

Exploring Adverse Childhood Experiences in Healthcare Professional Students: Insights from a Mixed-Methods Pilot Study

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Research Article

Keywords: adverse childhood experiences, healthcare professional students, trauma-informed education, well-being, burnout, health professions education

Posted Date: April 9th, 2026

DOI: <https://doi.org/10.21203/rs.3.rs-9034259/v1>

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Additional Declarations: No competing interests reported.

Abstract

Background

Adverse childhood experiences (ACEs) are associated with long-term mental and physical health outcomes and may influence vulnerability to stress and burnout. Despite growing attention to clinician well-being, limited empirical research has examined ACE prevalence among healthcare professional (HCP) students or how early adversity may shape training experiences. This mixed-methods pilot study assessed ACE prevalence and demographic predictors among HCP students and explored students' perceptions of how ACEs influence well-being and professional development.

Methods

One-hundred and fifty students from medicine, nursing, occupational therapy, physician assistant, and physical therapy programs at a private research university in the United States participated in the survey. Participants completed an online survey including sociodemographic items and the ACE questionnaire. Descriptive statistics and multiple linear regression were used to examine prevalence and predictors of ACE scores. Semi-structured interviews were conducted with eight students and analyzed using reflexive thematic analysis.

Results

Overall, 83.3% of participants reported at least one ACE and 32% reported four or more. Mean ACE score was 2.80 (SD = 2.28). Nursing students reported significantly higher ACE scores than medical students ($B = 1.19, p = .006$), and non-White students reported higher scores than White students ($B = 0.92, p = .016$). Age and gender were not significant predictors. The most frequently reported ACEs were verbal abuse (53.3%), living with a household member with mental illness (45.3%), and physical abuse (35.3%). Qualitative findings indicated that students perceived ACEs as influencing stress vulnerability, professional identity formation, and burnout risk, while also noting limited formal integration of trauma-informed content within training programs.

Conclusions

ACEs were highly prevalent among HCP students, with significant differences observed by program type and race/ethnicity. Findings highlight the importance of integrating trauma-informed educational approaches and targeted student supports to promote resilience and well-being among future healthcare professionals.

Background

Adverse Childhood Experiences (ACEs) are potentially traumatic events that occur before the age of 18 and are typically categorized into three domains: abuse, neglect, and household dysfunction such as divorce, death, exposure to substance use, and mental health problems among family members (1–5). Extensive research has linked ACEs to a wide range of adverse health outcomes, including chronic diseases, physical and psychological disorders, participation in high-risk behaviors, developmental challenges, and increased healthcare utilization (6). The seminal Centers for Disease Control and Prevention (CDC) Kaiser Permanente ACE Study revealed a strong relationship between cumulative exposure to childhood adversity and numerous health risk factors associated with leading causes of adult morbidity and mortality (7). Such traumatic experiences early in life can predispose individuals to chronic health conditions including cardiovascular disease, lung disease, depression, as well as reduced life expectancy (1). Multiple studies have incorporated the ACE questionnaire across diverse populations, consistently demonstrating similar patterns of association between early adversity and poor health outcomes (1,2). Due to the profound implications of early adversity on long-term health and functioning, this study explores how ACEs influence the well-being, empathy, and professional development of future healthcare providers.

Students entering healthcare professions (HCPs) are particularly vulnerable to stress and burnout due to the rigorous demands of their academic and clinical training (8). There is limited knowledge about the effects of early life adversity on HCP students,

especially concerning how such experiences may influence their resilience and susceptibility to burnout. Emerging evidence indicates that HCPs report higher ACE scores than the general population. This disparity raises concerns about the emotional toll and demands placed on those entering HCPs (9). Healthcare professionals face stressors in the workplace that can augment the effects of their personal history with ACEs. Providing care to traumatized clients may also contribute to re-traumatization in healthcare workers (10). Despite growing attention to clinician well-being, relatively few studies have examined the prevalence and implications of ACEs among healthcare professional students.

Trauma Informed Care (TIC) is recognized as a person-centered approach to trauma and healing through interpersonal interactions (11). According to the Substance Abuse and Mental Health Services Administration (SAMHSA), there are four responses (the “Four R’s”) meant to foster healing and recovery in people exposed to adversity in childhood. These include realizing, recognizing, responding and resisting (12). These principles emphasize the importance of understanding how trauma affects individuals, identifying signs and symptoms of trauma, integrating this knowledge in policies and practices, and actively working to prevent re-traumatization.

