieldwork*, and (c) *stress and distractions*.

Lack of a Structured Study Environment

The lack of a structured study environment theme describes how the participants were impacted while studying for the NBCOT exam. Participants described challenges related to the difficulty of studying in public places due to COVID-19 restrictions. In general, the participants felt challenged when it came to finding a distraction-free environment to study. Participant 1 used the following description to express their experience while studying: “Typically I prefer studying in a library for the quiet; study time and visit hours were restricted due to COVID-19...Opportunity for study groups in person was limited.”

One participant noted that in an attempt to overcome the challenge of finding an environment conducive to studying, they resorted to creating study groups over Zoom. They described this process as:

I used the online AOTA study pdfs, NBCOT study guides, and practice exams, and created a daily study schedule incorporating the use of these three sources. Normally I would prefer to go to a library to quietly study or get together with a small group but was not able to due to COVID-19 restrictions. I studied a couple of times with other classmates over Zoom but would have preferred it in person. I normally need a structured environment to study best (a library) and I have a hard time sustaining my attention for long periods studying at home.

The lack of study groups readily available to students was also a commonly reported impact on students’ study routines. Participant one expressed how their normal study routine was altered, “Normally, I would prefer to go to a library to quietly study or get together with a small group but was not able to do so due to COVID-19 restrictions.”

Participants explained how COVID-19 restrictions disrupted their studies and further exacerbated their stress levels. Participant three described, “It definitely created more stress due to extra [distancing] rules and lack of opportunities for study groups.”

Impact on Experiential Learning And Fieldwork

Participants experienced disturbances in their Level II fieldwork that impacted their involvement in hands-on learning as COVID-19 evolved. Participant seven explained, “...it limited a lot of hands-on learning as well as access to various fieldwork settings. Due to COVID restrictions, my fieldwork experience was greatly impacted.”

Participant twelve stated: “I had to change my second fieldwork II placement because the original one wasn’t taking students anymore. I don’t believe that I learned much from the placement I went to.” Participant eleven expressed similar sentiments, stating “The

portion of school [most impacted was] level II fieldwork. It was challenging to transition from in-person to online fieldwork, but I felt prepared have come from a weekend OT program where much of the learning was independent.”

Stress and Distractions

The pandemic created a significant impact on students’ ability to study due to having no libraries to go to and being forced to learn to study in distracting environments, such as at home. As described by participant thirteen, “Being in my own home alone home with everyone was a huge distraction. I tried noise-canceling earphones”. Some participants had to create strict schedules so they would remain focused while they worked from home as described by participant fourteen:

I created a schedule ahead of time and studied for about 14 weeks. I scheduled what I would read that day, podcasts I should listen to, and days to do questions. I always made sure to have at least the weekends off from studying. I usually like to study at a coffee shop or the library but had to study at home and it was difficult at times. I think maybe that’s why I ended up pushing my test further from the original date.

Participant one also described, “I do feel my experience leading up to exam day and during exam day was affected... I experienced challenges with mental health related to isolation due to COVID-19”.

Additionally, participants described the mask wearing requirement during the NBCOT exam as adding to the already stressful and anxiety inducing experience. Participant two stated “I do feel that there was increased anxiety during my test due to having to wear a mask.” Participant three stated:

Having to wear a mask during the exam was an added stress due to the distraction factor of having something novel constantly touching my face and providing pressure on my ears. I practiced at home wearing my mask while taking practice tests to acclimate myself.

Discussion

The author hypothesized that COVID-19 would have a negative effect on NBCOT exam passing rates during the height of the pandemic. A significant effect was found indicating that NBCOT exam pass rates were statistically significantly lower during 2020 when compared to the prior year (2019) and the year following (2021). According to NBCOT score reports (2022), 13 out of 20 New York OT schools experienced a drop in their NBCOT passing rate percentages.

While the direct causal relationship between the pandemic and decreased pass rates might be difficult to ascertain; qualitative data gathered from recent test takers’ perceptions regarding their lived experiences provided a glimpse into this relationship. Qualitative data provided specific examples on how the pandemic created an environment for increased stress-inducing environmental, social, and experiential learning disruptions.

Analysis of these surveys resulted in three emergent themes: (a) lack of a structured study environment, (b) impact on experiential learning and fieldwork, and (c) stress and distractions. In general, these participants described abruptly diminished experiential learning opportunities in the late stages of didactic education, as well as level II fieldwork. These barriers arose due to academic institution limitations of in-person learning environments and apprehensiveness or inability of clinics to accept fieldwork students. Participants also described the disruptions in study routines during both the didactic portion, as well as the NBCOT exam preparation period occurring directly after graduation. Furthermore, the participants described many instances of study challenges relating directly to the change or limited access to effective physical study environments. In other words, students experienced abrupt and unexpected changes to learning routines and new remote education platforms. Thus, these health-related students were deprived of critically important hands-on experiences as they prepared for entry into a healthcare crisis.

These themes are reflected in emerging literature describing the challenges associated with the loss of structure, routine, and face-to-face interaction with peers and instructors that comes with in-person learning (Gaffney et al., 2021). The benefit of in-person learning is that students are able to build relationships with peers and instructors. In-person learning can also benefit the students' academic performance because it typically allows students to ask questions with minimal disruption to the flow of the class (Stone & Springer, 2019).

