



Contents lists available at ScienceDirect

Exploratory Research in Clinical and Social Pharmacy

journal homepage: www.elsevier.com/locate/rcsop

Impact of COVID-19 on graduating U.S. pharmacy students in the early epicenter of the pandemic in New York City



Rim Elbeshbeshy, Suzanna Gim*, Elaena Quattrocchi

LIU Pharmacy (Arnold & Marie Schwartz College of Pharmacy and Health Sciences), United States of America

ARTICLE INFO

Article history:

Received 24 March 2021

Received in revised form 10 October 2021

Accepted 20 October 2021

Keywords:

COVID-19

Student

Well-being

Resilience

Advocacy

ABSTRACT

Objective: To describe the self-reported impact of the COVID-19 pandemic among final year student pharmacists enrolled in a Doctor of Pharmacy program in New York City during the first peak of the outbreak March through May 2020.

Methods: A required senior seminar course for graduating student pharmacists served as a conduit for faculty led monitoring of the wellbeing of the cohort through three data sources: 1) polling data regarding stress factors during a COVID-19 informational session (March 2020), 2) survey data from a 12-item COVID-19 Impact Survey developed and administered electronically in May 2020 and 3) qualitative data from reflection papers mentioning COVID-19. Descriptive statistics, bivariate analysis and thematic analysis were used to summarize data.

Results: In March, almost half of respondents (total = 185) reported high personal (47.6%) and school related stress (42.1%). Most students were participating in advanced pharmacy practice experiences (80%) and working in a pharmacy (80%). Survey data ($n = 96$) revealed the majority of participants perceived negative impact on their future career (69%) and reported concern for people close to them with suspected and confirmed COVID-19. One-third of participants reported knowing someone who died from COVID-19 and 8% were self-confirmed COVID-19 positive. Themes emerging from the reflection papers included: changed perspective, gained experience as a pharmacist during a pandemic, concern for loved ones, and positive outlook.

Conclusion: The COVID-19 pandemic had a significant impact on the wellbeing of a cohort of graduating student pharmacists in New York during the initial peaks of the spread in the United States. The results reinforce a need for student support during emergency situations, especially during the final year.

1. Introduction

The COVID-19 pandemic has taken over the world with over 215 million infections, and the highest number of deaths in the United States (over 637,000).¹ New York City (NYC) was most acutely affected in March 2020 resulting in city lockdown of nonessential businesses, reduced use and availability of mass transit and mandated social distancing. As the rest of the city shutdown and fear of exposure to COVID-19 at hospitals grew, pharmacies became as essential as grocery stores in the community. Pharmacy supplies quickly drained as pharmacists continued to serve as the most accessible healthcare provider. Most training programs for health workers in hospitals were discontinued, halted indefinitely or redirected due to pandemic related safety precautions and limited personal protective equipment.² Most educational institutions transitioned exclusively to on-line or remote instruction only.³⁻⁶

As the outbreak spread while precautions were slowly being enforced, the wellbeing of final year student pharmacists participating in advanced pharmacy practice experiences (APPEs) required for graduation, became

a concern.^{7,8} In response to the situation, the Accreditation Council for Pharmacy Education (ACPE) allowed adjustments in program criteria to meet APPE requirements for this cohort (e.g. hours, experiences), however even with these adjustments, many students still required additional practice hours during the outbreak in order to complete the Doctor of Pharmacy program as scheduled.⁹

The purpose of this mixed method study is to describe the impact of COVID-19 on the general wellbeing of a cohort of final year student pharmacists during the early epicenter of the pandemic in the U.S.

2. Methods

A required senior seminar course served as a conduit for monitoring overall stress on the cohort of graduating student pharmacists through three data sources collected during March to May 2020: 1) survey data, 2) polling data from a COVID-19 informational session, and 3) COVID-19 themed reflection papers. A 12-item online COVID-19 Impact Survey was developed by course faculty and administered electronically from April

* Corresponding author at: LIU Pharmacy (Arnold & Marie Schwartz College of Pharmacy and Health Sciences), 75 Dekalb Ave, Brooklyn, NY 11201, United States of America.
E-mail addresses: rim.elbeshbeshy@liu.edu (R. Elbeshbeshy), suzanna.gim@liu.edu (S. Gim), elaena.quattrocchi@liu.edu (E. Quattrocchi).