Researchers have demonstrated that HCPs who incorporate TIC practices into their care are more likely to correctly diagnose their patients, create therapeutic relationships and minimize re-traumatization in their patients (13). Furthermore, healthcare systems that incorporate trauma-responsive care may improve patient outcomes, quality of service and staff well-being (9). Understanding ACE exposure in this group is essential to designing trauma-informed educational approaches and fostering sustainable, empathic clinical practice.

Significance

ACEs are associated with significant negative mental health outcomes including substance use disorders, anxiety, post-traumatic stress disorder, and depression (3). Nursing students with four or more ACEs show significantly higher depression, anxiety, and stress scores (14). Medical students exhibit a dose–response pattern in which increased ACE exposure is linked to suicidal ideation, clinical depression, and higher overall stress (15). Other studies note associations with feelings of sadness, worthlessness, anxiety, and secondary traumatic stress (16).

Research has shown that people may be drawn to careers in healthcare to rewrite the narrative of their own personal trauma (17). Several studies also recommend trauma-informed curricular approaches to address the challenges posed by such early adversities (18–20). Understanding the ACE profiles of HCP students is essential, as it can inform the development of targeted interventions aimed at enhancing well-being in future HCPs, which may foster a more resilient and well-prepared healthcare workforce, ultimately improving patient care and patient outcomes.

Research has demonstrated that there is a link between ACEs and impaired work performance (21). Evidence suggests that adverse childhood experiences may contribute to occupational impairment among healthcare workers, including increased illness-related absenteeism (22). Within nursing, the inherent stress of clinical work may further compound the long-term sequelae of childhood adversity, potentially affecting work performance (23).

ACEs

Since introducing the constructs of ACEs more than three decades ago, researchers and professionals worldwide have utilized the knowledge of early life adversity to enhance individuals’ psychological and physical well-being across their lifespan (7). The most significant principle from this body of research is that childhood adversity can have enduring consequences throughout one’s life (24,25). Global evidence indicates that ACEs are linked to at least one-third of mental and behavioral disorders. These significant experiences in early childhood can cause a profound chemical response, affecting brain development, gene expression, and immune function (5). Documented physical outcomes of ACEs encompass a range of severe health conditions such as cancer, stroke, heart disease, severe obesity, diabetes, depression, and suicide (1,2). ACEs are associated with risk behaviors that jeopardize health and well-being, including smoking, alcohol, and drug abuse, as well as poor academic performance, unemployment, and incarceration (26).

The number of ACEs experienced is inversely correlated with quality of health and life opportunities. Since 2009, The Behavioral Risk Factor Surveillance System (BRFSS), an annual survey from the CDC collects data on the risk factors and health conditions of

United States (US) adults. Data as of 2020 is gathered on prevalence of ACEs by category and ACE score prevalence (27). Data from the BRFSS survey of US adults from 2011-2020 shows that nearly two-thirds (63.9%) of those surveyed had experienced one or more ACEs (5). In this same study, females (19.2%), as well as those with household incomes less than \$15,000 (24.1%), less than a high school education (20.5%), and unemployed (28.8%), have the highest prevalence of four or more ACEs. Research has found that those who have experienced four or more ACEs have a 390% increased probability of chronic pulmonary disease, a 240% increased probability of hepatitis, and a markedly elevated odds of depression and suicide attempt (28). The most reported ACE type was emotional abuse (34.0%), followed by parental separation or divorce (28.4%) and household substance abuse (26.5%) (5). These findings highlight the substantial and potential long-lasting influence of ACEs on health outcomes throughout adulthood (29).

ACEs among HCP students

There is long-standing evidence of a strong correlation between a person's exposure to ACEs and the likelihood of developing mental health issues (3,21,29–31). Students in HCP programs are exposed to traumatic content in their coursework and their clinical work. Research has shown that people exposed to adversity during childhood are at risk for secondary traumatic stress and re-traumatization (32). This puts HCP students with ACEs at increased risk of cumulative stress and exacerbated mental health issues (33).

