RESEARCH

A Large-Scale Multicentre Study of Academic Resilience and Wellbeing in Pharmacy Education

Simon Cassidy, PhD,[a] Andrew Mawdsley, MEd,[b] Catherine Langran,[c] Louise Hughes, PhD,[d] Sarah C. Willis, PhD[b]

[a] University of Salford, Greater Manchester, United Kingdom
[b] The University of Manchester, Manchester, United Kingdom
[c] University of Reading, Reading, United Kingdom
[d] Cardiff University, Cardiff, Wales, United Kingdom

Corresponding Author: Simon Cassidy, University of Salford, The Crescent, Salford M5 4WT, Salford, Greater Manchester, United Kingdom. Tel: +441612952199. Email: s.cassidy@salford.ac.uk

Objective. Health care students are at particular risk of stress and exposure to adverse events, negatively affecting wellbeing and performance and leading to increased attrition. Academic resilience (AR) has been identified as one factor helping mitigate such negative effects in students. Despite this, there is limited research exploring the topic in pharmacy education.

Methods. Using a cross-sectional survey design, students attending three schools of pharmacy in the United Kingdom (N=1161) completed psychometric measures of AR and wellbeing. Comparative, correlational and regression analyses were conducted, exploring the relationship between AR and wellbeing.

Results. AR and wellbeing were significantly lower in pharmacy students compared to other student populations. AR was a positive correlate and predictor for wellbeing. AR was highest in first year students, declined over subsequent years of study, and varied by pharmacy school and gender but not ethnicity.

Conclusion. Introducing and embedding strategies to enhance AR in pharmacy education may improve wellbeing and performance and reduce attrition.

Keywords: pharmacy education, academic resilience, wellbeing, student mental health

INTRODUCTION

Resilience is broadly defined as the process of adapting and coping when faced with adversity.[7,11-13] Established through lived experience and education,[14,15] resilience is a multifaceted set of protective factors[16] involving thoughts, behaviours and actions expressed as an individual's responses to stress and adversity involving 'bouncing back', personal growth, and change.[17,43] Resilience is a positive mental health and wellbeing indicator associated with academic performance and learning in studies involving student samples.[44] Evidence suggests that conceptualising and measuring resilience within specific domains or contexts offers greater assessment validity than applying a generalised, global, construct measure.[8] A*cademic resilience* (AR) is the context-specific form of resilience in educational contexts,[18,12,13] reflecting students' capacity to continue to achieve academically having faced challenges and adversity, including academic failure or setbacks, that threaten their progress.[7] Higher levels of AR are associated with students' self-confidence, coping, forming positive and supportive relationships, managing negative emotions, positive mental wellbeing, improved academic performance and reduced attrition.[1,3,11,20,19,21,22]

Habitual uncertainty, adverse events, emotional demands, and lack of supportive relationships are prevalent in health care practice.[6,27] Positive adaptation, buoyancy, and avoidance of burnout are key to working in these challenging and stressful environments.[13,28–31] Correlated with lower levels of emotional exhaustion and improved sense of personal accomplishment, resilience has been identified as a protective factor mitigating burnout in health care professionals[35] and an important positive predictor in clinical training and professional practice.[5,25,26] Health care students are exposed to both academic pressure and stressors in the clinical environment.[4,23] Thus, recent evidence of low AR in health care students and the suggestion that this may affect ability to cope with the challenges of clinical placements[24] presents a significant concern for clinical education providers.

Despite evidence of a negative correlation between stress levels and performance, and gender and ethnicity differences in reported stress levels of pharmacy students,[45] together with growing interest in the topic[47], research focussing on AR in pharmacy education is limited.[13] One study conducted with American pharmacy students reported gender and year of study differences in AR, but no age or ethnicity differences or relationship with academic performance at point of entry.[32] However, to date, no study has investigated AR in UK pharmacy students, or explored factors or outcomes associated with AR in this student population. Furthermore, few focus explicitly on mental health and wellbeing in pharmacy education. This is despite increased emphasis on student mental health in professional

standards for the accreditation of pharmacy schools, including the Accreditation Council for Pharmacy Education Standards 2016[2,45] and growing, but conflicting, evidence regarding the impact of student demographics, including gender, ethnicity, degree choice, route of entry and pharmacy school, on mental health, wellbeing and resilience.[1,33,34]

Given evidence suggesting potential for greater exposure to adversity and limited research, the present study explores the relationship between AR and wellbeing and the influence of student demographics in UK pharmacy students. The aim is to inform measures focussed on enhancing AR and improving student wellbeing and attainment in pharmacy education. Based on extant literature, a positive correlation between AR and wellbeing, together with differences according to student demographics and pharmacy school are anticipated.

