JOTE Journal of Occupational Therapy Education

Volume 5
Issue 2 *Online and Simulation Learning in Occupational Therapy Education*
Article 9

2021

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Recommended Citation

Miller-Cribbs, J., Bragg, J. E., Isaacson, M., Nay, E. D., Howell, D., Rodriguez, K., Wen, F., Jelley, M., & Coon, K. (2021). Evaluation of a Simulation-Based Training Program on Childhood Trauma with Occupational Therapy Students. *Journal of Occupational Therapy Education, 5* (2). https://doi.org/10.26681/jote.2021.050209

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Abstract

An educational and simulation-based training model, the *Professional ACEs-Informed Training for Health Professionals* designed for allied health students was evaluated using a pre-and-post design. The training model emphasizes trauma-informed care and uses social simulation to educate and train students with skills to address adverse childhood experiences. This study evaluated occupational therapy students' (N=70) levels of self-efficacy and knowledge of trauma-informed care at both pre- and post-training. Analysis of variance results indicated a statistically significant improvement in students' levels of general self-efficacy and knowledge from pre- to post-assessment ($p < .01$). These results are suggestive of the usefulness of brief didactics combined with simulation to educate occupational therapy students on adverse childhood experiences and trauma-informed care.

Keywords

Childhood trauma, adverse childhood experiences, simulation, trauma-informed care

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Volume 5, Issue 2

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ABSTRACT

An educational and simulation-based training model, the *Professional ACEs-Informed Training for Health Professionals* designed for allied health students was evaluated using a pre-and-post design. The training model emphasizes trauma-informed care and uses social simulation to educate and train students with skills to address adverse childhood experiences. This study evaluated occupational therapy students' (N=70) levels of self-efficacy and knowledge of trauma-informed care at both pre- and post-training. Analysis of variance results indicated a statistically significant improvement in students' levels of general self-efficacy and knowledge from pre- to post-assessment ($p < .01$). These results are suggestive of the usefulness of brief didactics combined with simulation to educate occupational therapy students on adverse childhood experiences and trauma-informed care.

Introduction

Extant literature has consistently demonstrated a significant and strong association between childhood exposure to trauma and adversity with the adoption of high-risk behaviors and negative health and mental health outcomes across the lifespan (Anda et al., 2010; Dong et al., 2004; Hertzman & Boyce, 2010; Hunt et al., 2017). Increased understanding of the links between human development, the developing brain, and the influence of adversity, trauma, and toxic stress on health and well-being provide possibilities for interventions across a wide variety of health professions, including occupational therapy (Cramm et al., 2013; Gronski et al., 2013; Shah et al., 2016; Waite et al., 2010). The necessity to educate and prepare health professionals to understand the complexities of the social determinants of health and to intervene in new ways to ameliorate health disparities and human suffering is fundamental to most allied health professions. It is not uncommon for occupational therapists to provide services to individuals and families, who have experienced functional limitations, disabilities, chronic pain, or mental health disorders—conditions that are significantly associated with trauma exposures and adverse childhood experiences (Cramm et al., 2013; Gronski et al., 2013).

Literature Review

Adverse Childhood Experiences (ACEs) have a significant dose-response relationship with health across the lifespan. Three categories of ACEs were included in the landmark ACEs study (Felitti et al., 1998) and these include: abuse (physical, emotional, sexual), neglect (emotional and physical), and household dysfunction (mental illness, incarcerated relative, mother treated violently, substance abuse by a caregiver, and divorce). Research documents that ACEs are common and that they intersect with other forms of vulnerability and disadvantaged circumstances such as poverty (Halfon et al., 2017; Wade et al., 2014; Yoshikawa et al., 2012).

Trauma exposures and ACEs are associated with a myriad of negative outcomes in children, adolescents, and adults. Maltreated children and adolescents are highly vulnerable to threats against their development and well-being into adulthood (Bethell et al., 2017; Hertzman & Boyce, 2010; Thompson et al., 2012). Parental divorce or separation, parental incarceration, and witnessing violence in the home have all been associated with delinquency and problematic or maladaptive behaviors, including offending behaviors (Baglivio & Epps, 2016). Having a parent with a substance abuse problem is associated with substance abuse in adolescence (Baglivio & Epps, 2016; Hamburger et al., 2008), and greater exposure to ACEs and trauma is associated with lower levels of mental health service use among adolescents and creates barriers to health care (Guterman et al., 2002; Miller-Cribbs et al., 2016).

