

Building Resilience in Medical Students: “Strengthening You to Strengthen Them”

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Abstract

Medical students, like many health professional students, are at risk for burn-out and other negative well-being outcomes. Research suggests that building resilience may help to mitigate these risks. A multi-disciplinary team developed, delivered, and evaluated a training on building resilience for medical students entitled, “Resilience for Health Providers – Strengthening You to Strengthen Them.” The training program provided parallel learning intended to teach medical students how to apply protective factors to both themselves and their patients. The research team proposed that training medical students to understand mechanisms that support resilience such as motivation and self-efficacy may increase the development of resilience as part of their medical training. Through parallel learning, students can also learn how to apply these mechanisms to their patients. The evaluation of the training’s effectiveness consisted of pre- and post-tests. Medical students’ resilience was measured using the Connor-Davidson Resilience Scale (CD-RISC-10), a tested and validated scale. Findings indicated that post-test scores increased in each domain from pre-test. Participants reported enhanced skill building for both their own resilience and that of patients after the training. Results from the CD-RISC-10 scale showed that the medical students rated slightly lower than the mean identified by the CD-RISC-10 creators. The results from this initial study to strengthen health professionals’ self-reported resilience showed that the training improved medical students’ self-reported resilience and their confidence in assisting houseless participants to improve their understanding of building their own self-resilience.

Keywords

Resilience, Medical Students, Resilience Training, Interdisciplinary

Abbreviations

CD-RISC-10 = Connor-Davidson Resilience Scale
EHPs = emerging health professionals

Introduction

A multi-disciplinary team funded by the Clinical Scholars Program, a national leadership program of the Robert Wood Johnson Foundation (RWJF), brought together areas of expertise to empower students in health care professional programs, referred to as emerging health professionals (EHPs). The team consisted of 2 medical doctors (endocrinologist and internist), a pharmacist, a psychologist, and a social worker. The team

sought to strengthen students’ abilities in areas such as resilience, leadership capacities, and knowledge of managing chronic illnesses such as diabetes and pre-diabetes. This was done through training, mentoring, and modeling. Due to COVID-19, the medical students were unable to work in-person with patients for a period of time, and this placed additional stress on them. At the same time, the stress the medical students experienced created an opportunity to help empower them through resiliency education. Thus, this project aimed to focus on empowering EHPs, specifically medical students, who attended the training discussed in this paper, to build both resilience in themselves while encouraging resilience in the populations with whom they serve through parallel learning. Parallel learning is a technique that teaches something in the classroom setting so that it can be modeled in the practice field.

This paper’s focus is on the results of a resilience training program provided to medical students, “Resilience for Health Providers – Strengthening You to Strengthen Them.” Building resilience was chosen as a mechanism to help the medical students both through the pandemic, as well as their schooling. Using parallel learning techniques, the training also aimed to help students build resilience within their patients.

Resilience

Much of the published literature defines resilience based on the context of each individual paper.¹⁻³ In an integrative review of the resilience literature in health professions, authors indicated that there is no one definition of resilience in recent literature.² However, key themes within resilience definitions can be identified, such as resilience being a dynamic process, involving adaptation and adjustment, and the ability to “bounce back.”² In 2019, Vella and Pai identified common aspects in definitions of resilience as bouncing back and overcoming an adversity; additionally, they emphasized the influence of resilience leading to positive outcomes despite an adverse situation.³

Research suggests that resilience can be learned.^{4,5} A critical review of the resilience literature concluded that resilience can be both learned and improved upon.⁵ Furthermore, it has

recommended discussion of resiliency for all undergraduate health professional students.⁵ Identity building, building coping skills and strengths, and being given the opportunity to reflect and learn from others has been identified as integral to teaching resiliency.⁵

A scoping review of resilience in health professional education found support for the need of resilience enhancement among health professional students, and the authors of that review highlighted a study which indicated that resilience is essential for admission into medical school.⁶ They also identified 22 resilience factors, which included flexibility, motivation, self-efficacy, spirituality, and social support.⁶ Some of the same factors are reflected in the resilience training program described in this study.