METHOD

The study used a cross-sectional survey design with undergraduate Master of Pharmacy (MPharm) students from three UK pharmacy schools, School A, B, and C. Involving four years of academic study followed by a one year training placement, the MPharm is the UK undergraduate Masters degree leading to registration as a pharmacist, equivalent in nature to the PharmD. Students typically enrol at age 18. Schools representing different geographical locations in the UK were selected on the basis of having similar course structures, cohort sizes and entry requirements. While the schools are all accredited by the regulator, the General Pharmaceutical Council, there are notable differences between the schools' outcomes as measured by performance in the end-point qualifying examination. School C has a lower pass rate than Schools A and B, which, we hypothesise, may lead to demonstrable differences in AR and wellbeing as factors previously associated with academic attainment.

Following IRB approval, surveys were distributed in registered classes for students from all years apart from the final year at School C, who were invited via email to complete the survey online as they were undertaking an independent research project or off-campus placement with no scheduled on-campus classes. 1586 students were invited to complete the survey. Participants were not compensated or rewarded, and consent was implied by completion of the survey. The survey comprised validated psychometric measures of AR, the Academic Resilience Scale (ARS-30)[8], wellbeing, the Warwick Edinburgh Mental Wellbeing Scale (WEMWBS,)[9] and questions capturing demographic and situational data including gender, ethnicity, year of study, school and questions related to possible academic setbacks or adversities encountered including whether the student was attending their first-choice university, whether pharmacy was their first choice for undergraduate study, and how their university place was secured.

The ARS-30[8] is a 30-item measure of student responses to academic adversity. Items are measured on a 5-point Likert scale. Summing responses gives an overall AR score with a theoretical range of 30-150. Higher scores indicate greater AR. The ARS-30 comprises three subscales, *perseverance* (eg, 'I would work harder'), *reflecting and adaptive help-seeking* (eg, 'I would try to think about my strengths and weakness to help me work better'), and *negative affect and emotional response* (eg, 'I would feel like everything was ruined and was going wrong'), with theoretical ranges of 14-70, 9-45, and 7-35 respectively. Whilst the ARS-30 was adapted for use with US pharmacy students in one study,[32] the original measure was selected for the present study to be more consistent with research in the wider field of AR, enabling comparison with other student populations and providing valuable insight in the context of exploring resilience and wellbeing in pharmacy education. Published data based on a normative sample of non-pharmacy undergraduate university students reports a mean (SD) ARS-30 total score of 115.6 (14.8).[8]

The WEMWBS[9] is a 14-item scale measuring feeling and functional aspects of mental wellbeing, including positive affect (eg, 'I've been feeling optimistic about the future'), satisfying interpersonal relationships (eg, 'I've been feeling interested in other people'), and positive functioning (eg, 'I've been feeling useful') in general populations, including university students.[9] Items are scored along a 5-point scale from 'none of the time' to 'all of the time'. Summing scores provides an overall wellbeing score with a theoretical range of 14-70, where higher scores indicate greater positive mental wellbeing. According to available population data, the mean WEMWBS score is 50.7 (±8.32).[36]

Following reliability analysis (Cronbach's alpha) of the ARS-30 and WEMWBS, comparative analyses were conducted using independent and one-sample t-tests (sample means with population norms, gender, first-choice course, and first-choice university), and ANOVA with Tukey's post hoc comparisons (ethnicity, school, and year of study). Effect size (ES) was calculated using Cohen's *d* for independent t-test results and eta-squared (η^2) for ANOVA results.[37,38] Pearson's correlation and regression were used to explore the relationship between AR and mental wellbeing. Findings were considered significant at a $p \leq .05$.

RESULTS

1161 students (from of 1586 invited) responded, representing a 73% response rate and reduced risk of sampling bias. Highest and lowest response rate was recorded for first-year (84%) and fourth-year students (48%), and for School A (79%) and School C (62%), with low response (24%) from fourth-year students in School C potentially explaining its low overall response rate (Table 1). The majority of respondents were female (72%), and the largest ethnic group represented overall was White (38%), followed by Asian (34%). The UK application process allows

students to select one first (firm) and one second (insurance) choice university/course place offer. Students failing to meet entry requirements for their firm or insurance offer must seek an alternative offer through the 'clearing' process. The majority of respondents had secured their MPharm place through firm or insurance choices (57%), were attending their first-choice university (78%) and had chosen pharmacy as their first-choice course (76%) (Table 2).

