



Development of an animal-assisted activity program on a pediatric behavioral health unit



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ABSTRACT

Animal-assisted activities (AAA), a form of animal-assisted interaction, have the potential to improve positive coping for youth with significant psychiatric symptoms admitted to acute behavioral health units. However, little is known regarding the appropriateness of an AAA program in short-term mental health hospital settings. The goal of this investigation is to describe and report on the feasibility and acceptability of embedding a canine-AAA program within the therapeutic programming of a pediatric behavioral health unit. Both patient participants and unit staff completed quantitative and qualitative measures. Outcomes yielded preliminary data suggesting AAA was feasible and acceptable to patients and unit staff. Initial efficacy outcomes demonstrated decreases in subjective distress. Qualitative data provided areas for further refinement of the AAA program.

The positive bond between human and animal is well-documented. Whether serving as a source of comfort, or as a method to improve social functioning or quality of life, the role that an animal has in the life of their owner or of a short-term companion is undeniable. Over the past twenty years, an increase in investigating the role that animals may have in improving the lives of individuals with chronic medical conditions, developmental disorders, and other psychiatric conditions has occurred [1]. Animal-assisted intervention is a therapeutic modality where animals are incorporated into a health, education, or human service environment for the purpose of improved health and psychosocial wellness [2,3]. Within animal-assisted intervention, there are a few different modalities including animal-assisted therapy, animal-assisted education, and animal-assisted activities. Animal-assisted therapy and animal-assisted education involve a series of scripted interactions between the individual(s), animal, and handler focused on improving a specific aspect of the recipient's cognitive, social, emotional, and/or physical functioning. Conversely, animal-assisted activities do not have a preconceived treatment goal or a specific protocol by which the interaction between the individual(s), animal, and handler must adhere to. Animal-assisted education occurs exclusively in school-based settings, whereas animal-assisted therapy and animal-assisted activities can occur anywhere. While all three animal-assisted intervention

modalities improve functioning, when time is limited, and a goal-oriented, individualized, or long-term approach cannot be utilized animal-assisted activities (AAA) is the preferred method.

When youth experience a psychiatric or behavioral health crisis, an admission to a behavioral health unit for stabilization may occur. The main goal during a psychiatric admission is to improve the child's psychosocial functioning through medication management, therapeutic supports, and safety/discharge planning [4]. In this healthcare setting, having access to brief interventions that can encourage the development of distress tolerance and positive coping skills is of utmost importance. AAA may have promise in augmenting psychotherapy programming on a behavioral health unit. AAA is used successfully with children who have experience trauma [5], and is linked with general improvement in patients who have depression, anxiety, post-traumatic stress disorder [6,7]. Research in specific applications of AAA further demonstrates the effects that a brief pet therapy visit with a trained handler can have in reducing anxiety and in promoting caregiver satisfaction in hospitalized children in non-specific medical settings [8]. Unfortunately, research is limited on the design, utility, and acceptability of AAA in short-term or crisis-focused pediatric psychiatric and behavioral health settings.

The purpose of this project was to develop an AAA program on a

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pediatric behavioral health unit for youth who were receiving short-term psychiatric stabilization services for acute or worsening mental/behavioral health needs. The children's hospital where the unit was located already had a program which provided both AAA and canine-assisted interaction therapy (i.e., collectively referred to as “pet therapy program” for the remainder of this article) embedded within medical units; however, services had not been occurring on the behavior health unit. Given the short duration of pediatric psychiatric stabilization within the hospital, it was unclear if adding an AAA program in the pre-existing milieu and therapeutic programming schedule would be feasible or desired by patients, providers, and staff. Quantitative and qualitative methods were employed to assess the viability of and satisfaction with an AAA program and to collect preliminary data on reduction in patient distress using a simple within case pre- post-design.

1. Methods

1.1. Setting/participants

This program development project was conducted from February 2017 to March 2019 on a child and adolescent behavioral health unit at a children's hospital part of a large academic medical center in the Midwestern United States. The behavioral health unit provides multidisciplinary care to youth ages 8–17 with acute, chronic, or worsening emotional and behavioral disorders. Across both partial and inpatient programming, upwards of 12 patients can be receiving care at any given period. At the time of this study, the hospital had a pet therapy program but teams did not visit the behavioral health unit. This project was supported by the hospital's pet therapy program, the unit staff, and the university's institutional review board (IRB).