In a review of the concept of grit and resilience in the health professions, Stoffel and Cain identified methods for teaching resilience. These methods included problem-based learning, self-care activities, teaching adaptive responses, identifying maladaptive coping mechanisms, and mentorship.⁷ Additionally, individual protective factors were identified as crucial and a major influence on resilience development. These protective factors included coping skills, social support, positive role modeling, and mentorship.⁷

Research specifically with medical students utilizing the Connor Davidson Resilience Scale (CD-RISC-10) has provided additional information of various groups of medical students. The CD-RISC-10 is measured on a scale of 0-40; a higher score indicates higher levels of resilience. In a study in Mexico, the mean score on the CD-RISC-10 of medical students was 37.48 while the score for their psychology students was 35.15.⁸ In a study using the CD-RISC-10 of Canadian medical students, researchers found that female medical students had a mean score of 28.84 and male medical students, a mean score of 31.25.⁹ A study using the CD-RISC-10 examined medical students at the University of Saskatchewan, and found that resilience was a partial mediator of the relationship between attachment and the level of perceived stress.¹⁰ Specifically, resilience altered the way in which stress was perceived, thus altering the response to it.¹⁰ Examining psychological distress among female medical students at Universities in Malang, using the CD-RISC-10, authors found that "...The higher the level of medical students' resilience, the lowest the level of students' psychological distress and vice versa, the lowest the level of medical students' resilience, the highest the level of students' psychological distress".¹¹

Research-Based Protective Factors

For the purpose of the training provided for this project, the designers of the training selected the following protective factors to focus on, based on the literature and on practice experience. These protective factors are similar to the lists provided

above; however, they differ slightly due to the experience of the training designers.

Motivation. Crane and Havercamp "found that the DSP (direct service provider) who is resilient to stress and burnout is motivated by family, social relationships, and the desire to contribute to the well-being of their community (citizenship)".¹² DSPs are similar to the EHPs discussed earlier. In examining challenges faced by pharmacists, specifically during the COVID-19 pandemic, Whitfield and Wilby highlight identifying a connection to one's life and work through motivation and resilience. Additionally, the authors speak to the importance of having purpose to provide for motivation, self-determination, and the ability to bounce back.¹³

Self-Efficacy. In a 2018 study of nurses, Wang et al found that self-efficacy had a direct and positive significant effect on resilience.¹⁴ Studying university students and academic resilience, 1 study found that academic self-efficacy was a significant predictor of resilience.¹⁵

Social Support. For social work students, family and friend social support have been found to be positively associated with resilience.¹⁶ In a study of health care professionals during the COVID-19 pandemic, Brown et al found that participants utilized social support from friends and families to promote resilience.

Other Factors. Having hope and a resilient mindset were identified as important to promoting resilience in a qualitative study.¹⁷ In a study of child welfare workers, hope was directly associated with lower levels of burnout.¹⁸ Initiative-taking was identified as important in resilience of health professionals among focus groups members in the study by Matheson et al as were flexibility and adaptability.¹⁹ Creative thinking was discussed in a study of Lithuanian public health professionals in looking at how creative thinking aided in resilience during the pandemic.²⁰ Finally, communicating effectively to enhance resilience was highlighted in a study of focus groups with nurses caring for older people.²¹

Medical Students

Existing literature supports resilience as a critical aspect influencing medical student success. For example, Cheung et al emphasize that the mental health of this group declines during medical school because of the lack of sleep and high levels of stress and responsibility, indicating that their well-being and resilience may suffer, and they may face higher risks of burnout or failure. Williams et al found that poor mental health is a common problem for medical students. Under these conditions, activities aimed at enhancing resilience are vital for achieving better outcomes. It was also noted by William et al that it helps to be flexible and adaptive to numerous challenges, to build resilience.²²

Research by Bird et al²³ and Cheung et al¹ suggests that curriculum programs can improve resilience. This study sought to advance these findings with an innovative resilience curriculum. The resilience program developed for this study was based on research, the direct practice experience of 2 of the authors, and the needs of the student population.