28 to May 16, 2020. The survey items were reviewed by two faculty and students for face validity. The survey recorded self-reported wellbeing, potential stress factors and coping mechanisms used.

Polling data regarding stress factors and COVID-19 knowledge were collected via Zoom (video teleconferencing platform) before and after a COVID-19 informational session developed and presented by course faculty on March 31, 2020 during the peak of the pandemic in New York. The informational session included prevention, testing, progression of disease and management including investigational treatments.

A reflection paper regarding practice experiences during the final year was a required assignment for the course. Personal reflections related to COVID-19 was added as an optional topic for the assignment. Since journals are often beneficial for stressful situations, keeping a personal journal was suggested to students as part of this assignment. This activity was intended to provide an open-ended platform for valuable insight by self-selected participants most affected by the pandemic. Reflections submitted including the keyword COVID-19 and substantial discussion of the pandemic effects on personal experiences were included. Reflections that mentioned COVID-19 without elaboration were excluded. All reflection submissions were reviewed through SafeAssign™, a plagiarism prevention tool.

De-identified data were collected via Google Forms and Zoom polling and analyzed with IBM SPSS Statistics, Version 26.0 (Armonk, NY). No personal identifiers were linked to survey results to ensure privacy. Data were password protected and maintained by the investigators. Descriptive statistics were used to evaluate quantitative data. Wilcoxon signed rank tests were used to analyze associations between stress factors and levels. Qualitative analysis was used to identify emerging themes in the reflection papers. Thematic analysis was conducted by two authors RE and EQ, as part of creation of the themes and in evaluation of the themes using inductive reasoning. The data was first reviewed by a student author to identify predominant themes using key words and phrases, followed by independent review by the faculty author to validate themes and expand or add as relevant. Any disagreements were further reviewed by the third author.

The study was approved by the Long Island University Institutional Review Board.

3. Results

The study cohort included final year student pharmacists enrolled at one College of Pharmacy in Brooklyn, New York ($n = 190$) scheduled to graduate in 2020. One hundred eighty-five student pharmacists attended the informational session and participated in the polling data. Ninety-six student pharmacists completed the voluntary COVID-19 impact survey and 77 student pharmacists submitted reflection papers with COVID-19 themes.

Reported personal, school and career related stress factors are presented in Tables 1 & 2. Students reported high personal (Very/Most Stressed = 47.6%) and school related stress (Very/Most Stressed = 42.1%) at the time of the informational session, which appeared to decrease as a measure of overall stress after the session (Very/Most Stressed = 25.6%). Additionally, the senior seminar polling data (pre = 185 participants; post = 168 participants) revealed a significant increase in perceived COVID-19 knowledge (5-point Likert scale, mean 2.93 vs 3.26, $p < .001$) implying knowledge gained from the informational session may have contributed to the observed decrease in overall stress.

Survey participants most commonly reported feeling anxious, sad, and overwhelmed throughout the pandemic (Table 2). The most common factors contributing to stress were potential for delayed licensing and future employment. At the peak of the outbreak in New York, the majority of students were participating in APPEs (80%), commuting to APPE sites (57.3%) and working in a pharmacy (79%). The majority of survey participants reported knowing someone close with suspected (79.2%) or confirmed (63.5%) COVID-19. One third of survey participants reported knowing someone close who died from COVID-19 and 8% were self-confirmed COVID-19 positive. Although the majority of students reported stress related to all these factors, students also reported feeling proud overall

Table 1

Pre and Post Polling Data from the COVID-19 Informational Session (March 31, 2020).