1.2. Population

Patients 8–17 years old on the behavioral health unit who were present on at least one of the therapy dog visits days were eligible for this study. For younger patients or patients whose developmental level did not fit well with completing a survey on their experiences, visits were fully facilitated by a Certified Child Life Specialist (CCLS); therefore, their experiences are not captured in the data presented in this paper. Patients were ineligible if they were on isolation precautions and/or with open wound, drain, open tracheostomy, solid organ or stem cell transplant, had an active viral or respiratory infection or an allergy to/asthma exacerbated by dogs documented in the electronic medical record (EMR). RNs provided a verbal description of the program to caregivers either upon admission or within 24 h of the scheduled animal assisted activity session. They were able to ask questions, let staff know of any allergies or negative reactions to canines (i.e., fear, rough with pets, etc.), and consent or decline for their child to participate. Upon the day of the visit, patients were given the opportunity to verbally assent or decline participating in the activity.

1.3. Intervention/animal assisted activity description

The hospital's Pet Therapy Program requires a team consisting of at least 1 handler, 1 dog, and 1 assistant. Dog and handler team must register with and meet standards of an approved outside pet therapy organization that is independent of the hospital. The registering organization is required to meet the hospital's therapy training, evaluation, and renewal criteria. Once this requirement is met, the team proceeds with the onboarding processes through volunteer services, including an interview with the pet therapy coordinator looking at temperament. This process ensures the hospital population and pet therapy program are a good fit. The dog's handler is responsible for the dogs' safety, health, care, and overall well-being at all times while visiting the hospital.

The study intervention consisted of a one-time visit between a

therapy dog team and each patient; the same dog, handler, and assistant team conducted all visits. The same unit CCLS was also present for all visits. The interaction between the pet therapy team and the patient occurred either in a private consultation room or in a quiet area in the general milieu when a consultation room was not available. Reasons as to why a private consultation room may not have been available were most often that the room was actively in use for individual or family therapy. Patient visits with the dog were typically two patients visiting for at least 10 min, but when appropriate one on one visits and/or three patients sat together with the dog for a longer period. During the visits, there was no clear structure to the interaction (as is the norm for AAA) – patients could interact with the therapy dog, handler, and assistant as they wished provided it was appropriate. The handler would interact with the patient if the patient had a question; otherwise, they allowed the patient to enjoy their time with the dog. The time with the dog varied, but patients typically had at least 10 min. Some patients chose to be done before this time, but most remained for their entire time allowed. For longer-term patients, there were times when the CCLS was able to facilitate a longer visit with the dog and handler team.

The hospital's Pet Therapy Program began in 2013, as parent visits in a NICU consult room. Patient visits began in August 2014. Currently, there are nineteen pet therapy teams seeing patients on units throughout the hospital. A CCLS provides oversight of the Pet Therapy Program to ensure quality and safety. The consistent therapy dog for this specific project was an eleven-year-old labradoodle (Quigley) who lives with the two handlers that accompany this dog for each visit. The dog is comfortable in the hospital environment and follows commands given by the owners exceptionally well. The dog and handlers have been certified through Pet Partners since 2013, and have been a part of the Pet Therapy Program at the hospital since 2014.

1.4. Data collection

To assess feasibility of future studies, we collected information on the number of patients and families who consented or denied participation into the study, return of patient/provider surveys, and factors that might affect the participation willingness in the future (e.g., staff views, incidence of infection or other adverse events). To assess whether the intervention showed promise for reducing distress, we required patients to rate their distress using the Subjective Units of Distress Scale (SUDS) 10-min prior to and after their interaction. Given the preliminary and project development nature of this study, we wanted a brief and easy to complete (as opposed to a precise) measure to assess any changes the patient observed in his/her emotional functioning and arousal as a direct result of interacting with the dog.

Data sources consisted of patient self-report surveys completed before and after the therapy dog visit, observations noted by the CCLS during each visit, adverse event forms completed by unit staff, and surveys open to any of the behavioral health unit staff not directly affiliated with this developmental study (e.g., physicians, nurses, behavioral health technicians, educational liaison, etc.).

Patient Surveys. The CCLS handed each patient a printed copy of the pre-activity survey immediately following verbal assent. In all cases, completed forms were collected 10–20 min before the therapy dog visit. Patients completed age-appropriate versions of the Subjective Units of Distress Scale (SUDS; [9]). The SUDS is a brief measure used across many age ranges, diagnoses, and settings for both clinical and research purposes to allow the individual to measure the intensity and impact of their feelings as well as the level of distress they are presently experiencing. Patients rated their SUDS level on a scale of 0–100 where zero is equal to being “totally relaxed” and one hundred is equal to “extreme and overwhelming” distress. Outside of this project, patients on the behavioral health unit learn to use the SUDS scale as a way to communicate their overall level of distress. Therefore, all participants had some level of previous exposure to the SUDS and, in most cases, were well versed in its use. However, for children who needed assistance

completing the forms, the CCLS read and explained the scale to the patient and helped them determine their distress level using developmentally appropriate language, examples, and visual aids.