Resilience Training

The training was created by members of the research team. The training incorporated a parallel learning model that helped the students identify and discuss resiliency factors as they apply to the life of a student in a health profession, and then applied the same concepts to case examples of patients, specifically those struggling with houselessness. Parallel processes and learning involve content taught in the classroom that is similar to the skills needed to achieve learning objectives in direct practice.²⁴ To achieve this parallel learning, the training utilized lecture, self-reflection, examination and application to case examples, and opportunities for question and answer.

The medical students were led through training in 6 research-based protective factors to build their resilience and learn to help those they serve build resilience. These protective factors were: motivation; self-efficacy; appropriate utilization of social support; hope and resilient mindset; initiative-taking, taking charge, and communicating needs; and flexibility and creativity in response to challenges. The trainers then provided examples and descriptions for each protective factor. Students were then led through exercises to help them first implement the protective factor in their own lives, and then in the lives of the population with whom they work.

For example, when discussing the protective factor of motivation, students were asked to think about the reasons they selected their profession, or their “why.” When providing the training, the floor was opened to allow students to share their why. Trainers then spoke to why this motivation is important to resilience, such as, helping one to persist when tired, making a tedious task more doable, or reducing the number of choices that must be made daily. Turning the tables, participants were guided through a reflection on why motivation may increase the resilience of houseless individuals in the case study.

Methods

In 2020, a feasibility study was conducted to examine the effectiveness of this resilience training with a variety of EHPs, including medical, social worker, pharmacy, and psychology students. The training was presented virtually due to the COVID-19 pandemic restrictions on in-person learning activities. Students participated in 1 training. The feasibility study found that scores improved from pre-test to post-test, and the open-ended comments were positive about the impacts of the training. Specifically, results of the feasibility study suggested

that participants were more able to cope with environmental challenges, participants built up their resilience to stress factors, and participants had improved mental health overall. Adjustments were made for the final version of the training that mainly involved improving the training for an asynchronous virtual environment that allowed for a wider audience. The final training was 60 minutes long and included all of the concepts identified previously. In-person, the participant took the training in 1 sitting. Online, participants could take breaks during the training as needed.

Following the feasibility study, a final version of the training was developed, and presented to the current participants in fall of 2021. Participants were identified by the medical school and were asked to participate in the training; the research team did not have to engage in recruitment. All training participants were medical students. The medical students completed a pre-test survey and answered demographic questions before the training started. The pre-test included 6 questions, with answers based on 5-point Likert scale from “not true at all” to “definitely and completely.” Participants were asked to select the answer that best described them, and the questions assessed resilience, understanding of factors related to resilience, ability to teach patients about resilience, comfort level of working with people who are houseless, and competency in helping people who are houseless improve their health. (See **Table 1** for the list of questions). The participants also responded to the full Connor-Davidson resilience scale, a tested and validated scale (CD-RISC-10).²⁵ A QR code and link to the survey were provided to participants using Qualtrics survey software (QualtricsXM, Seattle, WA). After taking the pre-test, the medical students received the hour-long online synchronous version of the resilience training presented by 2 of the authors. At the end of the training, participants then took a post-test with the same 6 questions in the pre-test and the CD-RISC-10 to measure the efficacy of the training. Participants were given a unique survey code so that their pre and post-tests could be matched.

The CD-RISC-10 measures different aspects of resilience, including flexibility, self-efficacy, the ability to regulate emotion, and cognitive focus/maintaining attention under stress. (See **Table 2** for the list of questions). Overall, the scale is described as a measure of hardiness.²⁵ Participants provided responses to the questions based on the prompt: “Please indicate how much you agree with the following statements as they apply to you over the past month. If a particular situation has not occurred recently, answer according to how you think you would have felt.” The scale measures 10 questions on a 5-point scale, ranging from 0 (not true at all) to 4 (true nearly all the time). The total score is obtained by adding the 10 items together. Scores range from 0 and 40 with higher scores indicating higher levels of resilience.²⁵ Population scores for the CD-RISC-10 are reported as mean scores between 31.8 and 32.1.²⁵ The psychometric properties of the scale have been found to apply to a variety of populations, samples, and contexts, and it has been tested

across diverse groups such as university students, health care workers, social workers, and medical students.²⁵

Qualtrics survey software normality and equality of variance tests revealed the data was not normally distributed, hence the median was used as the central tendency instead of the mean.²⁶ In this case, the Wilcoxon Sign-Rank test, which is the non-parametric counterpart of the Paired-Sample *t* test was utilized using R software (R Foundation for Statistical Computing, Vienna, Austria).²⁷ As this was an evaluation of an educational program, the study was determined to be “not human subjects research” per the institution’s Institutional Review Board (IRB) (IRB reference number 2019-00670).