Compared to the general population, ACEs rates are higher in helping professions. In one study of 419 medical students, 74.6% reported experiencing at least one ACE and 25.8% reported experiencing four or more (17). In studies of medical, nursing, social work, and other health science students, 51% to 88.5% of students reported at least one ACE. Those students who reported four or more ACEs vary from 12% to over 40% (15). These findings are higher than the latest BRFSS data (2023), which revealed that 64% of adults reported one or more ACEs and 17.3% reported four or more (5,27). Several studies among HCP student populations note that the most frequently reported ACEs included emotional abuse, physical abuse, and witnessing violence (14,15,34).

Among healthcare professional trainees, nursing students may represent a particularly vulnerable subgroup and there is a call for curricular revisions needed to support stress and promote resilience (34). In a study of ACEs among undergraduate nursing students, students with ACE scores of four or higher reported higher rates of depression, anxiety, and stress (14). Medical students are also at increased risk for mental health concerns, with anxiety and depression prevalence reported as high as 54% and 50% respectively and suicidal ideation estimates reaching 11% (35,36). The cumulative effects of childhood adversity, exposure to traumatic clinical content during training, and caring for patients with histories of ACEs may place healthcare professional students at heightened risk for psychological distress. These concerns have contributed to growing interest in incorporating trauma-informed care (TIC) into healthcare education and practice, which has been shown to support the well-being of both patients and healthcare professionals. However, TIC implementation remains an emerging area that requires further evidence to support widespread organizational adoption (13).

Objectives

The evidence from published research suggests that unaddressed ACEs may contribute to burnout, secondary traumatic stress, and impaired well-being during training and professional practice. The aim of this mixed-methods study was to assess the prevalence of ACEs among healthcare professional students and to explore how students perceive the relevance of early adversity to their training experiences. Specific objectives were to: (1) examine patterns of ACE scores across demographic and program characteristics; (2) explore students' perceptions of how ACEs influence stress, resilience, and professional identity; and (3) integrate quantitative and qualitative findings to better understand subgroup differences.

Methods

Design and Setting

This study used a convergent mixed-methods design. Quantitative survey data and qualitative interview data were collected concurrently and integrated during interpretation. The study was conducted at a private, federally chartered research university in the mid-Atlantic United States during the 2025 academic year.

This study was determined to be minimal risk and was approved by the Institutional Review Board (IRB) at the academic setting of the research (NCR246153). Using a convenience sampling technique, HCP students enrolled in HCP programs were recruited to participate, which was chosen due to its accessibility and feasibility, allowing the research team to recruit readily available participants. The HCP programs included medicine, nursing, physician assistant (PA), physical therapy (PT), and occupational therapy (OT). Interested students used a QR code or survey link to access the eligibility screener, developed using Research Electronic Data Capture (REDCap). Once screened, study participants accessed the informed consent and surveys. Upon completing the surveys, participants were asked if they could be contacted for follow-up interviews. Those who agreed were contacted via email for scheduling.

Quantitative Instrument

Participants completed a single online survey including a sociodemographic questionnaire, the ACEs questionnaire for adults (7). The full survey is available in Appendix A.

The ACEs questionnaire assessed the number of adverse experiences by the participant before the age of 18 (7). This 10-item questionnaire accounts for emotional and physical abuse as well as neglect and other negative experiences resulting from a dysfunctional and unstable household. ACEs include emotional abuse, physical abuse, sexual abuse, emotional neglect, physical neglect, mother treated violently, substance abuse in the household, mental illness in the household, parental separation or divorce, and incarceration of a household member (37). The ACEs questionnaire remains a reliable, valid, and cost-effective screening tool with good internal and external validity well tested across populations (38–40). The questions require a yes/no response, and each affirmative (yes) response is assigned 1 point. An ACEs score of 4 or greater indicates a higher risk of adverse health problems.

Qualitative Data Collection

Following the completion of survey data collection and analysis, participants who expressed interest were invited to complete an individual interview (Appendix B). Eight students elected to complete one-on-one interviews with a member of the research team. All interviews were conducted over Zoom to allow flexibility in scheduling for members of the community, and all interviews were semi-structured in nature. Interviews were recorded and transcribed using Zoom's internal tools. Transcripts were manually reviewed and corrected before uploading to NVivo 15 for analysis. Qualitative analysis was conducted following an approach to thematic analysis wherein data were systematically coded, refined into categories, and refined through multiple rounds of review with members of the research team to ensure coherence and trustworthiness (41). Final themes were defined, named, and supported with illustrative quotations.

