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International Journal of Complementary and Alternative Medicine

Research Article
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The impact of an animal assisted activity on healthcare worker well-being in the inpatient hospital setting

Abstract

Chronic stress and burnout experienced by healthcare workers has been exacerbated by the COVID-19 pandemic. Animal-assisted activities, traditionally patient-focused, have the potential to benefit healthcare worker well-being. With limited evidence to support animal assisted activities for healthcare workers within inpatient hospital settings, the purpose of this study was to evaluate the acceptability and impact of an animal assisted activity using therapy dogs on healthcare worker stress, burnout, work engagement, and mood. Using a quasi-experimental, waitlist control design, healthcare workers from paired medical intensive care and medical-surgical units served as intervention and waitlist control groups and were offered the animal assisted activity three times a week for eight weeks. Visits ranged from 20 to 60 minutes. Measures of stress, burnout, and work engagement were measured pre- and post-intervention. Self-reported mood was collected before and after each intervention with participants reporting weekly participation. Intervention acceptability was measured post-intervention. Differences between pre- and post-intervention measures of stress, burnout, work engagement, and mood were assessed with paired and independent samples *t*-tests; participation and acceptability were measured descriptively. Acceptability of the animal-assisted activity, rated on a scale of 1 to 10, was similar for both intervention (M=8.92; SD=1.256) and waitlist control (M=9.57; SD=.787) groups. Weekly participation for both groups averaged one to two per week. There were no significant improvements in stress, burnout, or work engagement. Self-reported mood increased significantly for the intervention group (p=.05). Our findings suggest that an animal assisted activity, available for healthcare workers within busy inpatient settings, may offer immediate benefits through improved mood. Further research is needed to better understand short and and long-term effects of animal assisted activity on healthcare worker, patient, and organizational outcomes.

Keywords: animal assisted activity, therapy dogs, healthcare, stress, burnout

Volume 17 Issue 4 - 2024

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Received: July 05, 2024 | **Published:** July 26, 2024

Introduction

The individual and organizational effects of stress and burnout among health care workers (HCW) have been well-documented.[1–3] Unfortunately, the COVID-19 pandemic has exacerbated feelings of stress and burnout with the pandemic's lingering effects testing the physical and emotional limits of HCWs who work in inpatient settings.[4–6] Hospitals, intense and chaotic workplaces due to increasing patient acuity, capacity constraints, and declining reimbursements, are driven by competing demands such as the need for financial viability and other post pandemic factors. The resultant stress and burnout HCWs experience because of these organizational and environmental factors have been shown to negatively affect individual physical and mental health which in turn can affect professional relationships and organizational outcomes.[7–9] To better support HCW well-being, many hospitals have initiated system-wide efforts to minimize bureaucratic stressors and have also implemented various individual worksite interventions to support employee well-being.[4,10,11] Mindfulness-based programs, yoga and meditation, coaching, and peer support initiatives have all reported varying levels of improvements in HCW well-being, work engagement, and resilience, as well as reductions in burnout, stress, and anxiety.[12–15] However, participation in structured well-being interventions is not always feasible due to busy patient care assignments, variable work shifts, and an inability to leave the clinical unit to participate. To ensure optimal benefit, work site interventions must be appropriate, accessible, and offer measurable benefits associated with participation.[16–18]

Animal assisted activity (AAA), "planned and goal oriented informal interaction and visitation conducted by the human-animal team for motivational, educational and recreational purposes" is what is commonly referred to in hospitals and ambulatory settings as pet therapy.[19] Traditionally available for hospitalized patients, AAAs usually involve scheduled visits with patients by a trained volunteer, the handler, and a trained, certified therapy animal, usually a dog, however, other domesticated animals can also be involved in AAA.[20–22] Visits involve interaction between the therapy animal and the patient and are usually unstructured and relatively brief.[23] These types of hospital-based programs provide a pleasant distraction for the patient and have been found to improve patient health outcomes and well-being.[24–26] Investigations using AAA across diverse care settings and patient populations have reported improvements in anxiety, mood, loneliness, quality of life, and physiological measures such as blood pressure and pain.[27–30] In several studies, due to their direct or indirect exposure to AAA, HCWs experienced similar psychological benefits and reported positive perceptions of these patient-focused interventions.[23,31–34]

