

BRIEF

Effects of Resilience and Wellness Behaviors on Burnout and Academic Performance Among First-Year Students During the COVID-19 Pandemic

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Objective. To determine if students' levels of resilience and self-reported wellness behaviors predict burnout and grade point average (GPA) at the end of the first fall semester of the COVID-19 pandemic.

Methods. We measured first-year students' resilience, burnout (exhaustion and disengagement), and self-reported wellness behaviors (sleep, nutrition, social time, and self-care activities) at the beginning and end of the fall 2020 semester of pharmacy school. We also collected students' demographic information and obtained end-of-semester GPA from their academic records. Using multivariable regression, we assessed whether students' resilience and wellness behaviors predicted burnout and GPA at the end of the semester. We also assessed for changes in burnout and wellness behaviors over time.

Results. Resilience was positively associated with older age and was lower among students of color. Exhaustion and disengagement were high at baseline and continued to worsen over time. Students' self-reported wellness behaviors also decreased over time, except for ratings of sleep adequacy. Resilience predicted lower levels of disengagement at the end of the semester, but its relationship with exhaustion was inconsistent. The only wellness behaviors associated with lower burnout were nutrition and sleep adequacy. Students' end-of-semester GPA was also related to nutrition and sleep adequacy but not resilience or burnout.

Conclusion. Resilience offered some protection from burnout, but its relationship to immutable factors suggests that individual-focused interventions to improve student well-being (eg, wellness behaviors such as mindfulness meditation) should be complemented by organizational support, especially for younger students and students of color.

Keywords: pharmacy education, burnout, psychological resilience, academic performance

INTRODUCTION

Burnout is a chronic work-related strain that emerges after prolonged periods of psychological distress, and its prevalence appears to be growing across the health professions, including pharmacy.¹ Although burnout arises from an imbalance of job demands and resources, interventions in pharmacy have focused primarily on personal coping strategies (eg, mindfulness meditation, physical activity, and other wellness behaviors), which are often informally referred to as "building resilience." However, resilience is a psychological phenomenon reflecting one's capacity to bounce back from adversity, and although it can be enhanced by one's life experiences and targeted interventions (eg, cognitive-behavioral therapy), its relationship to personal wellness behaviors is unclear.² Nonetheless, higher levels of resilience are thought to protect people from burnout, though most studies to support this relationship are cross-sectional and limited in their ability to establish cause and effect.³

Student pharmacists were at increased risk for burnout (eg, high-stakes testing, competition for jobs and residencies) even before the COVID-19 pandemic introduced a new set of stressors to their academic experience.⁴ Students with higher levels of resilience may be better equipped to deal with these stressors, as are those who engage in protective wellness behaviors (eg, adequate sleep) irrespective of their relationship with resilience. This study examined whether first-year students' baseline levels of resilience and wellness behaviors predicted burnout and academic performance at the end of an especially high-strain period—their first semester of pharmacy school in an exclusively remote learning environment during the fall 2020 phase of the COVID-19 pandemic. We selected first-year students to test an extreme case (ie, the high levels of strain associated with starting a professional doctoral program) to support generalization of our findings to students facing milder levels of strain.

METHODS

Participants were first-year students at the University of Maryland School of Pharmacy. We administered surveys at the beginning (t_1) and end (t_2) of the fall 2020 semester to measure study variables at both timepoints and their changes over time (Δ). Participation was a course requirement, but students could opt out of having their results used for research. Students received information about self-care and mental health resources throughout the semester, but as an observational study, no specific interventions were performed. The study was deemed exempt by our institutional review board.

We measured resilience using the Connor-Davidson Resilience Scale-10 (CD-RISC-10), which consists of 10 Likert-type items and yields a score of 0 to 40, with higher scores indicating higher levels of resilience.² We measured two dimensions of burnout—exhaustion (strain resulting from excess demands) and disengagement (distancing oneself from work)—using the 16-item Oldenburg Burnout Inventory (OLBI), which yields a mean score of 1 to 5 for each domain, with higher scores indicating higher levels of exhaustion or disengagement.⁵ We developed our own Likert-type rating scales to assess students' perceptions regarding sleep adequacy (the extent to which students perceived the number of hours slept as adequate for feeling well-rested on a scale of 1 to 5) and nutrition (the extent to which students perceived their dietary pattern as healthy on a scale of 1 to 5). We also asked students to report the number of hours/week engaged in social activity and self-care (physical activity, mindfulness [eg, meditation], relaxation, and hobbies). Because resilience is in part shaped by life experiences, we also included demographic questions to ascertain how differences in the experiences of students of color may affect resilience, burnout, and academic success. We analyzed race/ethnicity as a dichotomous variable, defined as any race/ethnicity other than “White or Caucasian.” We obtained grade point average (GPA) from students' academic records.