The collective impact of exposure of trauma and ACEs is known as the *cumulative ACEs approach,* and research documents that these exposures are interrelated and contribute to the negative impacts of well-being across the lifespan (Anda et al., 2010; Dong et al., 2004; Hertzman & Boyce, 2010). Research indicates an association between higher ACEs and negative impacts on children and adolescents' mental, physical, and behavioral health (Appleyard et al., 2005; Baglivio & Epps, 2016; Balesteri

DOI: 10.26681/jote.2021.050209

& Alvira-Hammond, 2016; Bethell et al., 2014; Boynton-Jarrett et al., 2008; Bright et al., 2015; Burke et al., 2011; Duke et al., 2010; Fagan & Novak, 2018; Flaherty et al., 2013; Flouri & Kallis, 2011; Hamburger et al., 2008; Hillis et al., 2004; Hunt et al., 2017; Thompson et al., 2012). Ever-increasing evidence corroborates that individuals exposed to multiple ACEs carry these health burdens with them as they age, that both physical and mental health problems can continue or manifest into adulthood, and that these impacts include heightened risks of chronic and serious disease and shortened lifespans (Anda et al., 2010; Babiss, 2012; Chapman et al., 2004; Dube et al., 2003; Felitti et al., 1998; Cuijpers et al., 2011; Merrick et al., 2017; Scott et al., 2011).

ACEs in Occupational Therapy Education

Despite mounting evidence that education and training about ACEs, trauma-informed care (TIC), and the social determinants of health is warranted across many health disciplines, many professions have not kept pace with incorporating these concepts into educational programs (Babiss, 2012; Foster & Delitto, 2011; Goldstein et al., 2017). Occupational therapy is built on the foundation of understanding the value and healing effects of occupation along with its impact on health and well-being. Mind-body unity and the value of occupation in service provision for individuals with mental illness is central to the profession (Haller, 1981). The early founders of occupational therapy endeavored to create a new identity and role for occupation in the process of healing both the mind and body. The value of the mind-body interaction and the impact of occupation on health continues to be foundational in the profession today.

The American Occupational Therapy Association's (AOTA; 2020) *Occupational Therapy Practice Framework: Domain and Process*, also referred to as "the Framework," identifies and defines the central concepts that ground occupational therapy. A core concept advises occupational therapists to collaborate with clients to develop intervention plans aimed at engagement in occupation related to health, well-being, and participation (AOTA, 2020). The Accreditation Council for Occupational Therapy Education (ACOTE), an Associated Advisory Council of the Executive Board of the AOTA, accredits all occupational therapy education programs in the United States. Section B of the ACOTE, 2018 standards outlines both mandated professional coursework and expected student outcomes. Educating occupational therapy students on the importance of ACEs addresses various accreditation standards, including those related to the understanding of the social determinants of health (B.1.3), the role of mental illness and trauma and occupational performance (B.3.5), and evaluating and discussing mechanisms for referring clients to specialists both internal and external to the profession (B.4.26).

One important element of TIC includes the avoidance of the re-traumatization of patients. Occupational therapists frequently see patients in their homes and sometimes must touch patients for diagnoses and intervention, introducing the possibility of retraumatization if not conducted in a trauma-informed manner (Fraser et al., 2017; Havig, 2008; Monahan & Forgash, 2000; Oral et al., 2016). Many health care professionals express hesitance initiating conversations regarding trauma or childhood adversity for several reasons, including fear that it may worsen a tense situation; lack of

adequate intervention skills; and lack of time to address these concerns within a typical clinical encounter (Agar & Read, 2002; Alvarez et al., 2004; Chung et al., 2012; Feng et al., 2012; Goldstein et al., 2017; Read & Fraser, 1998; Russell et al., 2004). However, research suggests patients' trauma already manifests in the form of complex medical conditions, functional limitations, and poor health and mental health histories in ACE-impacted patients. Health professionals may confer relief to patients by simply asking about current and past trauma (Agar & Read, 2002; Chung et al., 2012; Goldstein et al., 2017; Read & Fraser, 1998). On a daily basis, occupational therapists assess and intervene with patients who experience a variety of maladaptive responses to trauma, including mental health or substance abuse disorders, impairments and functional limitations, disability, and poor physical health (Baum, 2011). Further, occupational therapists are well-suited to promote health and well-being and to assess both individuals and families and the environmental contexts in which they reside (Baum, 2011; Trentham et al., 2007; Babiss, 2012; Gronski et al., 2013).