Recognizing the need for more flexible programming that offers much needed social support and connection, hospitals are increasingly implementing or expanding patient-focused AAAs to support HCW well-being. With an understanding of the reported physical and psychological benefits experienced by patients, studies evaluating the effects of AAA on HCWs have increased over the past decade. Animal assisted activity and animal assisted therapy exist in many pediatric

healthcare facilities with peer-reviewed studies describing AAAs for HCWs and those that encompass both pediatric patients and HCWs. Jensen et al.,[35] evaluated the effects of exposure and interaction with facility dogs on HCW burnout, job-related well-being, and mental health. The indirect benefits experienced by HCWs who worked in hospitals with facility dogs showed significant improvements in perceptions of personal accomplishment, job-related enthusiasm and satisfaction, and overall mental health. Gerson et al.,[36] described a study in a children's hospital where a "Medical Dog" Office Hours Program was implemented to support pediatric HCWs. Significantly fewer negative emotions, decreases in tiredness and pain, and increases in comfort and energy were reported by HCWs after weekly interactions with a therapy-dog handler team. A qualitative study by Rodriguez et al.,[33] revealed themes that described the benefits of facility dogs on work-related stress, well-being, staff relationships, and morale of pediatric HCWs.

Implementation of AAA in ambulatory healthcare settings may benefit from more structured workflows and hours of operation. The effects of an AAA using therapy dogs on nursing staff in outpatient units was reported by Clark et al.[37] Results showed that more frequent interactions with therapy dogs during work breaks significantly improved happiness, reduced burnout, self-reported depression, and improved emotional well-being. Etingen et al.,[38] reported significantly decreased HCW burnout and significant increases in mood after a 3-month intervention offering clinic HCWs unstructured interaction with a therapy dog. Yordy et al.,[39] described a study that included HCWs employed in both an inpatient cardiovascular unit and an outpatient clinic. Direct access to the therapy dogs in both settings resulted in decreased HCW stress, improved overall well-being, and acceptability of the program. In addition, significant improvements in unit work environment, dog acceptability and perceptions of adverse impact related to the presence of dogs in the clinical area were reported. Similarly, a correlational study by Coto et al.,[40] examined the effect of a worksite AAA, one 10-minute therapy dog visit per week, for nursing staff working in inpatient and outpatient settings. After this four-week intervention, work-related anxiety was significantly decreased for these HCWs. Pruskowski et al.,[32] described the effects of integrating a therapy dog into clinical care of burn patients and the indirect effects on HCWs. After one year, HCWs reported they were "satisfied" or "very satisfied" with the therapy dog presence. Improvements in HCW mood, as well as feasibility, acceptability, and desirability of the therapy dogs in the worksite was also reported.

Integration of AAAs into inpatient environments is more complex as workflows are less structured and accessibility to HCWs working variable shifts must be managed. Ginex et al.,[23] assessed effects of an "animal facilitated therapy" program on patients and staff in a surgical oncology unit. HCWs were able to interact with therapy dogs directly or indirectly as they visited with patients. While no differences in compassion satisfaction or burnout were reported, qualitative themes indicated HCWs felt a sense of calm and comfort that lowered their stress and improved happiness and hopefulness. Machova et al.,[41] reported implementation of therapy dog visits for nurses working in two inpatient units. Nurses who interacted with therapy dogs during work breaks had significant reductions in salivary cortisol as compared to nurses who had no work break or a work break without therapy dogs. An intervention study by Brown et al.,[42] evaluated the effects of unstructured interaction with therapy dogs on patients and staff in two inpatient psychiatric units. Scheduled weekly visits in the unit's dayroom significantly decreased negative moods and increased positive moods of the HCWs. A single center randomized controlled trial involving Emergency Department HCWs assessed the effectiveness of five minutes of therapy dog interaction versus coloring versus no intervention on self-reported and physiological stress.[43] While both therapy dog interaction and coloring decreased salivary cortisol, self-reported stress was significantly decreased with the therapy dog interaction. A qualitative study by Abrahamson et al.,[44] assessed the impact of a hospital-based therapy dog program on HCWs in the acute care setting. Interviews with nine HCWs overwhelmingly reported that the therapy dog interactions helped decrease their stress and improve social interactions with patients.

Post-pandemic, HCWs continue to suffer from severe occupational stress and exhaustion, overwhelmed by inadequate staffing and limited organizational resources.[45,46] Well-being interventions that are less structured, integrated into the workday, accessible, and require less effort for participation are optimally suited for success and sustainability.[47–49] Animal assisted activity is a relatively low-cost intervention that can lead to increased communication and collaboration among co-workers, improved morale, and support positive perceptions of the work environment.[35,50] However, within the hospital setting, evidence supporting benefits of AAAs for HCWs remains limited. Our hypothesis was that an AAA for HCWs in the hospital setting will improve perceived stress, burnout, work engagement, and mood.