In each analysis, we operationalized resilience as a stable phenomenon (t_1 only) and treated other variables as dynamic processes. Our main endpoint of interest was whether baseline resilience (t_1) and concurrent wellness behaviors (t_2) predicted end-of-semester burnout or GPA using multivariable linear regression. Additional analyses included how exhaustion, disengagement, and wellness behaviors changed over time (paired t-test or Wilcoxon signed-rank test), and whether changes in wellness behaviors (Δ) predicted burnout or GPA. Given evidence that resilience may differ by age, gender, and race/ethnicity,^{2,6} we adjusted models for these covariates. We inspected data for violations of assumptions and major outliers, and performed analyses in SPSS v.26 (Armonk, NY).

RESULTS

A total of 108 students completed the baseline survey (t_1); due to attrition, 98 students completed the follow-up survey (t_2) (100% response rate at both timepoints). The sample was a median age of 23 years (interquartile range [IQR] 22-25) and 72% women; respondents were 24% White, 40% Asian, 24% Black, 8% Hispanic, and 4% Other.

Baseline Analyses (t_1)

Mean (standard deviation) resilience at baseline (t_1) was 29.7 (5.4)—significantly lower than two normative samples of US adults (32.1 [5.2] and 31.8 [5.4]; $p < .001$ for both),² but similar to a cohort of Canadian medical students, 29.8 (6.9) ($p = .90$).⁶ The correlation between age and resilience was significant ($r = .21$, $p = .03$), but scores did not differ by gender (29.9 [5.3] and 29.6 [5.5] for men and women, respectively; $p = .76$). Resilience was significantly lower among students of color (28.9 [5.1] vs. 32.1 [5.8] for White students, $d = 0.59$, $p = .008$). In multivariable analysis, age and race/ethnicity were significant predictors of resilience ($B = .21$, 95% CI 0.02 to 0.39 and $B = -3.14$, 95% CI -5.45 to -0.82, respectively; $p < .05$ for both). After adjusting for age, gender, and race/ethnicity, the only wellness behaviors associated with resilience were nutrition and social time ($B = 1.80$, 95% CI 0.75 to 2.85 and $B = 0.15$, 95% CI 0.04 to 0.25, respectively; $p < .05$ for both). As baseline (t_1), mean exhaustion and disengagement were 2.4 (0.4) and 2.1 (0.4), respectively—already meeting some definitions for high levels of burnout.⁷ These scores were significantly lower than a pre-pandemic sample of first- through third-year student pharmacists at another school (2.9 [0.4] and 2.7 [0.4] for exhaustion and disengagement, respectively; $p < .001$ for both).⁴

Follow-up Analyses (t_2)

Based on data inspection, we excluded two highly influential outliers (standardized residuals exceeding ± 3). One student who disenrolled to pursue another career had a disproportionate effect on disengagement, and another was excluded from GPA analyses due to having not completed the semester. In analyses of changes over time, social time and self-care time demonstrated evidence of multicollinearity. Because social time was a predictor of baseline resilience and was especially relevant to this study (ie, less socialization due to quarantining and social distancing), we retained it and excluded self-care time.

Resilience did not change over time ($p=.22$), supporting its use as a stable phenomenon in this study. Exhaustion and disengagement both worsened significantly, as did several wellness behaviors (Table 1); only sleep adequacy remained unchanged.

After adjusting for age, gender, and race/ethnicity, resilience (t_1) did not predict exhaustion when analyzed with concurrent wellness behaviors (t_2) (Table 2); only nutrition predicted exhaustion. When assessing whether exhaustion (t_2) was predicted by resilience (t_1) and changes in wellness behaviors (Δ), the adjusted model was not significant, though resilience emerged as a predictor (Table 3). Neither resilience nor changes in wellness behaviors (Δ) were significant predictors of the change in exhaustion (Δ) over time.

Resilience was more consistently related to disengagement, emerging as a predictor when analyzed with concurrent wellness behaviors (t_2) (Table 2) and changes in wellness behaviors over time (Δ) (Table 3). Decreased sleep adequacy was also a predictor of disengagement. As with exhaustion, none of the variables predicted worsening disengagement.

None of the psychological phenomena of interest in this study predicted GPA. Regarding concurrent wellness behaviors (t_2), nutrition was a positive predictor of GPA (Table 2), and decreases in sleep adequacy over time (Δ) were associated with higher GPA (Table 3).