Reliability analysis estimating internal consistency supported reliability of the ARS-30 in the present study, $\alpha=.89$ (overall scale), $\alpha=.83$ (perseverance subscale), $\alpha=.79$ (reflecting and adaptive help-seeking subscale), and $\alpha=.79$ (negative affect and emotional response subscale). Alpha $\geq .07$ is routinely cited in the literature as acceptable. The WEMWBS also demonstrated acceptable internal consistency reliability, $\alpha=.90$.

One sample t-test comparisons with published norms for the ARS-30 and WEMWBS[8,9,36] (Table 3) demonstrated that pharmacy students had significantly lower AR ($M=108.4$ vs.115.6, $t(1079)=17.1$, $p<.001$, large ES $d=13.85$), wellbeing ($M=46.4$ vs. 50.7, $t(1118)=16.98$, $p<.001$, large ES $d = 8.57$), and scored lower on all AR subscales (perseverance $M= 55.7$ vs. 59.2, $t(1114)=16.87$, $p<.001$, large ES $d=6.94$; reflection and help-seeking $M=33.3$ vs. 35.41, $t(1138)=13.37$, $p<.001$, large ES $d=5.34$; negative affect and emotional response $M=19.4$ vs. 21.0, $t(1134)=11.26$, $p<.001$, large ES $d=4.92$), than comparable student populations.

Correlational analysis revealed a significant medium positive correlation between overall AR and wellbeing ($r(1047)=0.47$, $p<.001$). ARS-30 subscales also showed medium positive correlations with wellbeing (perseverance $r(1079)= 0.37$, $p<.001$; reflection and help-seeking $r(1101)=0.3$; negative affect and emotional response $p<.001$, $r(1095)=0.46$, $p<.001$). Regression analysis demonstrated that academic resilience was a significant predictor for wellbeing ($b=.3$, $t(1047)=17.34$, $p<.001$), explaining 22% of variance in wellbeing scores ($R^2=.22$, $F(1, 1047)=300.51$, $p<.001$). Multiple regression exploring ARS-30 subscales as predictors for wellbeing showed that the model was significant ($R^2=.26$, $F(3, 1045)=123.66$, $p<.001$), explaining 26% of variance, with all subscales identified as significant predictors for wellbeing (perseverance $b=.19$, $t(1045)=3.92$, $p<.001$; reflecting and help-seeking $b=.19$, $t(1045)=3.3$, $p<.001$; negative affect and emotional response $b=.643$, $t(1045)=12.6$, $p<.001$).

Table 4 presents mean AR scores for each of the demographic data sets. Male students had higher mean scores, indicating greater resilience, than females for overall AR, perseverance, and negative affect and emotional response, but lower mean score for reflecting and adaptive help-seeking. However, only differences in negative affect and emotional response ($t(1116)=5.33$, $p<.001$, small to moderate ES $d=0.35$) and reflecting and adaptive help-seeking ($t(1121)=-2.31$, $p<.05$, small ES $d=0.15$) subscales reached significance.

Comparisons according to ethnic group suggested white students had the lowest mean overall AR score, and black students had the highest. However, differences in overall AR between ethnic groups did not reach significance ($F(4, 1067)=1.05$, $p>.05$). While separate ANOVAs suggested a significant effect of ethnic group for the reflecting and adaptive help-seeking subscale ($F(4, 1126)=3.01$, $p<.01$, small ES $\eta^2=0.01$), post-hoc pairwise comparisons were not significant ($p>.05$).

ANOVAs confirmed a significant small to moderate effect of year of study for overall AR ($F(3, 1067)=16.89$, $p<.001$, ES $\eta^2 =0.05$), and for the three subscales, perseverance ($F(3, 1111)=15.59$, $p<.001$, ES $\eta^2 =0.04$), reflecting and help-seeking ($F(3, 1135)=13.90$, $p<.001$, ES $\eta^2 = 0.04$), and negative affect and emotional response ($F(3, 1131)=14.83$, $p<.001$, ES $\eta^2 = 0.04$). First-year students reported significantly higher overall AR ($p<.01$) and subscale scores than all other years ($p<.05$), with the exception of fourth-year students, where differences in perseverance did not reach significance ($p>.05$). Third-year students scored significantly lower for negative affect and emotional response (indicating lower resilience) than all other years ($p<.05$), while second-year students scored significantly lower reflecting and help-seeking and perseverance than third and fourth-year students respectively ($p<.01$).