Research question

The research question investigated in this quasi-experimental, waitlist control study was, for hospital based HCWs working in intensive care and medical-surgical units, does an AAA that is available and accessible to HCWs decrease perceived stress and burnout, and improve work engagement and mood, over an 8-week period?

Methods

Setting

This study was performed in a large, midwestern academic medical center that serves as a tertiary referral center. Two medical intensive care units (MIC 1 and MIC 2) and two medical-surgical units (M-S 1 and M-S 2) served as the clinical sites. The clinical services and levels of patient care provided on the medical intensive care units were identical. As shown in Table 1, unit characteristics in terms of bed capacity, average daily patient census (ADC), average patient length of stay (ALOS), case mix index, a calculation of patient illness severity (CMI), nursing leadership, and HCW roles and full-time equivalents (FTE) are also similar. The medical-surgical units provided identical clinical services and levels of patient care. The difference in bed capacity and a slightly lower CMI on M-S 2 accounted for the differences in ADC, ALOS, and HCW FTEs (Table 1).

Table 1 Unit descriptions

Unit	Level of Care	Unit Capacity	ADC	ALOS	CMI	RN FTE	PCA FTE	UCA FTE	NM FTE	ANM FTE
MIC 1	ICU	24	22	8.89	4	87.2	9.4	4.2	1	1
MIC 2	ICU	24	22	7.03	3.73	85.9	9.4	4.2	1	1

Citation: Steinberg B, Clark SS, Justice M, et al. The impact of an animal assisted activity on healthcare worker well-being in the inpatient hospital setting. *Int J Complement Alt Med.* 2024;17(4):174–182. DOI: 10.15406/ijcam.2024.17.00701

Table 1 Continued..

Unit	Level of Care	Unit Capacity	ADC	ALOS	CMI	RN FTE	PCA FTE	UCA FTE	NM FTE	ANM FTE
M-S 1	Acute Care	28	27	5.29	2.2	49.1	14.3	4.2	1	1
M-S 2	Acute Care	23	19	4.39	1.92	38.4	11.8	4.2	1	1

Note: MIC, medical intensive care; MS = medical surgical; ICU, intensive care unit; ADC, average daily census; ALOS, average length of stay; CMI, case mix index; RN, registered nurse; PCA, patient care associate; UCA, unit clerical associate; NM, nurse manager; ANM, assistant nurse manager; FTE, full time equivalent

Study design

This research was approved by the institutional Internal Review Board (#2021B0235). This intervention waitlist control study used a convenience sample of HCWs recruited from the four clinical units. All participants provided informed consent which described the intervention and waitlist control unit-based groups, the intervention, and the intervention timelines per requirements of the Internal Review Board. The study ran from October 2021 through March 2022. Outcome measures were collected at the same time for all participants one week before the date of the first AAA intervention, one week after the last day of the AAA intervention for the intervention group, and again one week after the waitlist control group received the AAA.

Participants and procedures

Recruitment. HCWs were invited to participate, recruited via informational flyers posted in staff areas of each unit and reinforced in unit and department communications. Nursing leaders and medical directors of each unit were informed of the project during regularly scheduled meetings.

Participants. A convenience sample of 64 HCWs participated with 55 HCWs employed as permanent staff on one of the four designated units. Nine HCWs were employed within staffing resource pools or provided patient care in more than one study unit. While these HCWs were assigned intermittently to the study units to fill staffing vacancies, their work assignments in one specific unit were variable. Registered nurses accounted for 85% of HCWs in the medical intensive care units. HCWs in the medical-surgical units averaged 70% registered nurses. Physicians and other HCWs, including advanced practice nurses, physician assistants, and respiratory therapists, accounted for less than 10% of staff in each of the four study units. HCWs were at least 18 years old and had direct patient care responsibilities while working in MIC 1, MIC 2, M-S 1, or M-S 2. HCWs with temporary employment, as well as individuals with conditions or preferences that limited their ability to interact with therapy dogs, including allergies, fear of dogs, or cultural preferences were excluded from participation.

Intervention. The intervention was an AAA that had been developed and implemented at this academic medical center in March 2020. Guided by a prescriptive policy, the primary goal of the AAA was to provide emotional support for HCWs in the inpatient setting through worksite interactions with trained therapy dog-handler teams. All handlers for this study were female hospital employees who held a variety of clinical and administrative positions and volunteered their time to provide the AAA intervention. Seven participating therapy dogs, certified through the Alliance of Therapy Dogs (ATD) and badge-identified medical center "volunteers," ranged from 4 to 8 years of age and included a male Boxer, two male Golden Retrievers, a female English Labrador Retriever, a male American Labrador Retriever, a male Goldador, and a female German Shepard.