The decreased engagement resulting from online learning formats, however, can cause students to lose self-motivation (Kara et al., 2019; Kennel & Ward-Smith, 2017). For entry-level nursing students, the shift from in-person to distance learning created a loss of interaction and a sense of isolation. Many students described that they struggled to maintain self-motivation, academic confidence, and build relationships with professors (Gaffney et al., 2021). When students have little interaction with classmates and instructors, the risk of failure is greater due to decreased motivation (Gaffney et al., 2021).

Not only does a lack of interaction affect students' performance in their education, but other obstacles that impede their learning are their tools such as computers, laptops, and internet connection. Students often face difficulties such as slow internet connection, slow computers, and distractions which can affect their education. Furthermore, remote learning caused students to have difficulty in time management due to home comforts and discomforts. The distractions at home and lack of time management, inhibited students' ability to properly grasp the material being taught. As the transition occurred, many students had to adjust to the new learning styles, because the remote platform teaching methods often did not align with student preferred learning styles. This problem was exacerbated by the rapidity of the transition, which made it very difficult for students to adapt to the change (Gaffney et al., 2021). Furthermore, these drastic changes can negatively affect students' mental health.

At Texas A&M a cross-sectional survey of 2,031 students was conducted where most participants reported that their stress and anxiety levels had increased during the pandemic, and it affected them from being able to perform at their optimum level (Wang et al., 2020). Beltekin and Kuyulu (2020) sent out surveys to 594 students from private and public universities to explore their feelings in regard to the transition to online learning. The results showed that students did not favor online classes and they would not recommend them going forward (Beltekin & Kuyulu, 2020).

Overwhelmingly, the literature and the present study results suggest academic performance was negatively impacted by sudden changes to remote learning, but a few opposing viewpoints suggest these platforms do provide some benefits and convenience. According to Gaffney et al. (2021), nursing students expressed they felt confident in their ability to be successful in their academic nursing program and in their ability to learn the skills needed to provide safe, high-quality nursing care during the transition from in-person to online classes. Several themes regarding confidence levels in online learning emerged from various studies that targeted attitudes towards online learning. These themes describe online learning as effective and convenient (Escalon et al., 2020; Langegard et al., 2021).

Overall, the literature and present study findings describe the challenges associated with transitions to remote learning platforms in the face of natural disasters/pandemics, highlighting the need for more seamless transitions to remote learning platforms, as well as a confidence-inspiring return to in-person formats. Thus, there is a need for institutions to better understand and strengthen their support for the students, educators, and the learning process during periods of crisis, particularly in healthcare education.

Limitations

A relatively small sample size of 14 participants from one OT program completing the qualitative survey is a limitation of this study. Furthermore, these surveyed participants were residents from only two of the states under investigation (NY and NJ). This limits the generalizability of qualitative findings. Methods for trustworthiness beyond the independent coding and peer debriefing processes were limited. Furthermore, an analysis including other states, both quantitatively and qualitatively could have provided a baseline for comparison and context and is being considered by the present author for further investigation.

Implications for Occupational Therapy Education

Natural disasters and pandemics, such as COVID-19 have significant impacts on the routines of OT students as they prepare for the NBCOT exam and entry-level practice. This problem is accentuated by the disparity that essential front-line healthcare providers are most needed during these troubled times, yet their level of academic preparation is most jeopardized or at times even delayed due to disruptions in the continuity of academic programming (Compton et al., 2020). It appears that academic institutions should be prepared for future events so that students may be provided

sufficient experiential learning opportunities and environmental support toward promotion of successful program completion and NBCOT examination. In other words, academic institutions should be better prepared to manage abrupt routines in learning so as to maintain the readiness of OT graduate as entry-level practitioners.

Conclusion

The COVID-19 pandemic changed the academic learning environment, as it led institutions to implement remote learning methodologies, particularly in the states most impacted by rising infection cases. Students were forced to adapt quickly as new rules, regulations, and remote learning platforms were put into place. This transition was particularly impactful for healthcare related education which is heavily dependent on experiential and hands-on learning opportunities.

The present study sought to explore *if* the pandemic had an impact on NBCOT exam pass rates for OT graduates and if so, *how*, through an open-ended questionnaire survey. The results suggest that NBCOT pass rates significantly decreased for the year 2020 during the height of the pandemic among highly impacted states. Qualitative data describes themes in which study/learning environments and routines were disrupted.

NBCOT exam pass rates appear to have returned to pre-pandemic levels as measured by the 2021 scores, suggesting the academic and student populations have reached an adjustment period resembling a level of 'normalcy'. However, these results indicate the importance of institutional preparedness in the event of future natural disasters, which is when well-prepared healthcare-related entry-level practitioners are most needed.

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Appendix A

Post OT Graduate Survey on Student Performance on the NBCOT Exam

Instructions: Read the following questions and answer.

1. How old were you when you took the NBCOT exam?
2. When did you graduate?
 - a. 2018
 - b. 2019
 - c. 2020
 - d. 2021
3. Were you able to access the NBCOT testing centers?
4. Did you pass the NBCOT exam?
5. How many attempts did it take to pass the exam?
6. What were the studying strategies used to prepare you for the NBCOT exam and how were those strategies impacted by COVID-19?
7. Describe the difficulties of your transition from in-person learning to online learning?
8. Do you believe that COVID-19 impacted your performance/learning in the OT program, why or why not?
9. Do you believe that COVID-19 impacted your performance on the board exam, why or why not?
10. Did COVID-19 create more stress in regard to taking the NBCOT exam, if so, how did you cope with it?