Immediately after visiting with the therapy dog, the CCLS handed patients their pre-activity forms to complete their post-activity SUDS rating and three feedback questions. The questions asked included two 7-point Likert-type questions aiming at assessing their satisfaction with the interaction (How much did you like interacting with the dog; Did you have enough time with the dog), and one open-ended question aimed at soliciting areas for improvement (What could have made the visit go better). Patients were asked to complete the forms immediately and hand them back to the CCLS. If necessary, unit staff collected any remaining forms within 30 min of the conclusion of the therapy dog visit.

Adverse Events. Nursing staff reported adverse events that occurred within 24–48 h of each AAA visit. Any adverse events that occurred during the visit (e.g., patient bitten by dog, patient having behavior problems while with the dog; allergic reactions) were similarly noted by the CCLS. Things that nursing staff were asked to report included any illnesses, infections, or allergic reaction occurring post-visit; any significant increase or escalation in negative behaviors including suicidal/homicidal thoughts or actions, non-suicidal self-injury or self-harm, physical aggression, or verbal aggression. The 24–48 h period was selected due to the relatively brief admission (3–5 days) for the majority of patients, and potential difficulty with accessing medical records post-discharge.

Provider/Staff Surveys. A brief form was designed to collect information on provider/staff perceptions on the effects of therapy dog visits for patients and staff, their concerns, and overall assessment of allowing therapy dog visits on the behavioral health unit. Staff completed form at the conclusion of the project development period and were given approximately one month to log their responses. Two methods were provided for staff to provide their feedback: paper or online. A paper copy of the survey was made available in the unit breakroom, and a large mailing envelope was provided for staff to turn in their forms. This envelope was checked once a day during weekdays. Additionally, a link to the online version of the survey was emailed to all behavioral health providers who had been affiliated with the unit at the time of the study period and were still within the hospital-system. The email invited providers and staff – regardless of whether or not they were present on a pilot study day – to complete the survey anonymously through the link provided in the email.

Both the paper and electronic versions of the survey did not ask for identifying information from the respondent. While emails were sent and managed by REDCap, an electronic data capture tool, and the research team was alerted when the survey was completed, there was no method by which to determine who the respondent was. REDCap is a secure web-based application hosted at the [redacted for peer review] Clinical and Translational Sciences Institute funded, in part by Grant Numbers UL1TR001108, KL2TR001106, or TL1TR001107 from the National Institutes of Health, National Center for Advancing Translational Sciences, Clinical and Translational Sciences Award and at the [redacted for peer review] Pervasive Technology Institute [10]. During the month where providers were given the opportunity to provide feedback, reminders to solicit participation was provided both via additional automated emails sent by REDCap and verbally during shift changes/morning huddles, unit wide organized meetings, and treatment team meetings.

1.5. Analysis

Descriptive statistics were computed on patient demographic characteristics and on both patient and provider/staff surveys. Hypothesis testing using a two-tailed, one-sample paired *t*-test was conducted using SPSS 25.0 to assess changes in pre- and post-intervention SUDS ratings. Qualitative information (written responses to open-ended survey

Table 1
Patient Demographics.

Characteristic	# of patients (%) (N = 94)
Sex	
Female	69 (73.4)
Male	25 (26.6)
DSM-5 Primary Diagnoses	
Mood Disorders	47 (50.0)
Eating Disorders	15 (15.9)
Anxiety Disorders	9 (9.6)
Adjustment Disorder	7 (7.4)
Disruptive/Impulse-Control Disorders	6 (6.4)
Trauma and Stress Disorders	5 (5.3)
Psychotic Disorders	3 (3.2)
Obsessive Compulsive Disorders	2 (2.1)

questions) was not formally analyzed but reviewed to provide examples of the range of attitudes expressed by patients, providers, and staff, and for use in developing future studies.

2. Results

2.1. Feasibility

Patient Description. Ninety-four patients participated during the study period. Gender was skewed to more predominantly female ($n = 69$; 73.4%) and the mean age was 13.9 years ($SD = 2.2$). Patients were diagnosed with a variety of emotional and behavioral conditions, with most carrying a primary psychiatric diagnosis of a mood disorder ($n = 47$; 50.0%). See Table 1 for further information regarding primary psychiatric diagnoses noted across patient participants. Average length of an AAA visit was 11.5 min ($SD = 3.4$). While the majority of patients only participated in the study once during their admission to the behavioral health unit, six patients had more than one visit. Four out of the six patients were present for two pet therapy visits, and two were present for three visits. Their data for each individual visit is included in the data analysis provided they did not opt out of the AAA. Of the 102 recorded visits, six patients (4.1%) did opt out of the pet therapy activity on the day of. Four of the six patients reported feeling too distressed at the time to visit, one indicated he did not “feel well,” and another indicated seeing a dog “other than his own” was useless. None of these patients completed a pre-group SUDS rating. Therefore, 96 complete AAA visits were conducted during the development phase.