Ethical Considerations

This study was reviewed and approved by our IRB and conducted in accordance with the principles of the Declaration of Helsinki. Participation in this study was entirely voluntary, and students were informed of their rights and protections prior to participating (e.g., participation would have no impact on their academic standing). Informed consent was collected at two distinct points in the study: via REDCap immediately prior to completing the online survey and again prior to completing an individual interview. Given the sensitive nature of ACEs, participants were reminded that they were able to skip any questions or end their participation in the study at any time without penalty. Furthermore, a list of mental health and well-being resources and contacts were provided to students during data collection.

Results

Descriptive statistics were computed to summarize the distribution of key variables, including means, standard deviations, and frequencies. Bivariate correlations (Pearson's r) were conducted to explore preliminary associations between ACE scores and demographic variables such as program type, gender, race, and age. These correlations informed model selection and helped assess potential multicollinearity prior to regression analysis. Collinearity diagnostics, including variance inflation factor (VIF) and

tolerance statistics, were also examined to ensure the independence of predictors in the regression model. Residual plots, histograms, and normal probability plots were reviewed to evaluate model assumptions.

A multiple linear regression was conducted to examine predictors of ACE scores. Predictor variables included program type (nursing, other), gender, race, and age. Categorical variables were dummy coded, with medicine, female, and white students serving as the reference categories. Age was treated as a continuous predictor. The regression model was used to estimate the independent effect of each variable on ACE total scores. Collinearity diagnostics confirmed that the regression model's assumptions were met.

Sample Characteristics

A total of 172 participants initiated the eligibility screener, however only 150 met inclusion criteria and were included in the final analysis. The age of participants ranged from 23 to 44 years ($M = 28.64$, $SD = 4.80$). The most common age was 26. Most respondents were between the ages of 25 and 34 ($n = 110$, 73.3%). The sample was largely female ($n = 116$, 77.3%). Most participants identified as White ($n = 97$, 64.7%), with 16.7% ($n = 25$) identifying as Asian, 9.3% ($n = 14$) as Black or African American, and 8.0% ($n = 12$) as other. The largest proportion of participants were enrolled in medicine ($n = 77$, 51.3%) and nursing ($n = 52$, 34.7%) programs. The remaining participants were from OT ($n = 15$, 10.0%), PA ($n = 4$, 2.7%), and PT ($n = 2$, 1.3%) programs. Table 1 presents the demographic characteristics of the sample.

Table 1
Demographic Characteristics of Participants (N = 150)

Variable	n	%
Age Group		
< 25	11	7.3
25–34	110	73.3
35–44	18	12.0
Gender		
Female	116	77.3
Male	23	15.3
Non-Binary	1	0.7
Race*		
White	97	64.7
Black or African Am.	14	9.3
Asian (any)	25	16.7
Other Race	12	8.0
Program		
Medicine	77	51.3
Nursing	52	34.7
Occupational Therapy	15	10.0
Physician Assistant	4	2.7
Physical Therapy	2	1.3

Note. Percentages are based on the total sample (N = 150). Race categories are not mutually exclusive, and totals may exceed 100%.

Prevalence and Distribution of ACE Scores

The average ACE score in the sample was 2.80 (SD = 2.28), with a median and mode of 2. ACE scores ranged from 0 to 10. Participants were categorized into low-risk (< 4 ACEs) and high-risk (≥ 4 ACEs) groups. Sixty-eight percent of participants (n = 102) reported a low-risk ACE score, while 32% (n = 48) were in the high-risk group (Fig. 1).

The most frequently reported ACE was verbal abuse (53.3%). This was followed by having a mentally ill household member (45.3%) and experiencing physical abuse (35.3%). Less commonly reported ACEs included household incarceration (9.3%), emotional neglect (16.7%), and substance abuse in the home (33.3%). Notably, 20.7% of participants reported experiencing sexual abuse. An equally high percentage (20.7%) indicated they had not felt loved or supported during childhood, reflecting emotional neglect. Table 2 presents the frequency distribution of individual ACEs among participants.