Polling Items	N (%)
Personal (family, etc) stress rating before session ($n = 185$)	
Not stressed at all	13 (7.0)
Not stressed more than usual/ Neutral	18 (9.7)
Somewhat stressed more than usual	66 (35.7)
Very stressed compared to usual	56 (30.3)
Most stressed I have ever been	32 (17.3)
School related stress rating before session ($n = 185$)	
Not stressed at all	14 (7.6)
Not stressed more than usual/ Neutral	26 (14.1)
Somewhat stressed more than usual	67 (36.2)
Very stressed compared to usual	38 (20.5)
Most stressed I have ever been	40 (21.6)
Overall stress rating after session ($n = 168$)	
Not stressed at all	8 (4.8)
Not stressed more than usual/ Neutral	31 (18.4)
Somewhat stressed more than usual	86 (51.2)
Very stressed compared to usual	35 (20.8)
Most stressed I have ever been	8 (4.8)
Currently working in a pharmacy ($n = 185$)	146 (78.9)
Community	86 (46.5)
Hospital	47 (25.4)
Both	13 (7.0)

(22.9%) and while traveling to APPE sites (16.7%). The most common reported coping mechanisms included music, interacting with friends/ family, cooking and watching movies, television or YouTube (Table 2).

Four main themes emerged from the COVID-19 pandemic related reflection papers ($n = 77$): “changed perspective,” “experience as a pharmacist during a pandemic,” “concern for loved ones,” and “positive outlook.” Students expressed changed perspective related to varying aspects of the pandemic effects on their lives especially while they were working in the pharmacy.

“Going to work is like going to a war. Perhaps it would be worse than the war.” – Participant A. “I understand our job in the pharmacy is very essential and patients will need their medications but working does give me some fear and even a small amount of anxiety I didn't have before.” – Participant B.

Over half of the reflection papers mentioned that the COVID-19 outbreak provided valuable experience as a pharmacist during a pandemic. The following excerpts describe student insights related to the profession:

“Throughout this outbreak I learned how unpredictable and challenging our career as pharmacists can be. Also, how flexible and open minded we have to be in order to accommodate to changing environment and regulations. I believe that going through these various rotations during the current outbreak has definitely prepared me for future practice as a pharmacist.” – Participant C.

“It has shown that the profession of pharmacy still serves as a health care profession on the front lines of giving expert advice when physicians are not around.” – Participant D.

Most participants reported positive perceptions, however Participant E stated,

“It breaks my heart that after all we have been through to get our PharmD's, us dealing with sick COVID-19 patients without ANY proper PPE whatsoever, barely making above minimum wage (technicians and interns) ... that we still aren't seen as important.”

Specific triggers for heightened fear and anxiety students endured during this time such as work-related exposure and racism were projected through the theme of “concern for loved ones”:

Table 2
COVID-19 Impact Survey Response Summary (n = 96).

Survey Items	Respondents (%)
How have you been feeling throughout this pandemic?*	
Anxious	66 (68.8)
Sad	52 (54.2)
Overwhelmed	47 (49)
Challenged	44 (45.8)
Scared	39 (40.6)
Isolated	34 (35.4)
Angry	30 (31.3)
Valuable	28 (29.2)
Proud	22 (22.9)
Denial	8 (8.3)
Indifferent/ Fine	4 (4.2)
Independent	2 (2.1)
Factors that have contributed to your stress:*	
Potential for delayed licensing	66 (68.8)
Future employment	58 (60.4)
Family	56 (58.3)
Current work	49 (51.0)
School	48 (50.0)
Financial	36 (37.5)
Friend/Family confirmed COVID-19 +	35 (36.5)
Friend/Family suspected COVID-19 +	26 (27.1)
Friend/Family with COVID-19 related death	16 (16.7)
You were suspected COVID-19 +	16 (16.7)
You were confirmed COVID-19 +	8 (8.4)
Number of people close to you with suspected COVID-19	
M (SD), (Range)	2.4 (1.9), (0,20)
None (0)	21 (21.9)
Number of people close to you with confirmed COVID-19	
M (SD), (Range)	1.9 (2.2), (0,10)
None (0)	35 (36.5)
Number of people close to you who died from COVID-19	
M (SD), (Range)	0.5 (0.1), (0, 6)
None (0)	66 (68.8)
Coping methods:*	
Playing/ Listening to music	51 (53.1)
Calls/ Virtual meetings	49 (51.0)
Cooking at home	40 (41.7)
Watching movies/ TV/ YouTube	37 (38.5)
Hobbies	30 (31.3)
Reading books	26 (27.1)
Going on walks/ Working out	19 (19.8)
Keeping a journal	7 (7.3)
Nothing is working	3 (3.1)
How did you feel going to the APPE site during the stay-at-home order? (n = 56)	
Anxious	29 (51.8)
Fearful	24 (42.9)
Not protected/ Exposed	16 (28.6)
Proud to be part of the frontline	16 (28.6)
Protected	9 (16.1)

* Multiple responses allowed.

