
ORIGINAL ARTICLE

Dietetics Students' Perceptions of Academic and Health Impacts of the COVID-19 Pandemic

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This study examined dietetics students' perceptions of coronavirus disease-2019 (COVID-19) pandemic impacts on academics and mental and physical health. Data were collected via a cross-sectional online survey in February to March 2021 from undergraduate dietetics students across the United States. Among the 526 students who participated, during the fall 2020 semester, 87% experienced increased stress, 64% reported mental health concerns, and 32% reported disordered eating. Sixty-two percent agreed their program met educational needs; however, 62% also agreed COVID-19 negatively impacted the quality of education and 49% agreed to learning less than normal. Pandemic impacts are critical to consider as students enter dietetic internships and start careers. **Key words:** *coordinated program in dietetics (CPD), COVID-19, didactic program in dietetics (DPD), dietetics, education, online learning, registered dietitian nutritionist (RDN), students, undergraduate, university*

THE FIRST CASE of the novel coronavirus 2019 (COVID-19) was reported in the United States in January 2020, prompting the implementation of unprecedented public health measures by March 2020.^{1,2} Colleges and universities closed campuses, transitioning to online and remote learning environments, displacing students mid-semester.³ While many online undergraduate and graduate programs existed before

the pandemic, the transition of in-person courses to remote delivery was rapid and unexpected for university students, staff, faculty, and administration. Combined with the stress of a global pandemic, implementation of social distancing, mask wearing, quarantining, and self-isolation, students were affected across disciplines.^{3,4} There is now strong evidence that the pandemic affected college and university students' academic performance; mental health including anxiety, stress, and depression; food security; and even physical health including increased problematic eating behaviors and eating disorders.⁵⁻¹³

Health professions students such as nursing, physical therapy, premedical and medical, and dental students have been particularly affected.¹⁴⁻²⁰ Education and training programs for health professions students often include clinical rotations, internships, and shadowing requirements in hospitals, long-term care facilities, and community settings.

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These training experiences are necessary to build students' confidence and develop competent clinicians; however, many in-person educational experiences were suspended in spring and fall 2020. The combination of an unexpected transition to remote learning, the overwhelm of the health care system, and the general stress of the pandemic impacted health professions students' academic experiences and mental and physical health.¹⁴⁻¹⁸

Like other health professions, nutrition and dietetics students may have also been affected by the COVID-19 pandemic. In the United States, undergraduate training programs, including didactic programs in dietetics (DPD) and coordinated programs in dietetics (CPD), prepare students to pursue credentialing as registered dietitian nutritionists (RDNs). DPDs prepare students to apply for dietetic internships/supervised practice programs while CPDs include both undergraduate coursework and supervised practice requirements. DPD and CPD programs often include active learning; patient simulations and experiential learning; and interdisciplinary education with peers, patients, and students from other health professions.²¹⁻²³ Many of these learning experiences are difficult to implement online, and may even be difficult to implement in-person with social distancing, masking, and other necessary safety measures.²⁴

Despite challenges, colleges and universities across the United States have continued to offer coursework and activities necessary to meet competencies for DPD and CPD students required by the Accreditation Council for Education in Nutrition and Dietetics (ACEND).²⁵ It is possible, however, that dietetics students' academic experiences have been impacted, particularly those who did not anticipate online learning. One study reported challenges placing dietetics students at rotation sites in Australia,²⁶ while another reported the shift to digital teaching was challenging for public health nutrition students in Norway.⁴ In addition to educational impacts, the pandemic may have exacerbated

the high degrees of anxiety, stress, depression, and eating disorders reported among dietetics students before the pandemic.^{27,28} Overall, there is a lack of research on pandemic effects on educational experiences and health among nutrition and dietetics students in the United States specifically.

Thus, the aim of this cross-sectional survey study was to examine dietetics students' perceptions of the COVID-19 pandemic impacts on academic experiences, stress, mental health, physical activity, and disordered eating, nearly 1 year after the implementation of COVID-19 public health measures.