Table 2
Frequency of Individual ACE Categories (N = 150)

ACE Category	n	Percent
Emotional Neglect	25	16.7
Loss of a Parent	36	24.0
Mentally Ill Household	68	45.3
Substance Abuse	50	33.3
Household Violence	33	22.0
Incarcerated Household	14	9.3
Verbal Abuse	80	53.3
Physical Abuse	53	35.3
Not Feeling Loved	31	20.7
Sexual Abuse	31	20.7
<i>Note.</i> Frequencies are based on cases (N = 150).		

ACE Scores by Program Type

Mean ACE scores varied across academic programs (Table 3). Nursing students reported the highest average ACE score (M = 3.40, SD = 2.58), followed by PA students (M = 3.25, SD = 4.03) and OT students (M = 3.07, SD = 2.52). Medical students reported a lower mean ACE score (M = 2.34, SD = 1.82), and PT students reported a mean of 2.50 (SD = 3.54).

Table 3
Mean Total ACE Scores by Program Type (N = 150)

Program	<i>M</i>	<i>SD</i>	<i>n</i>
Medicine	2.34	1.82	77
Nursing	3.40	2.58	52
Occupational Therapy (OT)	3.07	2.52	15
Physician Assistant (PA)	3.25	4.03	4
Physical Therapy (PT)	2.50	3.54	2
<i>Note.</i> ACE = Adverse Childhood Experiences. Higher scores indicate greater exposure to childhood adversity.			

Bivariate Analysis

Pearson’s correlations were conducted to examine associations between ACE scores and demographic characteristics. ACE scores were significantly associated with race/ethnicity ($r = .19, p = .016$) and program type ($r = .25, p = .006$), such that non-White students and nursing students reported higher ACE scores. No significant associations were observed with age ($r = -.05, p = .52$) or gender ($r = .11, p = .17$).

Regression Analysis

A multiple linear regression was conducted to further explore predictors of ACE scores, with race/ethnicity, program type, gender, and age entered as independent variables. The model was statistically significant, $F(5, 144) = 3.23, p = 0.008$, accounting for 10.1% of the variance in ACE scores ($R^2 = 0.10$). Race and program type emerged as significant predictors: non-White students reported higher ACE scores compared to White students ($B = 0.92, SE = 0.38, \beta = 0.19, p = 0.016$), and nursing students reported higher ACE scores compared to medical students ($B = 1.19, SE = 0.42, \beta = 0.25, p = 0.006$). Neither age nor gender were significant predictors ($p > 0.05$) (Table 4).

Table 4
Multiple Linear Regression Predicting ACE Scores from Demographic Variables

Predictor	B	SE B	β	t	p
Race (Non-white vs White)	0.922	0.378	0.194	2.440	0.016*
Program Type (Nursing vs Medicine)	1.185	0.423	0.248	2.804	0.006*
Program Type (Other vs Medicine)	0.857	0.546	0.131	1.569	0.119
Gender (non-female vs Female)	0.611	0.440	0.111	1.390	0.167
Age	-0.020	0.031	-0.054	-0.645	0.520
Note. B = unstandardized regression coefficient; SE B = standard error of B; β = standardized coefficient; ACE = Adverse Childhood Experiences. Reference groups were Medicine (program type), Female (gender), and White (race). * $p < .05$.					

Qualitative Results

Analysis of eight semi-structured interviews yielded six overarching themes: (1) Personal Impact of ACEs on health and well-being, (2) ACEs and health care education, (3) self-awareness and professional identity formation, (4) responses to ACE questionnaire, (5) ACEs and burnout prevention, (6) implications for patient care and outcomes. Themes were identified through a reflexive thematic analysis process and refined through iteration to ensure they were internally coherent and distinct from one another (41). Of the eight participants, four were medical students, three were nursing students, and one was an occupational therapy student. Table 5 summarizes the themes, subthemes, and illustrative quotations identified through reflexive thematic analysis.

Theme One: Personal Impact of ACEs on Health and Well-being

Students described the enduring effects of childhood adversity on their emotional, physical, and relational health. Many perceived a direct link between ACEs and their susceptibility to stress and burnout in their training. As one nursing student explained, “*If well-being wasn’t prioritized in childhood, it can compound burnout risk in healthcare (Nursing Student, P5).*” A medical student reflected on how “*Trauma and stress can lead to chronic dysfunction and affect relationships.*” (Medical Student, P1). This same student discussed how exposure to early adversity causes them to feel more guarded in their relationships.