“Everyone in my household is considered an essential worker, so tension was high the first two weeks after the mandatory quarantine. I don't remember ever seeing my parents genuinely scared until COVID-19. Everyday my parents came home from work with news about people that work for their company that were diagnosed with the virus or died from the virus.” – *Participant F*.

“I am also aware of the racism and verbal abuse Asians in general have been dealing with lately and it hurts me to think that anyone in my family may be faced with this and I may not be there to protect them.” – *Participant G*.

The theme of “financial strain” was often an additional code rather than stand alone. As one participant stated,

“If I could afford it, I would stay at a hotel or an Airbnb, for as long as it took to keep my parents safe and healthy. There would be no need to borrow their car, I would stay close enough to work and walk, or as a pharmacist would be able to afford my own car. Instead, I am faced with

dealing with the situation as best I can, while fulfilling my duties to the public's health, and my parents.” – *Participant H*.

Although there was an overall tone of tragedy and despair in the reflections, a “positive outlook” of hope and strength also emerged from several students.

“All we can do is face it and go do what we promised we would do as essential healthcare providers. If anything, our experiences will make us even better than we were expected to be.” – *Participant I*.

One participant found hope in lessons learned through negative outcomes during the pandemic.

“Even though I have lost my second job working in hospitality industry (my main source of income throughout college), I knew I can last for the next couple of months. However, a lot of people who have lost their jobs didn't have any savings and were not ready to embrace this reality. I hope this pandemic will teach people to be prepared for any ‘surprises’ life can throw into them emotionally and financially.” – *Participant J*.

One additional noteworthy emerging theme was related to challenges of home life affecting students' ability to focus on adjusting to new remote formats of rotations.

“While dealing with my rotation, I also had to figure out how to help my two younger sisters with online learning since their schools shut-down due to the pandemic. This was a struggle for me since I had to still try to learn Zoom and how [to] complete my rotation remotely.” – *Participant K*.

“I believe COVID-19 did have somewhat of an effect on my rotation, but not to the same extent that it has affected my family/social life and work life.” – *Participant L*.

In contrast Participant M mentioned, “APPEs with zoom is very exhausting. Feeling less motivated and procrastinate a lot.” Selected excerpts which further illustrate the breadth of the presented themes are provided in [Table 3](#).

4. Discussion

Triangulation of the self-reported emotional state of the cohort in March during the informational session, perceived emotions and stressors during the overall timeframe collected at the end of the semester through survey data and COVID-19 themed reflection papers submitted in April, allowed for more rich analysis of student wellbeing during the March 2020 outbreak. According to Gallup, the five essential elements of wellbeing include a sense of purpose, financial, social, community and physical wellbeing.¹⁰ We were able to describe the impact of the COVID-19 outbreak in NYC on four of the elements through our study cohort (physical wellbeing was not measured due to challenges associated with collecting this data). Three main stressors affected our study cohort: 1) personal (concern for self, family and friends); 2) professional (completing requirements to obtain degree, licensure, post-graduate training) and 3) financial (need for financial support leading to risks associated with continuing to work during the pandemic).

The unknown behavior of SARS-COV2 during the study timeframe threatened to spread lethality at any time in any location without discrimination. Unpredictable and uncontrollable life events such as sudden job loss, unexpected family responsibilities and bereavement occurred at any given moment during this timeframe and were hypothesized to compound stress on this cohort. As reported by study participants, usual social support structures such as family and friends were challenged by isolating lockdowns and concern for harming loved ones due to their own potential infectivity to others associated with the pharmacy profession. The critical shortage of PPE and preservation of COVID-19 testing for hospitalized patients left community pharmacies and working interns vulnerable.¹¹ The lack of open testing centers nearby to schedule licensing exams as

Table 3
Additional Selected Excerpts from Reflection Papers By Coded Theme From Qualitative Analysis.