Professional ACEs-Informed Training for Health

The Professional ACEs-Informed Training for Health (PATH) model is an educational, social simulation-based model, designed to train health care professionals about ACEs and TIC and the importance of both (Wen et al., 2017). As a training model, PATH focuses on developing health professionals' skills on assessing patients' history with ACEs, educating patients on the connection found between ACEs and health outcomes, evaluating patients' risks and outcomes, and collaborating with patients concerning treatment planning and next steps—all skills necessitating an established, long-term relationship with patients (Wen et al., 2017).

The PATH model utilizes didactics to provide an overview of ACEs, including relevant research and findings, experiences within a local context, and the effects of toxic stress on neurodevelopment. The presentation also provides health professionals with strategies for self-care and TIC practices. After the lecture, the students engage in a social simulation with a trained, simulated patient (SP). In any of three scenarios, which are adaptable to the context of the students' specific profession, the student must interview a SP who portrays an adult with the sequela of ACEs. All students both interview an SP and observe a peer's interview over live video feed. After each interview, the student receives feedback from the peer observer, faculty, and SP. The educational ACE's event concludes with a large-group debrief for discussion and reflection over the simulations. In addition, an interdisciplinary panel of faculty is utilized in educating the students- this includes those from psychology, psychiatry, and social work to be able to address any issues of triggering among student participants. In sum, incorporation of ACEs and TIC are important to the training of occupational therapists, yet there is a lack of related evidence. The present study seeks to fill this gap by examining the effects of a modification of the PATH model for occupational therapy.

DOI: 10.26681/jote.2021.050209

Methods

The School of Social Work has been evaluating social simulation and its use as an educational tool. The school has ongoing institutional review board (IRB) approval for this evaluation project. Students may participate in the educational assessment by completing a two-measure evaluation: (1) knowledge importance of ACEs and TIC and (2) general self-efficacy. Participants completed these tests once before the beginning of the lecture and again after completion of the full training.

Participants

The sample included graduate occupational therapy students from three different cohorts (N = 70) that were in the second year of their education. Students participated in an ongoing training on ACE/TIC (outlined in the following section). Overall, participants consisted of 61 (87.14%) females and 9 (12.86%) males, with a mean age of 23.96 (SD = 2.83) years. A breakdown of sex and age by cohort is provided in Table 1.

Table 1

Demographics by Academic Year

Spring 2018		
	Min -Max	**M (SD)**
Age	22 - 38	25.00 (5.04)
Sex	**N**	**%**
Male	-	-
Female	11	100
Fall 2018		
	Min - Max	**M (SD)**
Age	22 - 33	23.57 (2.39)
Sex	**N**	**%**
Male	5	16.7
Female	25	83.3
Fall 2019		
	Min - Max	**M (SD)**
Age	21-31	23.97 (2.03)
Sex	**N**	**%**
Male	4	13.8
Female	25	86.2

Measures

Knowledge and Importance

To assess gains in knowledge of ACEs/TIC and increases in importance to practice (knowledge and importance is hereafter referred to as KAI), content experts developed a series of self-assessment questions. All questions were on a 5-point Likert scale with responses ranging from 1 (not at all familiar/relevant to practice) to 5 (extremely familiar/relevant to practice). Past research has demonstrated these questions to have acceptable reliability (α = .805 - .850; Randall et al., 2020.). Furthermore, the results of the current study illustrate the scale having acceptable reliability in both pre-administration (α = .826) and post-administration (α = .885).