Overall AR ($F(2, 1077)=3.68$, $p<.05$, small ES $\eta^2=0.01$) and perseverance ($F(2, 1112)=10.66$, $p<.01$, small ES $\eta^2=0.02$) varied significantly according to pharmacy school; School C scored significantly lower overall AR than School A ($p<.05$) and significantly lower perseverance than both Schools A and B ($p<.001$).

Small differences in AR according to how students secured their place on the course and whether students did or did not attend their first-choice university or first-choice course were not significant ($p>.05$), with the exception of perseverance scores, which were significantly higher for students attending their first-choice university ($t(1104)=2.14$, $p<.05$, small ES $d=0.15$).

DISCUSSION

As the first study investigating AR in UK pharmacy students, the principal aim was to explore the relationship between AR and wellbeing and identify demographic and situational factors explaining variations in AR and wellbeing. Consistent with previous literature reporting poor wellbeing in health care students,[3,39] pharmacy students reported significantly lower AR[11] and mental wellbeing[11] compared with normative data from comparable student populations, highlighting the need to introduce measures addressing poor student wellbeing as a priority for pharmacy education. Critically, in a field where correlates and predictors of resilient outcomes such as wellbeing are 'uniformly modest',[10] the study found a significant positive relationship between AR and wellbeing and identified AR as a significant predictor of wellbeing. Findings are similar to previous studies reporting an association between higher AR

and improved wellbeing and academic outcomes in health care students,[3,5,39,40,42] suggesting that cultivating AR in pharmacy education will benefit pharmacy student wellbeing and academic outcomes.

Interest in student resilience in higher education continues to grow,[47] with emerging evidence regarding interventions to enhance AR.[48] Positive relationships, self-confidence, productive failure, and emotion regulation are common features of these interventions, but developing and targeting interventions based on evidence and insight into particular student populations is likely to lead to improved outcomes.[48] Thus, findings from the present study indicating that gender, year of study, pharmacy school and attending first-choice pharmacy school all influence AR, provide valuable insight to help inform and tailor AR interventions in pharmacy education according to environmental, organisational, and cohort-specific contexts, as suggested by Brewer et al.[47] Despite a trend towards male students exhibiting greater overall AR, significant differences were only identified for negative affect and emotional response, where males exhibited greater resilience, and reflecting and adaptive help-seeking, where females exhibited greater resilience. Male students are therefore likely to benefit from training in reflection and identifying and using support, whereas interventions focussing on emotion regulation strategies may be more valuable for female students. Studies conceptualising resilience as a dynamic process and charting fluctuations over time report 'organisational newcomers' as more resilient, explained in terms of less pronounced emotional exhaustion.[49] This is supported by findings here of a trend towards declining AR from first to fourth year, with first-year students reporting significantly higher AR than all other years, and significantly lower emotional AR reported by third-year students. Lower perseverance and reflecting and help-seeking reported in second-year students may be indicative of increasing academic, social, and developmental demands reported for this group of students facing further transitional challenges[46]. Similar gender and year of study differences have been reported in US pharmacy students.[32] Whilst higher education typically directs support towards first-year students, easing their transition,[47] greater emphasis on tailored interventions targeted at second, third, and fourth-year students appears equally justified to maintain and enhance resilience and improve wellbeing. Students not attending their first-choice pharmacy school are likely to have failed to achieve their expected academic entry grades, negatively impacting their academic self-efficacy, and explaining lower AR reported for these students.[11] Resilience training emphasising productive failure, safe-to-fail, and self-efficacy is likely to be particularly valuable to these students. School C has an established profile of lower end-point pass-rate than the two other schools in the study. Lower AR reported for School C was anticipated and may be evidence of an association with academic attainment, further emphasising the value of identifying low AR in pharmacy students and introducing measures to address this and mitigate the impact on academic attainment and professional qualification. In line with previous research, no differences in AR according to ethnicity were found.[32,40,41]

Adopting a longitudinal design with multiple data points, including measures of academic performance and other educational outcomes such as progression and retention/attrition, and considering age and socioeconomic background would have provided further insight into the nature of the temporal trajectory of AR and increased the scope of the study. The lowest response rate was recorded in fourth-year students in School C, the only year group to be invited to complete the study online. These are considerations for future research in the area and in pharmacy education in particular, which should focus on evaluating interventions in terms of increased AR and student wellbeing, and collect outcome data, including academic attainment and professional qualification, to evaluate the measurable impact of increased AR and wellbeing.