The AAA consisted of unstructured HCW interaction with therapy dog-handler teams with visit times ranging from 20 to 60 minutes. The AAA was provided three times per week for eight weeks, on each unit, scheduled to allow HCWs working all days and shifts to participate. Visit times for each unit were chosen to minimize disruption to clinical care and occurred within clinical workstations, team rooms, and other staff areas. A calendar was posted in the unit's staff areas to promote awareness of scheduled visit times. The therapy dog-handler teams were rotated so the unit staff were able to experience interactions with various therapy dog-handler teams during the eight-week study period. Unit activity, staff need, safety, and therapy dog well-being were monitored by handlers.

HCWs in MIC 1 and M-S 1, served as the intervention group and received 24 visits occurring over the first eight-week study period. HCWs in MIC 2 and M-S 2, served as the waitlist control group with HCWs participating in standard unit activities during the first eight-week study period. The waitlist control group then received the intervention after the first group (MIC 1 and M-S 1) had completed the intervention and after the second set of self-report assessments were completed. Consent for participation was obtained electronically via REDCap. Demographic, survey, and participation data were collected and managed electronically via REDCap.[51,52] Self-reported mood was collected by study personnel and obtained immediately before and immediately after HCW participation in the AAA.

Measures

Demographic data included work unit and role, tenure in current role, age, gender, work shift, and worked hours per week. Measures of perceived stress, burnout, work engagement and mood were chosen to evaluate the effect of the AAA as a well-being intervention on HCWs that provided direct patient care in different inpatient hospital units. These measures were also chosen to allow future comparisons to an existing worksite mindfulness intervention which uses those measures and has been available as an employee benefit.[53,54] Perceived stress was evaluated using the Perceived Stress Scale (PSS-10), a 10-item self-report measure that measures general perceptions of stressful life events over the past 30 days (Cronbach's $\alpha = > 0.70$; test-retest reliability = > 0.70). Each question is answered using a five-point Likert scale, from 0 (Never) to 4 (Very Often). Scores range from 0 to 40 with a higher total score indicating increased perceptions of stress.[55] Burnout was evaluated using the Maslach Burnout Inventory-Human Services Survey (MBI-HSS).[56] The MBI-HSS includes 22 items that are answered on a seven-point Likert scale, ranging from 0 (Never) to 6 (Every day). The MBI-HSS encompasses three subscales, emotional exhaustion (Cronbach's $\alpha = 0.90$), depersonalization (Cronbach's $\alpha = 0.79$), and personal accomplishment (Cronbach's $\alpha = 0.71$), that are scored low, moderate, or high. Attitudes towards one's job was measured by the Utrecht Work Engagement Scale (UWES-9), a 9-item scale measuring three primary factors including dedication, vigor, and absorption. Each subscale score, answered on a seven-point Likert scale ranging from 0 (Never) to 6 (Always, every day), has a range of 0 to 18. Internal consistency of the UWES-9 has a Cronbach's α of 0.92 for a total score with Cronbach's α of 0.86 for the dedication subscale, Cronbach's α of 0.86 for vigor, and Cronbach's α of 0.79 for absorption.[57] Real time mood was measured using a visual analogue scale, specifically developed for this study, with 0 indicating "sad, down, depressed" to 10 indicating "happy, awesome, great." Participation was reported numerically as the number of interactions

HCWs had with the AAA each week. Post-intervention, participants were asked to rate acceptability of the AAA using a Likert scale that ranged from 1=not acceptable to 10=very acceptable.

Analysis

Demographic data were analyzed using descriptive statistics. Mean, standard deviation, and range were computed for weekly participation and acceptability of the AAA. Two-tailed *t*-tests were used to compare measures for the groups at baseline. For each measurement, differences between pre-intervention and post-intervention data were assessed using paired t-tests or repeated measures analysis of variance. Independent samples *t*-tests were used to assess pre- and post-intervention differences between groups. An alpha level of 0.05 was used to determine statistical significance. IBM SPSS Statistics for Windows, version 28.0 (IBM Corp., Armonk, NY) was used for data analysis. Missing values were managed using the SPSS *Exclude Cases Pairwise* option to exclude survey data only if there was missing data required for a specific analysis. Survey data was included for other analyses if data points were available.