Theme Two: ACEs and Healthcare Education

Students reported that ACEs were inconsistently addressed in their training programs. While some students recalled brief exposure to ACEs in their coursework, many described a lack of structured integration. As one medical student stated, “*Knowing about ACEs helps you approach patients without fear or overconfidence (Medical Student, P7).*” A different medical student commented, “*I’d learned about ACEs but never seen the questionnaire (Medical Student P2).*” These observations suggest an awareness of the importance of ACEs in understanding the totality of the patient experience but also highlight opportunities for curricula to more intentionally incorporate trauma-informed education in clinical training programs. This integration may benefit not only the students entering a caring profession, but also patients downstream.

Theme Three: Self-Awareness and Professional Identity Formation

Several students connected their personal experiences of adversity to their motivations for entering healthcare and to their developing professional identity. One medical student noted that, *"Because [redacted] happened to me, I want to be [a different] kind of practitioner..."* (Medical Student, P3). Others highlighted the importance of maintaining healthy professional boundaries, while recognizing that shared experiences with patients may be a strength. One nursing student noted that *"Encountering patients with similar experiences can be a strength, but you must anchor yourself in your professional role."* (Nursing Student, P6). In this way, shared identity may allow for greater trust to develop between clinician and patient.

Theme Four: Responses to the ACE Questionnaire

Student responses to the ACE questionnaire were mixed. Some valued it as a useful tool for awareness and starting self-reflection, while others found it limited and reductive. One OT student described it as *"simplistic but a good introduction,"* (OT Student, P8) whereas another medical student remarked that the questions were *"...not nuanced enough to capture complex experiences."* (Medical Student, P2). This variability in response to the instrument suggests a recognition that adversity is many and a concern that a 10-item instrument may not be sufficient to capture the nuance of an individual's experiences.

Theme Five: ACEs and Burnout Prevention

Students linked ACE exposure to both resilience-building as well as risk for burnout. Some students described using adversity as a source of strength, while others expressed their concerns about re-traumatization and risk of burnout in clinical environments. These feelings presented differently across participants. One medical student discussed feelings of anger and reflected, *"Working in the ER during COVID, I realized anger meant it was time to leave."* Another nursing student noted, *"Resilience is applauded [in health care], but it isn't always healthy."* (Medical Student, P7).

Theme Six: Implications for Patient Care and Outcomes

Students reflected on how their personal histories and exposures to ACEs informed their clinical approach. Some students described these experiences as deepening empathy and commitment to patient care, with one medical student noting, *"Shared experiences can deepen compassion and investment in patient outcomes."* (Medical Student, P3). At the same time, participants acknowledged that unresolved trauma could have unintended consequences for patient care. One nursing student specifically noted, *"Boundaries are important... you don't want to impose your trauma on patients."* (Nursing Student, P5).

Discussion

This study contributes new evidence of the prevalence and impact of ACEs among HCP students. Quantitative findings demonstrated that ACEs were highly prevalent: 83.3% of participants reported at least one ACE and 32% reported four or more. These rates are substantially higher than estimates in the US general population (64% and 17.3%, respectively) and fall on the higher end of ranges reported in prior studies of HCP students (51–88.5% with ≥ 1 ACE; 12–40% with ≥ 4 ACEs) (5).

The most common ACEs reported in this study were verbal abuse (53.3%), living with a household member with mental illness (45.3%), and physical abuse (35.3%). These rates exceed population averages such as those from the BRFSS, where only 17.3% of adults reported living with someone with mental illness and 23.3% reported physical abuse. Sexual abuse was reported by 20.1% of students, which is alarmingly higher than the 12.6% reported in national samples (5). These findings underscore not only the high overall prevalence of ACEs in HCP students but also the disproportionate exposure to specific forms of abuse and household dysfunction that carry long-term implications for mental health, burnout, and interpersonal relationships (33).

Regression analysis revealed program and demographic specific differences. Nursing students reported the highest mean ACE scores ($M = 3.40$), followed by PA and OT students, whereas medical students reported comparatively lower scores ($M = 2.34$). Students identifying as non-White had significantly higher ACE scores than their White peers suggesting that structural inequities and professional pathways may shape the distribution of ACE exposure within healthcare training programs, raising important considerations for how curricula and supports are designed.