CONCLUSION

Lower levels of AR and mental wellbeing reported by pharmacy students, along with the predictive relationship between AR and wellbeing identified in the study, provide evidence of the need for interventions that cultivate and enhance AR, improving wellbeing and overall education and professional outcomes in pharmacy education. Current accreditation standards, which focus on the wellbeing of patients and not pharmacy students or professionals, need reviewing and may need broadening. In the meantime, pharmacy schools should consider implementing programme-based interventions designed to address low AR and poor mental wellbeing.[50] Analysis of demographic data presented a nuanced temporal and situational resilience trajectory, providing the basis to better tailor and target interventions to the needs of pharmacy students, improving their effectiveness. The study also provides further evidence supporting the reliability and validity of the ARS-30 as a measure of AR in pharmacy students so that it can, it is suggested, be used to evaluate resilience and wellbeing interventions, a much-needed avenue for future research and practice in pharmacy education. The largest study of AR among pharmacy students and the first of its kind within the UK, the study provides an important and valuable addition to the limited literature, with the potential to impact pharmacy education, and education generally, at an international level.

REFERENCES
1. Martin A, Marsh H. Academic resilience and its psychological and educational correlates: a construct validity approach. *Psychol Sch*. 2006;43:267-281. doi:10.1002/pits.20149
2. Pate AN, Payakachat N, Harrell TK, Pate KA, Caldwell DJ, Franks AM. Measurement of grit and correlation

to student pharmacist academic performance. *Am J Pharm Educ*. 2017;81(6):105. doi:10.5688/ajpe816105

3. Hwang E, Shin S. Characteristics of nursing students with high levels of academic resilience: a cross-sectional study. *Nurse Educ Today*. 2018;71:54-59. doi:10.1016/j.nedt.2018.09.011

4. Thomas LJ, Revell SH. Resilience in nursing students: An integrative review. *Nurse Educ Today*. 2016;36:457-462. doi:10.1016/j.nedt.2015.10.016

5. Tempski P, Santos IS, Mayer FB, et al. Relationship among Medical Student Resilience, Educational Environment and Quality of Life. *PLoS One*. 2015;10(6):e0131535. doi:10.1371/journal.pone.0131535

6. Matheson C, Robertson HD, Elliott AM, Iversen L, Murchie P. Resilience of primary healthcare professionals working in challenging environments: a focus group study. *Br J Gen Pract J R Coll Gen Pract*. 2016;66(648):e507-15. doi:10.3399/bjgp16X685285

7. Martin AJ. Academic buoyancy and academic resilience: Exploring 'everyday' and 'classic' resilience in the face of academic adversity. *Sch Psychol Int*. 2013;34(5):488-500. doi:10.1177/0143034312472759

8. Cassidy S. The Academic Resilience Scale (ARS-30): A New Multidimensional Construct Measure. *Front Psychol*. 2016;7:1787. dio:10.3389/fpsyg.2016.01787

9. Tennant R, Hiller L, Fishwick R, et al. The Warwick-Edinburgh Mental Well-being Scale (WEMWBS): development and UK validation. *Health Qual Life Outcomes*. 2007;5:63. doi:10.1186/1477-7525-5-63

10. Bonanno GA. The resilience paradox, *European Journal of Psychotraumatology*. 2021;12(1): 1942642. doi:10.1080/20008198.2021.1942642

11. Cassidy S. Resilience Building in students: the role of academic self-efficacy. *Front Psychol*. 2015;6:1781. doi:10.3389/fpsyg.2015.01781

12. Richardson GE, Neiger BL, Jensen S, Kumpfer KL. The Resiliency Model. *Health Educ*. 1990;21(6):33-39. doi:10.1080/00970050.1990.10614589

13. Stoffel JM, Cain J. Review of grit and resilience literature within health professions education. *Am J Pharm Educ*. 2018;82(2):6150. doi:10.5688/ajpe6150

14. Earvolino-Ramirez M. Resilience: A Concept Analysis. *Nurs Forum*. 2007;42(2):73-82. doi: 10.1111/j.1744-6198.2007.00070.x

15. Richardson GE. The metatheory of resilience and resiliency. *J Clin Psychol*. 2002;58(3):307-321. doi:10.1002/jclp.10020