Results

A total of 73 medical students enrolled in the third year of a 4-year medical school program participated in the training. Although this training has been provided to other EHPs, the training session evaluated in this paper was provided only to medical students. In the race/ethnicity question, participants could select multiple responses, thus the percentages do not add up to the number of participants. The majority of participants identified as Asian (66%, *n* = 64), about 23% (*n* = 22) identified as Caucasian, and 15% (*n* = 11) identified as Native Hawaiian or Pacific Islander. About 55% (*n* = 40) of the participants identified as female. Participants were also asked if they have children to whom they have caregiving responsibilities, and 7 (10%) indicated they did.

Almost all participants (72 of 73) completed the pre-test and 58 completed the post-test. The mean scores and standard deviations from the pre and post-tests are displayed in **Table 1**. Participants’ scores on the CD-RISC-10, which was only given at pre-test, ranged from 15 to 40, with the average score being 30 (SD = 5), as displayed in **Table 2**. The reliability measurement for the CD-RISC-10 was high, as indicated by Cronbach’s alpha (α = 0.90).

Table 3 reveals the comparison between the median response of the 53 participants whose pre-test and post-test scores could be matched. The missing participants (*n* = 19) did not provide the information requested to match their scores. Statistically significant improvement was seen between pre- and post-test scores for participants’ understanding of the importance of self-efficacy in resilience (Question 2, *P* = .02). Significant differences were also found in teaching patients to be more resilient (Question 4, *P* < .001) and in feeling competent in using strategies that help people who are houseless live healthy lives (Question 6, *P* < .001). No significant difference was found between pre- and post-training for Questions 1 (*P* = .06), 3 (*P* = .40), or 5 (*P* = .06), a question asking if participants felt that regardless of what happened, they could make it through rough times.

Although overall participant pre-tests and post-tests have the same median scores, the *P*-value of < .001 suggests that the change in the overall distribution of scores from pre-test to post-test is statistically significant. This means that while the median score remained the same (at 4), there were likely significant

Table 1. Resilience Training Pre- and Post-Test Survey Mean Scores Among Third Year Medical Students from Fall 2021		
Question ^a	Pre-test Mean (SD) (N = 72)	Post-Test Mean (SD) (N = 58)
1. Regardless of what happens to me, I believe I can make it through.	4.28 (.77)	4.43 (.57)
2. I understand the importance of self-efficacy in resilience.	4.39 (.66)	4.66 (.48)
3. I understand how motivation helps me to keep trying when things are hard.	4.56 (.50)	4.62 (.49)
4. I can teach my patients skills to be more resilient	3.39 (.88)	4.00 (.68)
5. I feel comfortable working with people who are homeless.	3.76 (.74)	4.05 (.63)
6. I am competent in using strategies that help people who are homeless live healthy lives.	2.96 (.93)	3.78 (.77)

^a Responses based on a 5-point Likert scale with 1 = “not true at all” to 5 = “definitely and completely.”

Table 2. Connor-Davidson Resilience Scale Mean Scores Among Third Year Medical Students from Fall 2021		
Question Prompt: Please indicate how much you agree with the following statements as they apply to you over the past month. If a particular situation has not occurred recently, answer according to how you think you would have felt.	N	M(SD)
I am able to adapt when changes occur.	73	4.10(.61)
I can deal with whatever comes my way.	73	4.01(.63)
I try to see the humorous side of things when I am faced with problems.	73	4.18(.65)
Having to cope with stress can make you stronger	73	4.27(.69)
I tend to bounce back after illness, injury, or other hardships.	73	4.15(.72)
I believe I can achieve my goals, even if there are obstacles.	73	4.25(.62)
Under pressure, I stay focused and think clearly.	72	3.88(.71)
I am not easily discouraged by failure. I think of myself as a strong person when dealing with life’s challenges and difficulties.	72	3.56(.87)