DISCUSSION

Resilience provided some protection against burnout in our study, but the effects were inconsistent. For example, resilience did not predict exhaustion after controlling for age, gender, and race/ethnicity. The finding that resilience was partially explained by immutable factors—which may have in turn affected its relationship to burnout—aligns with a prior study of student pharmacists in which being married was more strongly related to lower burnout than personal behaviors.⁴ Although the relationship between age and resilience was expected, the finding that resilience was lower among students of color suggests that behavioral interventions (eg, mindfulness and other wellness behaviors) should not be the main approach to student well-being. Perceptions regarding the difficulty of overcoming adversity among students of color could be explained by numerous events at the time of this study, including the disproportionate effects of COVID-19 on communities of color, an increase in hate crimes against Asian people, and police violence against Black people. Indeed, a recent study in the *Journal* revealed some of the detrimental effects of racial trauma on the academic success and psychological well-being of Black student pharmacists.⁸

Our findings suggest that efforts to build resilience via behavioral change should be complemented with organizational support, especially for younger students and students of color. This aligns with a landmark report from the National Academies of Science, Engineering, and Medicine, in which health professional education and training programs are encouraged to address well-being from a systems- rather than individual-level perspective.⁹ Forms of organizational support likely to benefit all students include training faculty and administrators in follower-supportive leadership behaviors, increasing opportunities for faculty and peer social support, building social capital (eg, transparency and fairness in school policies, student voice in organizational decisions), and providing students with greater autonomy in their learning.¹⁰ Students of color are likely to derive additional benefit from an organizational climate of belonging and increased diversity among faculty and staff, as they are more likely to seek support from people who have faced similar experiences on account of their race.⁸

Wellness behaviors tended to decrease over time, but these trends did not correspond to decreases in resilience. This finding was even true for social time, which was a predictor of baseline resilience and decreased considerably by the end of the semester. The divergence between wellness behaviors and resilience raises questions regarding the connection between these phenomena, or at least the strength of their relationship relative to immutable factors. In practical terms, these findings suggest that professional organizations' focus on promoting wellness behaviors to "build resilience" may be misplaced, even if resilience offers some protection against burnout. Schools of pharmacy would likely benefit more from resources to support organizational strategies, as these are generally more effective at improving long-term well-being compared to individual-focused approaches.^{10,11}

Baseline levels of exhaustion and disengagement already met some definitions for burnout, suggesting that problems may exist long before entry into the profession. One concerning possibility is that health professions select for students who are at increased risk for burnout because of their accumulated exposure to stressors when preparing and applying to school (eg, GPA, standardized test scores, co-curricular activities). Some might argue that students matriculating in fall 2020 may have been exposed to an atypical amount of stressors at the onset of the pandemic; however, our finding that burnout scores were significantly lower than pre-pandemic scores at another school suggests

this is not the case.⁴ Because the duration of burnout may help explain its overlap with depression,¹² these findings have major implications for the timing of burnout interventions in pharmacy education.

Academic performance was influenced more by markers of physical health (eg, nutrition, sleep) than by psychological well-being. The inverse relationship between sleep adequacy and GPA was unexpected but could indicate that some students sacrificed sleep to achieve higher grades. With only one semester of data, we could not ascertain the longer-term effects of resilience, burnout, and wellness behaviors on GPA.

A methodological strength of this study is that we measured burnout and wellness behaviors over time. Indeed, many of these variables changed over the course of just a few months, and results differed when variables were analyzed concurrently or as changes over time. These findings illustrate the importance of assessing burnout as a dynamic phenomenon rather than at isolated points in time.

Regarding limitations, our study was small and representative of one school, and it is unclear how our results generalize to other programs given variability in how the pandemic has been managed across the US. However, one advantage of our student body is its diversity, which allowed us to assess for differences in the life experiences among students of color. A related limitation is our timeframe, as it did not capture how the pandemic has evolved, including the availability of vaccines and emergence of new strains. Consequently, our study likely only measured students' initial uncertainty about the pandemic, their reactions to social distancing requirements, and their experiences with remote learning. Another limitation is that we did not operationalize resilience as a dynamic phenomenon because it was not being targeted by a specific intervention. Given that students' social time was associated with resilience at baseline, an intervention worth studying as the pandemic subsides is whether facilitated interactions between students, faculty, and staff affect resilience. Regardless of the intervention employed, we suggest that resilience be explicitly measured in future studies rather than using the term informally to refer to any attempt to improve student well-being via behavior change.