Qualitative findings strengthened quantitative results by highlighting how students made sense of their experiences. Participants described the lingering impact of ACEs on their health and professional identity, with one nursing student reflecting, *"If well-being wasn't prioritized in childhood, it can compound burnout risk in healthcare."* (Nursing Student, P5). Students also emphasized the

absence of ACEs in formal curricula, with some calling for integration into training, with one medical student stating, “*Knowing about ACEs helps you approach patients without fear or overconfidence.*” (Medical Student, P7). While personal ACEs awareness was seen as an advantage in terms of approaching patient care, students emphasized that this awareness should be balanced with professional boundaries, with one nursing student observing, “*Encountering patients with similar experiences can be a strength, but you must anchor yourself in your professional role.*” (Nursing Student, P6). These reflections show how a personal history of ACEs may both inform and complicate the development of students’ professional roles.

These findings suggest that exposure to childhood adversity may be a common yet underrecognized dimension of healthcare professional training environments. High rates of reported abuse, neglect, and household dysfunction align with qualitative perspectives of how such experiences shape coping, boundaries, and career trajectories in students entering HCPs. Elevated ACE scores among nursing and non-White students highlight inequities within this student population and call for a holistic and student-centered approach to education and support.

Strengths and limitations

This study has several strengths. First, the use of a mixed-methods design allowed for the integration of quantitative prevalence data with qualitative insights into students’ lived experiences, providing a more comprehensive understanding of how ACEs may influence well-being and professional development among HCP students. The inclusion of students from multiple clinical training programs, including medicine, nursing, occupational therapy, physician assistant, and physical therapy, allowed for preliminary comparisons across healthcare disciplines. In addition, the study contributes to a growing but still limited body of literature examining ACE exposure specifically among HCP students and provides both descriptive prevalence estimates and contextual perspectives on how students interpret these experiences within their training.

Several limitations should also be considered when interpreting the findings. First, the study was conducted at a single private research university in the United States, which may limit the generalizability of the findings to other institutional settings or healthcare training programs. Second, the use of convenience sampling may introduce selection bias, as students with personal interest in the topic may have been more likely to participate. ACE exposure was assessed through retrospective self-report, which may be subject to recall bias or underreporting due to the sensitive nature of the questions. Additionally, while the qualitative component provided important contextual insights, the small interview sample limits the breadth of perspectives captured. Finally, the cross-sectional design prevents conclusions regarding causality between ACE exposure and student well-being or professional development outcomes.

Despite these limitations, this study provides important preliminary evidence regarding the prevalence and perceived impact of ACEs among healthcare professional students and highlights opportunities for trauma-informed approaches within health professions education.

Implications for Training and Practice

The findings emphasize an urgent need for trauma-informed educational strategies. First, ACEs should be explicitly addressed in health professional curricula, not only as a risk factor among patients but also as experiences that shape future HCPs. Second, institutions must provide supports such as peer groups, reflective practice sessions, and access to mental health resources, that acknowledge and support students who may have experienced early life adversity and are entering a stressful career (42). Lastly, addressing program-specific differences in personal ACEs (e.g., nursing students’ higher ACE profiles) may prevent burnout and strengthen workforce resilience.

Conclusions

This study demonstrates that ACEs are highly prevalent among HCP students, with one in three reporting exposure to four or more ACEs. These findings highlight the hidden burden of trauma within the training of future HCPs and underscore the need for trauma-informed and resilience-building strategies within health professions education. By integrating trauma-informed teaching approaches, institutions can better prepare students not only to survive training but to flourish as resilient, compassionate clinicians. This work should expand across diverse institutions and populations, incorporating larger and more inclusive

populations to design interventions that foster whole-person health and break cycles of adversity. Ultimately, attending to the personal human experiences of students is fundamental to shaping a sustainable, empathetic, and effective healthcare workforce.

Abbreviations

ACEs: Adverse Childhood Experiences

HCP: Healthcare Professional

TIC: Trauma Informed Care

BRFSS: Behavioral Risk Factor Surveillance System

Declarations

Ethics approval and consent to participate

This study was approved by the Institutional Review Board at the George Washington University (IRB# NCR246153). All participants provided informed consent prior to participation.