16. Rutter M. *Psychosocial Resilience and Protective Mechanisms.* Cambridge University Press; 1990. doi:10.1017/CBO9780511752872.013

17. Sanderson B, Brewer M. What do we know about student resilience in health professional education? a scoping review of the literature. *Nurse Educ Today*. 2017;58:65-71. doi:10.1016/j.nedt.2017.07.018

18. Health Education England. *Workforce Stress and the Supportive Organisation. A Framework for Improvement through Reflection, Curiosity and Change*.; 2019. https://www.hee.nhs.uk/sites/default/files/documents/Workforce Stress and the Supportive Organisation_0.pdf

19. Mclafferty M, Mallett J, McCauley V. Coping at university: the role of resilience, emotional intelligence, age and gender. *J Quant Psychol Res*. 2012;1:1-6.

20. Van Hoek G, Portzky M, Franck E. The influence of socio-demographic factors, resilience and stress reducing activities on academic outcomes of undergraduate nursing students: a cross-sectional research study. *Nurse Educ Today*. 2019;72:90-96. doi:10.1016/j.nedt.2018.10.013

21. Babal JC, Abraham O, Webber S, Watterson T, Moua P, Chen J. Student Pharmacist Perspectives on Factors That Influence Wellbeing During Pharmacy School. *Am J Pharm Educ*. 2020;84(9):ajpe7831. doi:10.5688/ajpe7831

22. Faye A, Tadke R, Gawande S, et al. Assessment of resilience and coping in undergraduate medical students: A need of the day. *J Educ Technol Heal Sci*. 2018;5. doi:10.18231/2393-8005.2018.0008

23. Brewer ML, van Kessel G, Sanderson B, et al. Resilience in higher education students: a scoping review. *High Educ Res Dev*. 2019;38(6):1105-1120. doi:10.1080/07294360.2019.1626810

24. Calo M, Peiris C, Chipchase L, Blackstock F, Judd B. Grit, resilience and mindset in health students. *Clin Teach*. 2019;16:317-322. doi:10.1111/tct.13056

25. Dunn LB, Iglewicz A, Moutier C. A conceptual model of medical student well-being: promoting resilience and preventing burnout. *Acad psychiatry J Am Assoc Dir Psychiatr Resid Train Assoc Acad Psychiatry*. 2008;32(1):44-53. doi:10.1176/appi.ap.32.1.44

26. Hegney DG, Rees CS, Eley R, Osseiran-Moisson R, Francis K. The contribution of individual psychological resilience in determining the professional quality of life of Australian nurses . *Front Psychol* . 2015;6:1613. doi:10.3389/fpsyg.2015.01613

27. Hart PL, Brannan JD, De Chesnay M. Resilience in nurses: an integrative review. *J Nurs Manag*. 2014;22(6):720-734. doi:10.1111/j.1365-2834.2012.01485.x

28. Hodges HF, Keeley AC, Grier EC. Professional resilience, practice longevity, and Parse's theory for baccalaureate education. *J Nurs Educ*. 2005;44(12):548-554.

29. Pryjmachuk S, Richards DA. Predicting stress in pre-registration nursing students. *Br J Health Psychol*. 2007;12(Pt 1):125-144. doi:10.1348/135910706X98524

30. Jones MC, Johnston DW. Distress, stress and coping in first-year student nurses. *J Adv Nurs*. 1997;26(3):475-482. doi:10.1046/j.1365-2648.1997.t01-5-00999.x

31. Moffat KJ, McConnachie A, Ross S, Morrison JM. First year medical student stress and coping in a problem-based learning medical curriculum. *Med Educ*. 2004;38(5):482-491. doi:10.1046/j.1365-2929.2004.01814.x

32. Chisholm-Burns MA, Spivey CA, Sherwin E, Williams J, Phelps S. Development of an instrument to measure academic resilience among pharmacy students. *Am J Pharm Educ*. 2019;83(6):6896. doi:10.5688/ajpe6896

33. Neufeld A, Malin G. Exploring the relationship between medical student basic psychological need satisfaction, resilience, and well-being: a quantitative study. *BMC Med Educ*. 2019;19(1):405. doi:10.1186/s12909-019-1847-9

34. STALLMAN HM. Psychological distress in university students: A comparison with general population data. *Aust Psychol*. 2010;45(4):249-257. doi:10.1080/00050067.2010.482109