METHODS

A cross-sectional online survey study was conducted in February to March 2021 to assess DPD and CPD students' perceptions of COVID-19 impacts on academic and mental health-related outcomes. Students answered questions about effects since the start of the pandemic, and specific effects experienced during the fall 2020 semester, as many universities continued to offer predominantly remote/online coursework.

Participants and recruitment

The study was approved by the University of New Mexico Office of the Institutional Review Board. Inclusion criteria were at least 18 years of age and enrolled in a DPD or CPD program in the United States in fall 2020 and at the time of the survey, in spring 2021. Participants were recruited for 4 weeks from February to March 2021. A recruitment email was distributed to all DPD and CPD Directors listed on ACEND's website in February 2021 (n = 255). Directors were asked to forward the recruitment email to their current DPD and/or CPD students. The recruitment email included a link to the survey in Opinio, an online survey platform. Two reminder emails were sent during the 4-week survey period, except to Directors who had already responded that they forwarded the recruitment

email to students or who declined to provide study information to students.

After clicking on the survey link in the recruitment email, participants were directed to the study's consent form. Participants provided consent by starting the survey. No identifying information was collected except for email addresses, which students could choose to provide at the end of the survey to enter a drawing for a \$25 gift card incentive. Twenty-five email addresses were randomly selected to receive \$25 electronic gift cards after data were collected. Email addresses were stored separately from survey responses and were deleted immediately after gift cards were sent.

Data collection

The survey instrument was developed by the research team and piloted with a group of 7 dietetic interns in January 2021. Content validation and face validation were not conducted prior to distributing the survey. The final survey included 3 screening questions assessing the potential participant's age and confirming current enrollment in a DPD or CPD program, and enrollment in a DPD or CPD program in fall 2020. The survey then included demographic questions assessing age, gender, race/ethnicity, state in which their DPD/CPD program was located, current standing in program, and current GPA and GPA before the COVID-19 pandemic (prior to spring 2020).

Participants indicated if they had experienced any of the following due to the COVID-19 pandemic: changed major to nutrition/dietetics, considered changing major from nutrition/dietetics, or delayed program completion/graduation. Next, participants were asked to indicate any academic and mental health-related impacts they experienced during the fall 2020 semester due to the COVID-19 pandemic: failed a course, dropped a course, earned a lower grade in a course than expected, took fewer credits, took no credits, took remote/online coursework, moved out of college housing, experienced increased stress, experienced

disordered eating, experienced other mental health concerns (anxiety, depression, post-traumatic stress disorder, etc), decreased physical activity level, or lost a job or had a reduction in income. Disordered eating was not defined in the survey.

Finally, participants responded to statements using a Likert scale (1 = strongly disagree to 5 = strongly agree) examining a number of positive and negative general impacts of the pandemic (eg, COVID-19 has negatively impacted the quality of my DPD/CPD education and my CPD/DPD program met my educational needs in fall 2020). Participants indicated what percentage of coursework (0%-100%) they completed online/remotely during the fall 2020 semester by dividing courses/credits completed remotely/online by total courses/credits completed. Finally, participants indicated which course delivery method they currently prefer (completely in-person, hybrid—mix of in-person and online/remote, or completely online/remote).

Data analysis

The number of students who received the recruitment email from DPD or CPD Directors was not recorded; however, 681 students started the survey. Of those, 61 (9.0%) were excluded based on answers to screening questions, 82 (12.0%) were excluded for incomplete responses (defined as not answering at least one question assessing pandemic impacts on academics or health), 6 (0.9%) were excluded for providing invalid responses, and 6 (0.9%) were excluded for indicating they were not enrolled in any credits in fall 2020 while taking the survey. Thus, 526 (77.2%) were included in the final analytic sample. All analyses were performed using Statistical Analysis Software (SAS; version 9.4; SAS Institute, Cary, North Carolina).