Results

Participants included registered nurses, physicians, advanced practice providers, respiratory therapists, and clinical support staff (Table 2). Tenure in current roles ranged from less than one year to greater than 10 years, however, just over 78% of the participants reported a tenure of six years or less. Participant age reflected tenure with most participants being 25 to 35 years of age. Participants were predominantly female with the majority working 33-40 hours per week on primary day and night shifts.

Table 2 Participant demographics

Clinical Unit	MIC 1	MIC 2	M-S 1	M-S 2	Multiple Units*
Participants *n* (%)	17 (26.6%)	20 (31.3%)	9 (14.1%)	9 (14.1%)	9 (14.1%)
Role Registered Nurse	13 (76.5%)	13 (65.0%)	8 (88.9%)	7 (77.8%)	2 (22.2%)
Physician	--	4 (20.0%)	--	1 (11.1%)	6 (66.7%)
Advanced Practice Nurse	3 (17.6%)	--	--	--	--
Respiratory Therapist	1 (5.9%)	2 (10.0%)	--	--	--
Speech Language Pathologist	--	--	1 (11.1%)	--	--
Physician Assistant	--	--	--	--	1 (11.1%)
Patient Care Associate	--	--	--	1 (11.1%)	--
Unit Clerical Associate	--	1 (5.0%)	--	--	--
Tenure in Current Role					
Less than 1 year	2 (11.8%)	3 (15.0%)	4 (44.4%)	--	1 (11.1%)
1-3 years	7 (41.2%)	5 (25.0%)	4 (44.4%)	4 (44.4%)	3 (33.3%)
4-6 years	3 (17.6%)	9 (45.0%)	--	2 (22.2%)	2 (22.2%)
7-10 years	2 (11.8%)	--	1 (11.1%)	--	2 (22.2%)
Greater than 10 years	3 (17.6%)	3 (15.0%)	--	3 (33.3%)	1 (11.1%)
Age					
18-24 years	2 (11.8%)	3 (15.0%)	4 (44.4%)	1 (11.1%)	--
25-35 years	10 (58.8%)	12 (60.0%)	4 (44.4%)	3 (33.3%)	6 (66.7%)
36-45 years	3 (17.6%)	4 (20.0%)	--	2 (22.2%)	2 (22.2%)
46-55 years	2 (11.8%)	1 (5.0%)	1 (11.1%)	3 (33.3%)	1 (11.1%)
Gender					
Female	14 (82.4%)	16 (80.0%)	8 (88.9%)	8 (88.9%)	4 (44.4%)
Male	3 (17.6%)	3 (15.0%)	1 (11.1%)	1 (11.1%)	4 (44.4%)
Non-binary	--	--	--	--	1 (11.1%)
No answer	--	1 (5.0%)	--	--	--
Primary Work Shift					
Primarily day shift	4 (23.5%)	10 (50.0%)	4 (44.4%)	7 (77.8%)	9(100.0%)
Primarily night shift	10 (58.8%)	7 (35.0%)	5 (55.6%)	2 (22.2%)	--
Rotating shifts	3 (17.6%)	3 (15.0%)	--	--	--

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Table 2 Continued..

Clinical Unit	MIC 1	MIC 2	M-S 1	M-S 2	Multiple Units*
Work FTE					
21-32 hours per week	1 (5.9%)	--	--	1 (11.1%)	--
33-40 hours per week	16 (94.1%)	16 (80.0%)	9(100.0%)	7 (77.8%)	3 (33.3%)
Greater than 40 hours per week	--	4 (20.0%)	--	1 (11.1%)	6 (66.7%)

Note: MIC, medical intensive care unit; M-S, medical surgical unit; FTE, full time equivalent

*Data from participants working in multiple units were not included in the analysis.

AAA weekly participation for the intervention group and during the waitlist control group's time of AAA exposure was similar. The intervention group (n=24) most often reported one interaction with the AAA per week (M=1.36; SD=.991) with a range of 0 to 3 times per week while the waitlist control group (n=21) most often reported two interactions per week (M=1.63; SD=1.097) with a range of 0 to 3 times per week. Post-intervention acceptability for the intervention group (n=13) ranged from 7 to 10 (M=8.92; SD=1.256) while AAA acceptability for the waitlist control group (n=7) ranged from 8 to 10 (M=9.57; SD=.787).