Theme	Selected Excerpts*
Changed perspective	<p>It's sad to come to work and see refrigerated trucks outside the hospitals for the storage of dead bodies. I panic anytime I cough or sneeze</p> <p>I'm saddened that it took our country so long to respond appropriately. You would expect that America would be prepared for something like this. Unfortunately, we weren't and it caused thousands of lives. On the other hand, these times showed how amazing Americans can be. I've seen so many beautiful humanitarian acts due to coronavirus. I salute those who still went out to their jobs and risked their lives to save others.</p> <p>As a student we tend to count the days until rotations are over, or we say we wish we didn't have to go into the hospital today, or we wish we didn't have to wake up early for rounds. But when the time came and we were told to stay home, all I wished was that things can go back to normal and that I can attend rotations again. I couldn't wait for my alarm to ring at 6 AM to get ready and make it in time for early morning rounds.</p>
Experience as a pharmacist during a pandemic	<p>Customers who would visit the pharmacy would hoard a lot of supplies and ask a lot of questions to which I did not know any answers to which made me curious and learn more about the virus. Looking back at it now, I understand that they were all just anxious and panicking just like how my own family felt.</p> <p>We, in this situation, have become not just experts on pharmacology, but also counselors in times of stress and need.</p> <p>It definitely prepared me for the real world we are going into and how patients will be leaning on us in situations like this for advice and care and counting on us to let them know which medications they should take, what they're for, what side effects they may have as well as calming them down and helping them realize it will pass and give them tips on how to stay safe through it all.</p> <p>Despite how others might feel about students being on rotations during this pandemic, I am actually quite thankful to have worked during such a rough time. It taught me essential skills such as prioritizing my duties, multitasking, and appeasing patients who were especially anxious.</p>
Concern for loved ones	<p>It was hard not being able to leave the house for the first time because I was worried I would put my parents and siblings at risk of possible infection.</p> <p>In terms of family and social life, I have chosen to extend my apartment lease by several months in order to have a place to stay during the pandemic. As a health care professional with patient interaction, I fear transmitting COVID-19 to my elderly parents, so finding a place to stay by myself while working was vital to me.</p>
Positive outlook	<p>I find myself tired at the end of a hard days work. I continue to find it being a rewarding, enthralling experience of the battlefield knowing that I may lose my life doing what I love and serving a country for which I pledge my allegiance towards.</p> <p>COVID-19 has taken a great deal away from people everywhere and changed how we live our day to day lives. What it did not take away was my excitement for my impending career.</p> <p>Although, this disease has impacted us negatively I feel like I have connected and spend more time with family. I learned new things about each person in my household.</p>

* All excerpts are from independent participants and do not overlap with excerpts presented in the Results.

well as travel restrictions, proposed new stressors for meeting requirements for competitive employment, residencies and fellowships for this cohort, as reported in the survey data. Lastly, this cohort was unable to celebrate the life achievement of graduation, after several postponements due to the lack of recommendations regarding in-person live events during the pandemic.

Almost a quarter to one third of survey respondents reported feeling valuable and proud. The positive outcome of perceived invaluable professional experience from this was also expressed through the data collected by students in the reflective essays. This highlighted the adaptability and resiliency of the cohort and the profession during this unprecedented time. The open nature of the reflection paper assignment provided a platform for students to express freely any experiences related to the pandemic which allowed for more exploratory analysis.

Most concerning is the students who reported "nothing is working" for the coping item in the impact survey. Due to the anonymous nature of the survey, we were unable to follow up with those students. The Dean of Students continued to offer regular emails for support and resources regarding wellness, the importance of mental health and knowing when and where to seek help. As mentioned in the commentary by Brazeau and colleagues, it is the responsibility of every educational institution to provide, support, and prevent any negative outcomes due to the pandemic to the best of their ability.¹² This would require regular monitoring and checking in with students.¹³ As hypothesized by the authors, the majority of the cohort reported friends and family with suspected/ confirmed COVID-19 as well as COVID-19 deaths and self-reported infection rates were likely underreported as during this timeframe testing was not readily accessible. It may be of value for administrators, staff and faculty to become familiar with trauma informed practice, a framework that involves understanding, recognizing, and responding to the effects of all types of trauma.¹⁴⁻¹⁶ As our experience with offering the information session during the required course demonstrated, providing a timely educational session regarding COVID-19 prevention, management and treatment helped decrease overall stress and provided additional support especially in the face of mass misinformation.