Demographic data were presented descriptively. Age was examined continuously (mean, SD) and categorized into 18 to 21 years reflecting the age of a typical undergraduate college student and 22 years and older. Gender was collapsed into 3 categories:

female, male, and gender fluid since no participants selected the survey options of nonbinary or other gender. Race/ethnicity was also collapsed into 5 categories due to the small number of respondents from certain racial and ethnic groups: African American or Black, Asian, Hispanic/Latinx, White, or other or more than one race/ethnicity. Responses to statements assessed via a Likert scale were collapsed into 3 categories: disagree (strongly disagree and disagree), neutral, and agree (strongly agree and agree). Questions addressing pandemic impacts on academic experiences and health were presented as frequency (n) and percentage, reflecting the number of students who reported experiencing each impact.

RESULTS

In this sample of 526 DPD and CPD students, the average age of participants was 24.2 years and the majority were 22 years and older. Shown in Table 1, the majority were female, identified as White, and were currently seniors. The sample included respondents from 33 states; however, the top 5 states included Illinois (n = 58, 11.0%), Utah (n = 57, 10.8%), Indiana (n = 52, 9.9%), Michigan (n = 40, 7.6%), and California (n = 24, 4.6%).

Students' mean self-reported GPA at the time of the survey in spring 2021 was 3.62 (SD = 0.35) while their mean self-reported GPA prior to the COVID-19 pandemic (defined as prior to spring 2020) was 3.59 (SD = 0.47). In comparing current GPA to prepandemic GPA, most students reported their GPA increased, shown in Table 1. The majority of respondents indicated they preferred hybrid courses at the time of the survey in spring 2021; just 18.3% preferred completely online courses.

Students reported taking an average of 78% (SD = 32.0%) of courses/credits online during the fall 2020 semester. Table 2 presents COVID-19 impacts on respondents' academic experiences, stress, and health

Table 1. Demographic and Other Characteristics of 526 DPD and CPD Students Who Participated in the Survey Study

Characteristics	n (%)
Age (mean = 24.2, SD = 6.0)	
18-21 y	217 (41.3)
≥22 y	309 (58.8)
Gender	
Female	488 (92.8)
Gender fluid	1 (0.2)
Male	37 (7.0)
Race/ethnicity	
African American/Black	27 (5.1)
Asian	51 (9.7)
Hispanic/Latinx	47 (8.9)
White	381 (72.4)
Other or more than one race/ethnicity	20 (3.8)
Student status	
Sophomore	46 (8.8)
Junior	169 (32.1)
Senior	233 (44.3)
Other	78 (14.8)
Change in GPA from prepandemic	
GPA decreased	142 (27.0)
GPA increased	227 (43.2)
GPA stayed the same	157 (29.9)
Course delivery method preference	
Completely in-person	166 (32.6)
Hybrid (mix of in-person and online/remote)	250 (49.1)
Completely online	93 (18.3)

during the fall 2020 semester. Most took remote/online coursework and more than one-third (n = 182, 34.6%) earned a lower grade in a course than expected. Twelve percent took fewer credits than they normally would and 11.2% considered changing majors from nutrition/dietetics. Other academic impacts experienced by students included dropping a course, delayed program completion or graduation, failing a course, and changing major to nutrition/dietetics.

DPD and CPD students also reported health-related and other impacts of the

Table 2. Academic, Health, and Other Impacts of the COVID-19 Pandemic Among 526 DPD and CPD Students During the Fall 2020 Semester

Impacts	n ^a (%)
Academic	
Took remote/online coursework	461 (87.6)
Earned a lower grade in a course than expected	182 (34.6)
Took fewer credits than I normally would	62 (11.8)
Considered changing my major from nutrition/dietetics	59 (11.2)
Dropped a course	43 (8.0)
My program completion/graduation was delayed	30 (5.7)
Failed a course	21 (4.0)
Changed my major to nutrition/dietetics	13 (2.5)
Health and other	
Experienced increased stress	458 (87.1)
Experienced other mental health concerns (anxiety, depression, posttraumatic stress disorder, etc)	336 (63.9)
Decreased my physical activity level	333 (63.3)
Lost a job/had a reduction in income	185 (35.2)
Experienced disordered eating	168 (31.9)
Moved out of college housing/dormitory	90 (17.1)

^aNumber of students who reported experiencing each impact.