There were no differences between the groups prior to the intervention for perceived stress (p=.80), burnout subscales of emotional exhaustion (p=.29), depersonalization (p=.63), and professional accomplishment (p=.56). Similarly, there were no differences between groups for work engagement subscales of vigor (p=.97), dedication (p=.98), and absorption (p=.85), or mood (p=.54). As shown in Table 3, participants reported moderate stress prior to the AAA in both groups, however, scores were not significantly decreased post-intervention for either group. There was no significant difference noted for perceived stress between groups (Table 4).

Table 3 Paired *t*-tests perceived stress, burnout, work engagement, and mood

Intervention group					Waitlist control group			
Outcome Measure	**Pre-intervention M (SD)**	**Post-intervention M (SD)**	**p**	**Cohen d**	**Pre-intervention M (SD)**	**Post-intervention M (SD)**	**p**	**Cohen d**
Perceived Stress[a]	20.18 (5.34)	19.00 (4.75)	0.41	0.2	19.00 (7.89)	18.08 (5.88)	0.74	0.09
Burnout Emotional Exhaustion[b]	41.71 (8.36)	45.79(6.88)	*.02	0.66	44.18 (8.35)	42.09 (8.26)	0.56	0.17
Burnout Deperson-alization[b]	64.23 (9.45)	67.43(9.89)	0.12	0.44	66.00 (9.02)	60.10 (8.43)	0.14	0.47
Burnout Professional Accomplishment[b]	46.62 (14.09)	47.50 (13.58)	0.92	0.02	50.53 (16.45)	43.90 (15.21)	0.36	0.29
Work Engagement Vigor[c]	7.57 (2.71)	7.43 (2.73)	0.85	0.05	6.65 (4.10)	7.64 (3.98)	0.57	0.17
Work Engagement Dedication[c]	10.07(2.59)	9.71 (2.01)	0.58	0.15	9.59 (4.89)	10.18 (4.09)	0.76	0.09
Work Engagement Absorption[c]	9.79 (3.04)	10.14(2.82)	0.68	0.11	9.76 (4.32)	9.10 (4.04)	0.72	0.11
Mood[d]	4.94 (1.61)	9.28 (0.97)	*<.0001	1.63	4.66 (1.73)	8.85 (1.84)	*<.0001	1.17

Note: * $p \leq .05$. Perceived stress[a] = PSS-10. Burnout[b] = MBI-HSS. Work engagement[c] = UWES-9. Mood[d] = 0-10 visual analogue mood rating scale.

Scores for the MBI-HSS subscales are detailed in Tables 3,4. In the intervention group, mean scores for emotional exhaustion significantly increased pre-intervention (M=41.71, SD=8.36) to post-intervention (M=45.79, SD=6.88), t (13) = -2.48), p=.02, with a medium effect size (d= .66). The waitlist control group showed no differences in mean scores and there were no differences between groups. No differences in mean scores were noted for depersonalization and professional accomplishment subscales for the intervention or waitlist control groups and no differences between groups were found.

Vigor, dedication, and absorption subscales of the UWES-9 were analyzed to assess pre- and post-intervention effects for (Table 3) and between groups (Table 4). No differences in means for the three subscales were found for the intervention and waitlist control groups and no differences were found between groups. As shown in Table 3, both groups reported significant increases in mood after the AAA intervention. A significant difference in mood between the intervention and waitlist control groups was also noted, t (176) = 1.930, p=.05.

Table 4 Independent samples *t*-tests perceived stress, burnout, work engagement, and mood

Intervention Group				Waitlist Control Group			Mean Differ-ence	95% CI	df	t	p	Partial eta squared
	n	*M*	*SD*	*n*	*M*	*SD*						
Perceived Stress[a]	17	19	4.75	12	18.08	5.88	0.92	-3.14, 4.97	27	0.463	0.64	0.007

Table 4 Continued..

Intervention Group				Waitlist Control Group			Mean Differ-ence	95% CI	df	t	p	Partial eta squared
Burnout Emotional Exhaustion[b]	14	45.79	6.88	11	42.09	8.26	3.7	-2.57, 9.95	23	1.22	0.23	0.061
Burnout Depersonali-zation[b]	14	67.43	9.89	10	60.1	8.43	7.33	-.68, 15.33	22	1.897	0.07	0.141
Burnout Professional Accomplishment[b]	14	47.5	13.98	10	43.9	15.21	3.6	-8.85, 16.05	22	0.6	0.55	0.016
Work Engagement Vigor[c]	14	7.43	2.73	11	7.64	3.98	-0.21	-2.98, 2.57	23	-0.155	0.87	0.001
Work Engagement Dedication[c]	14	9.71	2.01	11	10.18	4.09	-0.47	-3.04, 2.11	23	-0.375	0.71	0.006
Work Engagement Absorption[c]	14	10.14	2.82	10	9.1	4.04	1.04	-1.85, 3.94	22	0.746	0.46	0.025
Mood[d]	86	9.28	0.97	92	8.84	1.84	0.44	-0.01, 0.86	176	1.93	*.05	.021

Note: $^{*}p \leq .05$. Perceived Stress[a] = PSS-10. Burnout[b] = MBI-HSS. Work engagement[c] = UWES-9. Mood[d] = 0-10 visual analogue mood rating scale.