Consent for publication

Not applicable.

Availability of data and materials

The datasets generated and/or analyzed during the current study are available from the corresponding author on reasonable request.

Competing interests

The authors declare that they have no competing interests.

Funding

This research received no specific grant from any funding agency in the public, commercial, or not-for-profit sectors.

Authors' contributions

Michelle Clausen led the study and served as corresponding author. She directed study implementation, data acquisition, analysis, and interpretation, and drafted and critically revised the manuscript for important intellectual content.

Julie Gibbons contributed to the conception and design of the work, supported data interpretation, and critically revised the manuscript for important intellectual content.

Shivani Saravanan contributed to data acquisition and analysis and critically revised the manuscript for important intellectual content.

Leigh Frame contributed to the conception and design of the work, supported interpretation of findings, and critically revised the manuscript for important intellectual content.

Patrick Corr served as the senior mentor overseeing the project, contributed to the conception and design of the work, provided oversight of methodological and analytic decisions, supported interpretation of findings, and critically revised the manuscript for important intellectual content.

All authors approved the final version to be published and agree to be accountable for all aspects of the work, ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved.

Declaration of Generative AI

The authors used OpenAI's ChatGPT (GPT-5, OpenAI, 2025) to assist with formatting and reference organization. The authors reviewed and verified all content for accuracy and take full responsibility for the final version of this manuscript.

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Table

Table 5 is available in the Supplementary Files section.

Figures

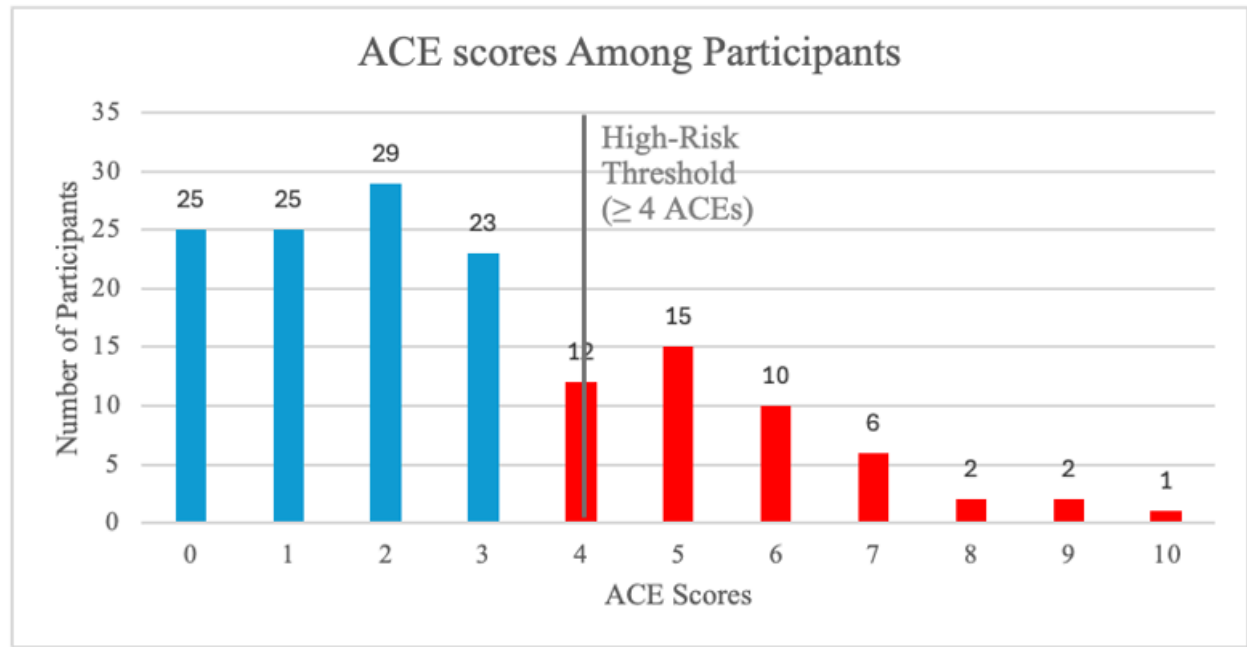


Figure 1

Legend not included with this version

Supplementary Files

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