COVID-19 pandemic in fall 2020. Eighty-seven percent experienced increased stress and 62.9% experienced other mental health concerns. The majority also reported decreased physical activity levels and 31.4% reported experiencing disordered eating. Table 2 shows additional COVID-19 impacts experienced by students in this study.

Table 3 outlines students' perceptions of the COVID-19 pandemic general impacts on academic experiences. The majority agreed the COVID-19 pandemic negatively impacted the quality of their DPD/CPD education and agreed they learned less during the fall 2020 semester compared with normal. The majority of students still, however, agreed their DPD/CPD program met their education needs in fall 2020 and that DPD/CPD courses can be taught effectively online/remotely.

DISCUSSION

While most DPD and CPD students across the United States reported their program met their needs in fall 2020 during the COVID-19 pandemic, over 62% reported the quality

of education was negatively impacted. Most students experienced increased stress, 64% reported mental health concerns and 32% reported disordered eating. This is an important finding since mental health, disordered eating, and eating disorders are already concerns among nutrition and dietetics students.^{27,28} Despite negative academic and health impacts found in this study, students' mean self-reported GPA increased from prepandemic to spring 2021. Since nearly 50% reported learning less than normal and nearly 35% reported earning a lower grade in a course than expected, the increase in GPA found may reflect difficulties in instructors' abilities to implement online assignments, quizzes, and examinations, which accurately capture students' knowledge.

Findings in this study mirror academic and health impacts of the pandemic reported among other health professions students in the United States.^{19,29-31} Nearly 75% of medical students in a national sample agreed the pandemic significantly interrupted their medical education, and 84% reported feeling at least somewhat anxious.²⁹ Undergraduate and graduate nursing students also reported

Table 3. Perceptions of General COVID-19 Pandemic Academic Impacts Among DPD and CPD Students

	Disagree^a n (%)	Neutral n (%)	Agree^b n (%)
Positive perceptions			
My DPD/CPD program met my education needs in fall 2020	62 (12.1)	131 (25.5)	320 (62.4)
DPD/CPD courses can be taught effectively online/remotely	143 (28.0)	144 (28.2)	224 (43.8)
My GPA has increased due to the COVID-19 pandemic	224 (43.7)	159 (31.0)	130 (25.3)
COVID-19 has positively impacted the quality of my DPD/CPD education	314 (61.5)	141 (27.6)	56 (11.0)
I learned more in my DPD/CPD courses during the fall 2020 semester compared with normal	316 (61.6)	148 (28.9)	49 (9.6)
Negative perceptions			
COVID-19 has negatively impacted the quality of my DPD/CPD education	97 (18.9)	96 (18.7)	320 (62.4)
I learned less in my DPD/CPD courses during the fall 2020 semester compared with normal	160 (31.2)	104 (20.3)	249 (48.5)
My GPA has decreased due to the COVID-19 pandemic	286 (55.8)	125 (24.4)	102 (19.9)

^aIncludes Likert responses of disagree and strongly disagree,

^bIncludes Likert responses of agree and strongly agree

high stress levels due to the pandemic and concerns regarding online learning^{30,31}; however, more than 65% of undergraduate nursing students reported the pandemic increased their desire to become a nurse.³⁰ In this study, just 11% of students reported thinking about changing their major from nutrition/dietetics due to the pandemic, a reassuring finding. Dental and dental hygiene students have also reported high stress, moderate to severe levels of anxiety, and concerns related to training immediately after the start of the pandemic in April to May 2020.¹⁹ Overall, it is clear the COVID-19 pandemic directly impacted health professions students' mental health and well-being. Our findings provide the first evidence that dietetics students were also affected.