Post-intervention, the PSS-10 was completed by 17 of the 26 participants in the intervention group and 12 of the 29 participants in the waitlist control group. Fewer participants in the intervention group completed the MBI-HSS (n=14) and UWES-9 (n=14). In the waitlist control group, completion of the post-intervention MBI-HSS (n=11) and the UWES-9 (n=10) decreased as well. Registered nurses accounted for 33% and 34% of those lost to follow-up in the intervention and waitlist control groups, respectively. Registered nurses in both groups reported six years or less of tenure with the organization. There were no differences between the included sample versus those lost to follow-up for perceived stress (p=.43), burnout subscales of emotional exhaustion (p=.90), depersonalization (p=.48), and personal accomplishment (p=.64), work engagement subscales of vigor (p=.87), dedication (p=.89), and absorption (p=.88) or mood (p=.65).

Discussion

The negative effects of stress and burnout on HCW well-being are significant and have consequences for patient care and organizational outcomes. Worksite interventions that have been shown to reduce stress and burnout and improve coping for hospital based HCWs have recently included AAAs.[39–41] This study evaluated the effects and acceptability of an AAA, using certified, trained therapy dogs, on HCWs working in intensive care and medical-surgical units. The intervention waitlist control study design allowed all participants to experience the intervention in a sequenced approach, comparing the effects of the AAA within and between paired critical care and medical-surgical units. This study provides further evidence that an AAA, using therapy dogs, can be implemented within inpatient hospital settings to support HCW well-being. Our results suggest that this type of worksite intervention is acceptable to HCWs and may provide immediate benefits to HCW mood that may translate to improved patient care and satisfaction.[44,58]

This study utilized an AAA developed specifically to support the well-being of HCWs. Guided by a prescriptive policy, the AAA had established procedures for recruitment, training, unit visitation, and animal welfare. Protocols for the AAA instructed handlers to be attentive to the therapy dogs' needs during visits and to end the visit if the dog showed signs of stress or needing a break.[59] Although this program existed prior to the study, as a newer program and with pandemic-related restrictions still in place, interactions with the therapy dogs had been limited to specific requests for rounding and special unit events. While the organization also had a variety of existing well-being programs available to employees, staffing, workload, and personal schedules often limited participation. This program was implemented to provide an intervention that was more accessible to HCWs and did not require prior scheduling or a defined time commitment. With the goal of offering connection and comfort through interactions with trained therapy dogs, this AAA provided an alternative intervention to support HCWs with coping and resiliency in the hospital setting.[18]

The HCWs averaged at least one interaction with the therapy dogs per week even with varying work shifts and clinical responsibilities. They also considered the intervention to be acceptable with scores ranging from seven to 10 on a 10-point Likert scale. In contrast, other studies that have shown AAAs to be beneficial and acceptable to HCWs were implemented in ambulatory settings where scheduling and clinical flow may be more predictable than an inpatient setting.[37,38] The Likert scale for acceptability, developed specifically for this study, was a concise and subjective quantitative rating of participant comfort and satisfaction with the AAA intervention.[60]

The immediate benefits of the AAA on HCW mood were realized in both groups. In addition, mood scores for the intervention group were significantly higher post-intervention. Our results mirror improvements in HCW mood that have been noted in various healthcare clinic settings and have been associated with positive influences on overall HCW well-being.[32,38,44] The use of a simple visual analogue scale to assess mood immediately before and after the AAA interaction is similar to previous studies and allowed an assessment of intervention impact without the influence of previous or post-interaction work-related stressors.[38,43]