4.1. Limitations

The limitations of this study are related to the survey instruments used as items may not have been all inclusive and although efforts were made for validation, clinical instruments such as the Generalized Anxiety Disorder Scale were not used in an effort to keep the questionnaire brief and general to increase response rate. Due to the unprecedented nature of the situation, most data collection was exploratory. Response rate was dependent on timing and situational constraints of participants. Residents of the NYC area were experiencing frequent interruptions in internet connectivity during the time of survey administration and many students may have been distracted due to personal responsibilities (e.g. working, family).

This research summarized perceived stresses on graduating students which continued to compound without any foreseeable resolutions up to completion of the professional program. Proactively supporting the wellbeing of students should be incorporated as an integral part of planning during such emergent situations.¹³

5. Conclusion

The COVID-19 pandemic had a significant impact on the lives of student pharmacists in one Doctor of Pharmacy program. Management of the impact of acute COVID-19 outbreaks on the wellbeing of student pharmacists across the globe may provide insight into best practices for providing support for student pharmacists during such situations.

Financial disclosure

None.

Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

References

1. COVID-19 Dashboard by the Center for Systems Science and Engineering (CSSE) at Johns Hopkins University. Johns Hopkins University Coronavirus Resource Center website. 2021. Updated January 11. Accessed January 11, 2021. <https://coronavirus.jhu.edu/map.html>.
2. Rose S. Medical student education in the time of COVID-19. *J Am Med Assoc* 2020;323(21):2131–2132.
3. Lyons KM, Christopoulos A, Brock TP. Sustainable pharmacy education in the time of COVID-19. *Am J Pharm Educ* 2020;84(6).
4. Draugalis JR, Johnson EJ, Urice DR. Challenges and lessons amid the COVID-19 pandemic at one college of pharmacy. *Am J Pharm Educ* 2020;84(6).
5. Tofade T, Daftary MN. Managing college operations during the coronavirus outbreak. *J Am Pharm Assoc* 2003;60(3):525–526. 2020.
6. Romanelli F, Rhoney DH, Black EP, Conway J, Kennedy DR. Pharmacy education crosses the rubicon. *Am J Pharm Educ* 2020;84(6).
7. Stone JK, Pate AN. The impact of COVID-19 through the eyes of a fourth-year pharmacy student. *Am J Pharm Educ* 2020;84(6).
8. Fuller KA, Heldenbrand SD, Smith MD, Malcom DR. A paradigm shift in US experiential pharmacy education accelerated by the COVID-19 pandemic. *Am J Pharm Educ* 2020;84(6).
9. Engle JP. Assuring quality in pharmacy education during a time of crisis. *Am J Pharm Educ* 2020;84(6).
10. Gallup. The five essential elements of well-being. Accessed August 25: <https://www.gallup.com/workplace/237020/five-essential-elements.aspx> 2021.
11. NYC Department of Health and Mental Hygiene. 2020 Advisory #8: COVID-19 update for New York City. Published March 20. Accessed August 25, 2021: <https://www1.nyc.gov/assets/doh/downloads/pdf/han/advisory/2020/covid-19-03202020.pdf> 2020.
12. Brazeau GA, Frenzel JE, Prescott WA. Facilitating wellbeing in a turbulent time. *Am J Pharm Educ* 2020;84(6). <https://doi.org/10.5688/ajpe8154>.
13. Schlesselman LS, Cain J, DiVall M. Improving and restoring the well-being and resilience of pharmacy students during a pandemic. *Am J Pharm Educ* 2020;84(6).
14. Bair-Merritt MH. Five steps to a trauma-informed practice. *Contemp Pediatr* 2015;32(8):11–12.
15. Cannon LM, Coolidge EM, LeGierse J, et al. Trauma-informed education: creating and pilot testing a nursing curriculum on trauma-informed care. *Nurse Educ Today* 2020;85:104256.
16. Shalka TR. Toward a trauma-informed practice: what educators need to know. *About Campus* 2015;20(5):21–27.