General Self-Efficacy Scale

Comprised of ten 4-point Likert scale questions (1 = not at all true; 4 = exactly true) the General Self-Efficacy Scale (GSES) measures self-efficacy from a minimum score of 4 to a maximum of 40 (Schwarzer & Jerusalem, 1995). Within the confines of this scale, high self-efficacy is indicated by higher scores with lower self-efficacy represented by lower scores. Past research on the GSES has demonstrated that the scale has acceptable reliability (Leganger et al., 1995) and includes studies utilizing the scale with simulation participants (Bragg et al., 2017). In this study, the scale demonstrated acceptable reliability in both pre-administration (α = .797) and post-administration (α = .846). An important note regarding this scale is that previous research has suggested general self-efficacy as a greater predictor of increased academic success than GPA (Becker & Gable, 2009; Doménech-Betoret et al., 2017).

Data Analysis

Two repeated measures ANOVAs were conducted to determine if there were statistically significant differences in KAI and GSES scores within and between cohorts over a short course on ACEs and TIC utilizing a high-fidelity simulation. All data were entered into IBM SPSS® (version 24) for statistical analysis. There were no outliers and the data were normally distributed at each point in time, as assessed by boxplot and Shapiro-Wilk test ($p > .05$).

Results

The first analysis was that of KAI of ACEs and TIC to that of the profession of occupational therapy. Results indicated no statistically significant interaction (p>.05) between that of time (pre to post) and group (cohort). Next was an examination of main effect of time on KAI scores with results indicating a statistically significant increase from pre-assessment (M=14.42, SE=.29) to post-assessment (M=20.55, SE=.31; p<.0005). Furthermore, examination of the effect size demonstrated that the magnitude of this increase was large (η_p^2=.853). This was followed by an examination of the between subjects effects which illustrated there was a statistically significant difference between cohorts (p<.05). To ascertain where this difference occurred, one-way ANOVAs were conducted on both pre-assessment and post-assessment with cohort as the grouping variable. These results indicated that on pre-assessment, there was a statistically significant difference between the years (p<.05) with further examination

DOI: 10.26681/jote.2021.050209

indicative of the fact that the students in the Fall of 2019 scored significantly higher (M=15.59, SD=1.90) than students in the Fall of 2018 (M=13.77, SD=2.31; p<.05). Results of the analysis on post-assessment illustrated there was not a statistically significant difference (P>.05) between any of the cohorts.

The next analysis was concerned with the participants' scores on the general self-efficacy scale. First, the results indicated that there was not a statistically significant interaction between that of time and group (p>.05). This was followed by an examination of the main effect of time. Results of the analysis of the main effect illustrated that over time there was a statistically significant improvement in GSES scores from pre-assessment (M=30.37, SE=.48) to post-assessment (M=32.22, SE=.47; p<.0005). Moreover, the results indicated that the magnitude of this improvement was medium to large (η_p^2 =.201). Finally, the results of the between subjects analysis indicated that there was no statistically significant differences between any of the groups (p>.05). Full descriptive statistics are provided in Tables 2, 3, and 4.

Table 2

Descriptive Statistics by Year

	Pre-Assessment		Post-Assessment	
	M	SD	M	SD
KAI				
Spring 2018	13.91	2.47	20.27	1.35
Fall 2018	13.77	2.31	20.17	2.52
Fall 2019	15.59	1.90	21.21	2.37
GSES				
Spring 2018	30.45	3.39	31.64	2.87
Fall 2018	30.73	3.04	32.37	3.42
Fall 2019	29.93	4.17	32.67	3.90

Table 3

ANOVA Results

	Df	F	Sig.	η_p^2
KAI				
Interaction	2, 67	.920	.403	.027
Main Effect	1, 67	389.192	<.0005	.853
Between Groups	2, 67	4.518	.014	.119
Pre-Assessment	2, 67	5.708	.005	.146
Post-Assessment	2, 67	1.631	.204	.046
GSES				
Interaction	2, 67	1.156	.321	.033
Main Effect	1, 67	16.812	<.0005	.201
Between Groups	2, 67	.116	.891	.003

Table 4

Estimated Marginal Means

	M	SE	95% CI LB, UB
Main Effect of Time			
KAI			
Pre-Assessment	14.42	.289	13.844, 14.998
Post-Assessment	20.549	.307	19.935, 21.162
GSES			
Pre-Assessment	30.37	.478	29.419, 31.327
Post-Assessment	32.22	.472	31.276, 33.162
Between-Subjects			
KAI			
Spring 2018	17.09	.578	15.936, 18.245
Fall 2018	16.97	.350	16.268, 17.666
Fall 2019	18.40	.356	17.686, 19.108
GSES			
Spring 2018	31.05	.950	29.149, 32.942
Fall 2018	31.55	.575	30.401, 32.699
Fall 2019	31.29	.585	30.125, 32.461