HCW interactions with an AAA using therapy dogs have also been shown to decrease stress and components of burnout in various healthcare settings.[23,35,37,38,43] However, this study did not find a significant difference in perceived stress. Understanding that the PSS-10 reflects perceptions of stress over the past 30 days, it is possible that the eight-week intervention combined with the limited number of interactions with the therapy dogs per week was not enough to influence the moderate levels of perceived stress that were reported pre-intervention.[55] Similarly, this research did not find decreases in any components of burnout. In fact, in the intervention group, there was a significant increase in emotional exhaustion and an increase in depersonalization post-intervention. While this AAA was hypothesized to improve HCW burnout, participants reported high levels of emotional exhaustion and depersonalization pre-intervention. The

significance of the long-term psychological effects of the COVID-19 pandemic on existing levels of HCW burnout cannot be underestimated and was likely was a factor for these participants as well. Finally, there were no significant differences in work engagement. Pre-intervention, participants reported low to moderate scores for the subscales of vigor, dedication, and absorption reflecting limited physical, mental, and emotional engagement in their work.[57] For HCWs who have been working throughout the pandemic and who continue to work within very challenging inpatient environments, these findings may reflect a general feeling of distress that worksite interventions, even those that are well-intentioned and offer brief periods of distraction during the work day, may not be able to counteract.[5,6,61,62]

Evidence-based worksite interventions will continue to be necessary to support the well-being of hospital-based HCWs. However, it is imperative that these interventions are effective, acceptable, appropriate, feasible, and sustainable.[60] Including AAAs as part of an array of well-being interventions for hospital based HCWs may offer an alternative to more traditional programming. In addition, integrating AAAs across a healthcare organization may also benefit HCW well-being by changing perceptions of busy and stressful inpatient environments. Future research is needed to evaluate measures that can reliably provide an assessment of the short and long-term effects of the AAA on individual and organizational outcomes. The optimal AAA visit frequency and interaction length to support improvements in HCW well-being remain unclear and also requires further evaluation. Lastly, efficient and effective implementation of AAAs in inpatient clinical settings is warranted to ensure awareness, participation, and safety of HCWs, patients, and animals.

Limitations

While this study provides evidence to support an AAA as a well-being intervention for HCWs in inpatient hospital units, there are several limitations to generalizability of the results. Planned and initiated prior to the COVID-19 pandemic, this organizationally endorsed therapy dog program existed prior to the study. While the AAA was relatively new, it was familiar to HCWs in the designated intervention and waitlist control units. The convenience sample of HCWs who participated in the study may have been biased by previous interactions with the therapy dogs, having an affinity for dogs as companion animals, and possibly more motivated to participate. In contrast, those HCWs who were fearful or allergic to dogs, or had cultural preferences against dogs as companion animals, were excluded from participating in this study. Differences in participants' gender, personality, and other characteristics (such as being a cat/dog owner) may have also affected responses.

The clinical units were chosen based on the ability to pair them with units similar in capacity, patient acuity, and staff composition. All HCWs in these units had experienced changes to patient acuity, work responsibilities, and environment due to the COVID-19 pandemic. These challenges, some that have continued, may have affected participant outcomes, specifically perceptions of stress, burnout, and work engagement. While all HCW participants completed the pre-intervention surveys, post-intervention responses were limited, possibly due to the length and frequency of the surveys. Increased workloads, staff exhaustion, and survey fatigue may also have been factors in missing post-intervention data. The measures for acceptability and mood were chosen to be brief, however, valid and reliable measures for these constructs could have been used to provide comparisons to current research. It was noted that just over 30% of the registered nurse participants across the sample either transferred to a different clinical unit or terminated their medical center employment during the study. The missing post-intervention data was accounted for in the analysis; however, the smaller sample size likely influenced our results.

Finally, there are certain limitations and risks to engaging animals in the healthcare setting. Some include allergies, infections (including zoonosis), and animal-related accidents, however the benefits of AAA far outweigh the risks. All our therapy dog-handler teams were insured and followed strict isolation and hygiene protocols and policies.

Conclusion

In the hospital setting, AAAs can be an acceptable well-being intervention for HCWs. Our findings suggest that offering this type of intervention for HCWs positively influences mood and could have subsequent beneficial effects on patient and organizational outcomes. As hospitals work to increase staff morale and provide interventions to support the well-being of HCWs, AAAs offered within the inpatient environment could complement more traditional well-being interventions. Based on our results, additional research is needed to determine outcomes and intervention frequency that provide optimal HCW benefit. In addition, defining effective implementation processes for AAAs within hospital settings is needed.

Acknowledgments

The authors would like to thank the staff, faculty and learners of the study units, as well as the medical center leadership for their support of this therapy dog intervention.

Conflicts of interest

The authors have no conflicts of interest regarding the publication of this manuscript.

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