35. Rushton CH, Batcheller J, Schroeder K, Donohue P. Burnout and Resilience Among Nurses Practicing in High-Intensity Settings. *Am J Crit care an Off Publ Am Assoc Crit Nurses*. 2015;24(5):412-420. doi:10.4037/ajcc2015291

36. Stewart-Brown S. The Warwick-Edinburgh Mental Well-Being Scale (WEMWBS): Performance in Different Cultural and Geographical Groups. *Ment Well-Being Int Contrib to Study Posit Ment Heal*. 2013;9789400751:133-150. doi:10.1007/978-94-007-5195-8_7

37. Tabachnick B, Fidell L. *Using Multivariate Statistics*. (Pearson/Allyn and Bacon, ed.). Pearson; 2007.

38. Cohen J. *Statistical Power Analysis for the Behavioural Science*. 2nd ed. Routledge; 1988.

39. Bacchi S, Licinio J. Resilience and Psychological Distress in Psychology and Medical Students. *Acad psychiatry J Am Assoc Dir Psychiatr Resid Train Assoc Acad Psychiatry*. 2017;41(2):185-188. doi:10.1007/s40596-016-0488-0

40. Oliveira ACP de M, Machado APGM, Aranha RNM. Identification of factors associated with resilience in medical students through a cross-sectional census. *BMJ Open*. 2017;7(11):e017189. doi:10.1136/bmjopen-2017-017189

41. Lekan DA, Ward TD, Elliott AA. Resilience in Baccalaureate Nursing Students: An Exploration. *J Psychosoc Nurs Ment Health Serv*. 2018;56(7):46-55. doi:10.3928/02793695-20180619-06

42. Ríos-Risquez MI, García-Izquierdo M, Sabuco-Tebar E de los A, Carrillo-Garcia C, Martinez-Roche ME. An exploratory study of the relationship between resilience, academic burnout and psychological health in nursing students. *Contemp Nurse*. 2016;52(4):430-439. doi:10.1080/10376178.2016.1213648

43. American Psychological Association. *Building Your Resilience*. 2020, https://www.apa.org/topics/resilience

44. Bittman F. When problems just bounce back: about the relation between resilience and academic success in German tertiary education. *SN Soc Sci*. 2021;1(65). doi:10.1007/s43545-021-00060-6

45. Votto RJ, Nenau EM. Predictors of stress in doctor of pharmacy students: Results from a nationwide survey. *Currents in Pharmacy Teaching and Learning*. 2013;5(5):365-372. doi :10.1016/j.cptl.2013.06.014

46. Sterling AJ. Student Experiences in the Second Year: Advancing Strategies for Success Beyond the First Year of College. *Strategic Enrollment management Quartely*. 2018;5(4); 136-149. doi:10.1002/sem3.20113

47. Brewer ML, van Kessel G, Sanderson B, et al. Resilience in higher education students: a scoping review. *Higher Education Research & Development*. 2019; 38(6):1105-1120. doi:10.1080/07294360.2019.1626810

48. Fenwick-Smith A, Dahlberg EE, Thompson SC. Systematic review of resilience-enhancing, universal, primary school-based mental health promotion programs. *BMC Psychol*. 2018; 6(30): 2-17. doi:10.1186/s40359-018-0242-3

49. Flynn PJ, Bliese PD, Korsgaard MA, Cannon C. Tracking the Process of Resilience: How Emotional Stability and Experience Influence Exhaustion and Commitment Trajectories. *Group & Organization Management*. 2021;46(4):692-736. doi:10.1177/10596011211027676

50. Bell V, Cassidy S. Facing the challenge of university study: An academic resilience intervention for students. In: Turner S, Kalawsky K, ed. *Wellbeing in Higher Education*. SEDA Special 45. SEDA; 2020: 23-25. ISBN 978 1 902435 69 5

Table 1. Response Rate by School of Pharmacy and Year of Study

Year	School A			School B			School C		
	Total Participants	Total Population	Response Rate (%)	Total Participants	Total Students	Response Rate (%)	Total Participants	Total Students	Response Rate (%)
1	146	162	90.7	112	125	89.6	124	168	73.8
2	116	139	82.7	97	126	77.0	78	107	72.9
3	120	150	78.0	98	117	83.8	86	103	83.5
4	88	143	60.1	62	107	57.9	32	136	23.5
Total	470	594	79.1	369	475	77.7	322	514	62.6