Study strengths

This cross-sectional survey study included a sample of DPD and CPD students across the United States. Thirty-three states were

represented, providing an assessment of pandemic impacts on dietetics students across the country. In addition, positive and negative pandemic-related impacts were included. Many investigations focus on negative impacts of the pandemic, but our findings suggest some students may prefer and even thrive in an online/remote environment. For example, most students agreed their program met their educational needs and that DPD/CPD courses can be effectively taught online/remotely. Eleven percent even agreed that the COVID-19 pandemic positively impacted the quality of their DPD/CPD. Finally, since survey responses were anonymous and not provided to participants' DPD or CPD faculty, students may have been more honest in responses.

Study limitations

The study does have limitations. A response rate could not be calculated since the number of students who received the

recruitment email was not determined. The study was also cross-sectional and included retrospective assessments of COVID-19 pandemic impacts during the fall 2020 semester. Students who were enrolled in a DPD or CPD in fall 2020, but not in spring 2021 when the survey was administered, were not eligible to complete the survey. These students could have experienced more negative academic and health-related impacts, hence the lack of enrollment in spring 2021.

The sample was also predominantly female and identified as White. Although representative of the demographic makeup of the dietetics field, results may not be generalizable to DPD and CPD students of underrepresented genders, races, and ethnicities who may have experienced even more pronounced academic and health impacts due to the pandemic. In addition, the average age of participants (mean = 24.2 years) was higher than typically considered normal for undergraduate-level students. The inclusion of primarily older students could have introduced bias since older students may have additional life stressors, may have experienced pandemic impacts differently, and may have different preferences for in-person versus online/remote learning compared with younger, traditional college students.

Current and prepandemic GPA were self-reported and current GPA would not have captured grades earned in the spring 2021 semester since the survey was completed by students in February to March. Stress, mental health, physical activity, and disordered eating were assessed through single statements instead of full screeners. Disordered eating was not defined in the survey, leaving participants to interpret individually. The high degree of disordered eating reported in this study should therefore be considered a subjective finding and interpreted cautiously. It is also impossible to attribute high degrees of stress, mental health concerns, and self-identified disordered eating to the pandemic alone; university students are already at risk, and findings could be due to preexisting issues.

Implications

Our findings have implications for colleges and universities, dietetics educators, and the Academy of Nutrition and Dietetics. As higher education moves toward offering more in-person courses, administrators, staff, and educators must consider long-term impacts of pandemic-related stress and mental health concerns experienced by students. Including hybrid course options, whether offering a portion of course material online and meeting in-person less frequently, or by live streaming in-person classes for students at home, may be a solution. Our survey suggests the majority (nearly half) of DPD and CPD students prefer a hybrid model. A hybrid model may also benefit student-parents, immunocompromised students, and those who contract COVID-19 and must isolate with minimal disruptions to learning. Identifying best practices and evidence-based methods for effectively teaching hybrid courses is an important next step.

To further our findings, larger, national studies are needed, including the assessment of student performance outcomes like meeting ACEND competencies and readiness to enter supervised practice/dietetic internships and entry-level RDN positions. It is also important to assess internship preceptors and employers' perceptions of students and new RDN preparedness. These data could inform professional development efforts by the Academy of Nutrition and Dietetics to ensure all RDNs are entering the field with appropriate knowledge and skills.

CONCLUSION

Like other health professions, the COVID-19 pandemic negatively impacted dietetics students' academic experiences and health, but most students reported their DPD or CPD met their needs in fall 2020. In this sample, most students preferred hybrid courses, combining in-person and online learning. Additional research on long-term pandemic

effects on dietetics students' mental and physical health and, ultimately, preparedness as RDNs is warranted. Finally, as in-person learning resumes, dietetics programs and in-

ternships may consider adding additional supports for students to address educational and health concerns noted in this study.

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