CONCLUSION

Our study supports the idea that resilience offers some protection from burnout, but it raises questions as to how resilience-building is traditionally framed in the pharmacy literature (ie, as a collection of interventions focused on behavior change). Additionally, our finding that resilience is partly shaped by immutable factors such as age and race/ethnicity underscores the importance of complementing individual-focused interventions with organizational support. Efforts in pharmacy to promote students' psychological well-being should therefore shift from the present focus on personal wellness behaviors to providing schools with guidance on structural changes to improve students' experiences.

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Table 1. Comparison of Resilience, Burnout, and Wellness Behaviors at Baseline and Follow-Up

Variable	Baseline (t ₁)	Follow-Up (t ₂)	p value
Resilience	29.7 (5.4)	29.1 (5.4)	.22
Exhaustion	2.4 (0.4)	2.5 (0.4)	.04
Disengagement	2.1 (0.4)	2.2 (0.4)	.006
Social hours/week*	10.7 (11.3)	9.0 (13.9)	.004
Sleep rating	2.6 (0.7)	2.5 (0.8)	.28
Nutrition rating	3.2 (0.9)	2.9 (1.0)	.002
Self-care hours/week*	19.8 (15.3)	14.5 (12.7)	<.001

*Analyzed using Wilcoxon signed-rank test, whereas all other variables were compared using paired t-tests.

Table 2. Relationships Between Resilience, Concurrent Wellness Behaviors, Burnout, and Academic Performance

Outcome	Predictor	B	95% CI	p value
Exhaustion r ² = .10, p = .02	Resilience (t ₁)	-0.01	-0.03 to 0.003	.10
	Sleep rating (t ₂)	-0.13	-0.28 to 0.02	.08
	Nutrition rating (t ₂)	-0.11	-0.21 to -0.02	.02
	Social hours/week (t ₂)	-0.004	-0.01 to 0.003	.23
	Self-care hours/week (t ₂)	-0.001	-0.01 to 0.01	.81
Disengagement r ² = .08, p = .06	Resilience (t ₁)	-0.02	-0.034 to -0.002	.03
	Sleep rating (t ₂)	-0.11	-0.24 to 0.03	.13
	Nutrition rating (t ₂)	0.01	-0.08 to 0.09	.90
	Social hours/week (t ₂)	-0.003	-0.01 to 0.003	.28
	Self-care hours/week (t ₂)	-0.001	-0.01 to 0.01	.77
Grade point average r ² = .10, p = .04	Resilience (t ₁)	-0.02	-0.05 to 0.01	.17
	Exhaustion (t ₂)	-0.09	-0.51 to 0.32	.65
	Disengagement (t ₂)	0.14	-0.26 to 0.55	.48
	Sleep rating (t ₂)	-0.20	-0.43 to 0.02	.08
	Nutrition rating (t ₂)	0.17	0.03 to 0.32	.02
	Social hours/week (t ₂)	-0.004	-0.01 to 0.01	.39
	Self-care hours/week (t ₂)	-0.003	-0.01 to 0.01	.55

CI=confidence interval

Table 3. Relationships Between Resilience, Changes in Wellness Behaviors and Burnout, and Academic Performance

Outcome	Predictor	B	95% CI	p value
Exhaustion r ² = .01, p = .34	Resilience (t ₁)	-0.02	-0.04 to -0.002	.03
	Sleep rating (Δ)	-0.07	-0.21 to 0.07	.33
	Nutrition rating (Δ)	-0.02	-0.13 to 0.09	.69
	Social hours/week (Δ)	0	-0.01 to 0.01	.88
Disengagement r ² = .16, p = .002	Resilience (t ₁)	-0.02	-0.03 to -0.002	.03
	Sleep rating (Δ)	-0.18	-0.30 to -0.06	.003
	Nutrition rating (Δ)	0.07	-0.02 to 0.17	.11
	Social hours/week (Δ)	-0.002	-0.01 to 0.003	.45
Grade point average r ² = .12, p = .02	Resilience (t ₁)	-0.002	-0.03 to 0.02	.86
	Exhaustion (Δ)	-0.01	-0.39 to 0.36	.94
	Disengagement (Δ)	-0.07	-0.43 to 0.30	.71
	Sleep rating (Δ)	-0.31	-0.51 to -0.11	.003
	Nutrition rating (Δ)	0.14	-0.01 to 0.29	.07
	Social hours/week (Δ)	0.003	-0.01 to 0.01	.42

CI=confidence interval