Table 3. Comparison of Pre and Post-test Scores for Medical Students Receiving Resiliency Training (N = 72)			
Variable	Median Pre-test	Median Post-test	P-Value
1. Regardless of what happens to me, I believe I can make it through.	4	4	.059
2. I understand the importance of self-efficacy in resilience.	4	5	.015
3. I understand how motivation helps me to keep trying when things are hard.	5	5	.40
4. I can teach my patients skills to be more resilient	3	4	< .001
5. I feel comfortable working with people who are homeless.	4	4	.060
6. I am competent in using strategies that help people who are homeless live healthy lives.	3	4	<.001

shifts in other aspects of the score distributions. For example, there may have been a change in the variability or the specific distribution of individual responses, even if the median itself did not change there was a significant increase in the participants' scores after the training.

Discussion

The results of the resilience training were similar to what was found with the feasibility study. The scores increased in each area, from personal resilience to building resilience in working with the patients after completing the resilience training. The Paired Samples Wilcoxon test showed that after the training, participants better understood the importance of self-efficacy in resilience. In addition, participants believed they could teach their patients skills to be more resilient. The participants indicated they were more competent in using strategies that help people live healthy lives, and that they are well-equipped with the knowledge, skills, and tools to work with houseless individuals. They also felt they were more able to develop and implement effective strategies, and offer support that can lead to healthier and more stable lives.

Interventions or trainings such as this one are needed to help build resilience in medical students. Resilience helps build coping skills to deal with stress²⁸ and is needed for a successful career.¹ Hayat et al support this idea, saying that higher academic resilience leads to increased self-efficacy and enhanced anxiety management.²⁹

This training was also timely. The training was implemented during the COVID-19 pandemic, and therefore it was even more encouraging to see that the training could improve perceived resilience in medical students. It was encouraging to see that medical students had an improved knowledge of self-efficacy and motivation, and that they felt stronger about being able to make it through. After the training was provided to medical students, the trainings were made available to other EHPs, beyond just medical students, in an asynchronous manner to allow for sustainability and the ability for all EHPs to participate in future implementations. The researchers continue to collect pre- and post-test data on the asynchronous trainings and continue to analyze the emerging data.

The CD-RISC-10 allowed for further insight into the resilience of the participants. The average score of the medical students was 30 which was slightly lower than the population findings by Davidson (2021). This indicates that focus on building resilience in this group of students is timely and needed. The CD-RISC-10 score in this study was slightly higher than reported by Houpy et al, who that found that medical students averaged about 28 on the CD-RISC-10 after stressful clinical events.³⁰ Future studies should include a follow up CD-RISC-10 after the students complete different stages of their schooling and at graduation.

Limitations

There are limitations to this study. This was a small convenience sample; thus, generalization of the findings is limited. There are also concerns for social desirability bias, in that these are students participating in a mandated training and may respond based on how they think they should answer. It cannot be ascertained if the current resilience scores are lower than the other scores reported in the literature due to this sample, due to the COVID-19 pandemic, or due to something else entirely. A post CD-RISC-10 was not completed by participants to determine longevity of the training in improving resilience. Finally, this study was limited to a single, community-based medical school. The study measured whether the students felt more comfortable teaching the protective factors to their patients, which was a self-reported measure based on students' own thoughts of what they would do in the future. Thus, these findings may not be generalizable to other EHPs or other academic settings.

Summary

This training was a novel approach to building resilience in medical students through a parallel learning model. The aims of the training were to help the students learn how to build their own protective factors and teach them how to build those factors in their patients. The study found that the training increased self-assessed skills in building resilience among both the students and the patients with whom they work. The training team continues to provide asynchronous resilience training using this established curriculum with the goal of improving EHPs' own resilience, as well as the resilience of their patients.

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Conflict of Interest

None of the authors identify a conflict of interest.

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