Discussion

Results suggested that overall there were significantly large increases in KAI scores from pre-administration to post-administration, indicating an increase in students' knowledge and self-reported belief in the importance of ACEs and TIC. In addition, results revealed a significant medium to large increase in overall general self-efficacy from pre-administration to post-administration. Results also indicated no significant difference in changes between the cohorts regarding increases in scores on both KAI and GSES, suggesting the PATH model as a standard, replicable training for occupational therapy students. However, results did indicate a significant difference in pre-assessment scores on KAI for the students in the Fall of 2018 and Fall of 2019. These differences are explained by additional coursework offered through a grant that the students were engaged in, and curriculum changes. The first change may be the result of an educational grant that the Department received. In the Summer of 2019, six of the students in the 2019 fall cohort were engaged in a course that revolved around Systems Change. Through this course they learned about the effects of trauma and the affect that it can have into adulthood. All students were enrolled in a pediatrics course in fall 2019. Modifications were made to the course which included a new lab experience. During this lab, students discussed and analyzed how early life experiences affect brain and skill development. Students watched videos and discussed implication of child interactions with adults, the environment, response to stress, executive function and self-regulation, and resilience. Students participated in and debriefed in activities that demonstrate early life experiences in combination with a child's genetics and environment matter for cognitive, motor, social-emotional, self-identity, and self-determination development.

DOI: 10.26681/jote.2021.050209

In conclusion, for the three sequential cohorts, evaluation results indicated that the PATH model provided occupational therapy students with the knowledge and skills to help them begin to address childhood trauma with patients. Of note, the geographic region where many of these learners will become practitioners faces high rates of trauma; thus, possessing the necessary understanding and tools to address exposure to trauma will prove useful in practice. As reported in literature, general self-efficacy predicts academic achievement (Doménech-Betoret et al., 2017; Schunk et al., 2008; Usher and Pajaras, 2008). Therefore, the results of this study support the structure of brief didactic sessions followed by simulations as useful and unique in educating occupational therapy students on the impacts of ACEs and the importance of TIC.

Implications for Occupational Therapy Education

The current study yields important primary considerations for the use of the PATH model in occupational therapy and practice. First, the PATH model had positive impacts on knowledge acquisition and skill building and is likely a feasible strategy for the development of occupational therapists' future practice. Additionally, the PATH training and simulation takes approximately one-half a day, making it a realistic addition to educational activities. The PATH training model allows occupational therapy students to practice these difficult or uncomfortable skills in a safe environment and to receive valuable feedback for improving their skills before encountering these challenges in the real world of practice.

Limitations

A potential limitation in this study exists around generalizability. In addition to the small sample size, most participants identified as female. However, this demographic is representative of the occupational therapy profession in general (Adams, 2010; Beagan & Fredericks, 2018). Males have typically dominated in the higher-paying occupations such as medicine and dentistry, while females in health care have been more notably numerous in the support professions such as nursing and allied health (Adams, 2010). Occupational therapy continues to be a highly sex-disproportionate profession, with most of the workforce being female, ranging from 91-92% according to a recent study (Adams, 2010; Beagan & Fredericks, 2018;).

Conclusion

With the increasing understanding of the importance on addressing ACEs through the use of trauma informed care, training in such should be implemented in occupational therapy programs. As supported by this research, brief didactics and simulation is an emerging way of educating future professionals on this subject. As such, future research should explore if these trauma-informed care skills maintain over time and if occupational therapists are able to integrate these skills into practice. If future research suggests a disruption between skills and practice, further research should investigate barriers to integration. Future modifications to the PATH model could include expanding the design to incorporate discussing ACEs and trauma exposures with younger patients and their families and in an interprofessional setting. Overall, occupational therapy is well positioned to promote well-being and ameliorate the impacts of toxic stress and trauma on patients and families (Cramm et al., 2013; Fitzgerald et al., 2012; Townsend & Wilcock, 2004; Trentham et al., 2007).

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DOI: 10.26681/jote.2021.050209