Table 2. Participant Demographics by Pharmacy School

Variable		Total		School A		School B		School C	
		N	%	n	%	n	%	n	%
Gender	Male	325	28	99	27	135	29	91	29
	Female	819	72	262	73	329	71	228	72
Ethnicity	White	433	37	235	73	137	30	61	19
	Asian	387	33	63	13	172	37	152	48
	Black	133	12	23	5	62	13	48	15
	Mixed	50	4	11	2	27	6	12	4
	Chinese/Other	150	13	37	8	67	14	46	14.5
First Choice Course	Yes	882	76	291	79	334	71	257	80
	No	274	24	76	21	134	29	64	19
First Choice University	Yes	901	78	332	91	384	82	185	58
	No	250	22	32	9	82	18	136	42
University Place Secured Through	Firm/Insurance	374	57	45	60	166	58	163	54
	Clearing	184	28	16	21	80	28	88	29
	Foundation Year	70	11	2	3	31	11	37	12
	Other	34	5	12	16	9	3.1	13	4
Total		1161		369		470		322	

Table 3. Mean Academic Resilience (ARS-30) and Wellbeing Scores (WEMWBS)

	N	Mean	SD	Range	Theoretical Range[8,9]
Academic Resilience	1080	108.4 *	13.6	60-150	30-150
ARS-30 Subscales					
- Perseverance	1115	55.7 *	7.0	29-70	14-70
- Reflecting and Adaptive Help Seeking	1139	33.3*	5.4	10-45	9-45
- Negative Affective and Emotional Response	1135	19.4 *	5.0	7-35	5-35
Wellbeing	1119	46.4 *	8.6	17-70	14-70

*p< .001 (sample mean significantly lower than published norm) [8,9,36]

Table 4. Overall Academic Resilience and Academic Resilience Subscales by Participant Demographics

	Overall Academic Resilience			Perseverance			Reflecting & Adaptive Help Seeking			Negative Affect & Emotional Response		
	N	Mean	SD	N	Mean	SD	N	Mean	SD	N	Mean	SD
Gender												
Male	303	109.4	13.8	314	56.0	7.0	318	32.7	5.5	317	20.6	5.0
Female	761	108.1	13.7	784	55.6	6.9	805	33.5	5.3	801	18.9	4.8
First Choice University												
Yes	834	108.6	13.4	863	55.9	6.7	880	33.3	5.3	881	19.4	4.8
No	238	107.6	15.2	243	54.8	7.8	249	33.1	5.7	245	19.5	5.2
First Choice Course												
Yes	824	108.6	13.6	849	55.7	6.9	861	33.3	5.3	866	19.5	4.9
No	252	107.7	14.5	262	55.5	7.0	273	33.1	5.7	264	19.0	5.0
Year of Study												
1	353	112.4	12.2	369	57.4	5.8	374	34.5	4.68	370	20.5	4.7
2	273	105.2	16.6	282	53.8	8.7	288	31.9	6.6	287	19.6	4.8
3	282	106.6	12.7	289	55.1	6.3	298	33.4	4.9	298	18.0	4.9
4	172	108.3	12.0	175	56.0	6.0	179	32.8	4.9	180	19.4	5.1
Ethnicity												
White	405	107.6	12.9	419	55.7	6.7	424	32.6	5.1	422	19.2	4.7
Asian	361	108.6	13.9	369	55.5	6.9	382	33.6	5.3	381	19.6	4.9
Black	120	110.4	17.2	127	56.4	8.4	129	33.8	6.2	128	20.0	5.6
Mixed	47	109.5	13.2	48	56.8	5.9	50	34.6	4.7	49	18.3	5.4
Chinese/Other	139	108.1	13.5	144	55.2	6.7	146	33.4	5.7	147	19.4	4.8
University Place Secured Through												
UCAS Firm/Insurance	351	108.5	14.2	359	55.3	7.4	369	33.6	5.7	367	19.4	4.7
Clearing	170	107.7	15.3	178	55.1	7.5	182	32.8	5.7	178	19.7	5.3
Foundation Year	63	109.3	15.0	66	55.6	7.5	67	33.9	5.5	68	20.1	5.7
Other	31	110.3	12.2	33	57.6	5.7	34	33.4	5.5	32	18.9	5.8
School of Pharmacy												
A	441	109.3	12.3	453	56.0	6.0	465	33.6	4.8	457	19.6	4.9
B	340	108.9	12.3	354	56.6	5.9	359	33.3	4.83	361	18.9	4.81
C	299	106.6	17.2	308	54.2	8.9	315	32.8	6.7	317	19.6	5.0