Staff and Provider Surveys. Thirty-three out of 44 possible providers/staff responded to our survey, all via the Web interface. Fifteen of the thirty-three were nurses (45.5%), 11 were mental health technicians (33.3%), 3 were physicians (9.1%), and the remainder were other therapeutic providers. Twenty-three (69.7%) reported that they were working on the behavioral health unit on one of the pilot days. Among the providers/staff who responded, all thirty-three (100%) reported that they believed the therapy dog visit had an effect on patients; all described the effect as positive. There were a variety of responses on staff's perceptions of the effect the AAA program had on our patients with many indicating the visit facilitates positive coping, motivation, increased positive affect and mood, distraction from distress, and increased communication. One staff wrote they “have seen children smile and open up when previously they had been struggling on the unit the dog has helped them to talk more about their own problems.” Another staff wrote that the visits “the patients are noticeable happier and have a sense of calmness that appears to over them after the visits, even our extremely agitated or anxious patients.”

Data were also gathered from providers and staff on their perceptions of the effect the AAA visits had on them or their work. Ten of the thirty-three respondents (30.3%) reported that the therapy dog visit had no effect on them or their work. Of the 23 who reported an effect, all described the effect as positive. Categories of the types of effects staff

received from the visits themselves were secondary gain from seeing patients' responses and stress relief/improving mood. For example, one staff noted that “by changing the patient's demeanor and attitude, it makes my job a lot easier” while another staff responded the visits “helps provide a therapeutic environment that enables me to also increase my own therapeutic service/ability to my patients.” Many staff who indicated they had interacted with Quigley during a visit did discuss their own personal experience of stress relief; however, one nurse noted that “just seeing my patients smile after visiting with the dog makes me feel better and have a more positive outlook on my day.”

Among the thirty-three staff and provider respondents, 31 (93.9%) thought having therapy dog visits on the behavioral health unit was a good idea and 2 (6.1%) were unsure. No respondents felt that the AAA program was a bad idea or should stop. When asked if the therapy dog visits needed to be improved, 15 (45.4%) reported it was fine as is, 7 (21.2%) reported they were unsure if improvements were needed, and 11 (33.3%) reported some level of change could occur. Categories of suggested areas for improvement included longer time for patient visits (n = 5), more frequent visits (n = 11), and dog tricks/toys/playful interactions with the dog (n = 4). A few staff provided responses that were coded in more than one category.

Adverse Events. One of the patients who participated in this pilot developed an upper respiratory infection during the 24–48 days after their therapy dog visit. Furthermore, within 24–48 h of the AAA two patients had an escalation in psychiatric symptoms: one experienced an increase in suicidal ideation (this occurred on 2 separate pet therapy visit days); the other patient engaged in an episode of significant physical aggression and property destruction. While neither the infection nor psychiatric crises could be clearly attributed to the therapy dog visit; however, we cannot rule out this possibility. No other adverse events (e.g., bites, allergic reactions) were reported by patients, staff, or providers on the adverse event report forms. No adverse events occurred during the therapy dog visits.

2.2. Preliminary data on benefits of the AAA program

At baseline, patients on average reported mild levels of distress (\bar{x} = 40.2; SD = 18.6). It should be noted that there was a wide range of reported levels of distress (see Table 2). The most commonly reported pre-visit SUDS rating was in the “normal”/no distress range (SUDS = 30–39; n = 30; 31.3%); however, there were also patients who initially reported feeling very relaxed (SUDS = 10–19; n = 8; 8.3%) or even moderately high (SUDS = 70–79; n = 8; 8.3%) to high (SUDS = 80–89; n = 2; 2.1%) distress levels. The range of distress of patients served on the unit does fluctuate based upon some factors that are unable to be controlled in this project: point in admission, diagnosis of patients, severity of psychiatric symptoms, and other extraneous

Table 2
Range of Subjective Units of Distress (SUDS) reported during 96 completed AAA visits.

SUDS	Pre-AAA	Post-AAA
Mean (SD)	40.2 (18.6)	24.4 (17.5)
SUDS category (N)		
0-9 Completed Relaxation	0	16
10-19 Very Relaxed	8	12
20-29 Peaceful/Calm	11	23
30-39 “Normal”	30	25
40-49 Mild Distress	12	10
50-59 Mild to Moderate Distress	13	6
60-69 Moderate Distress	12	2
70-79 Moderately High Distress	8	1
80-89 High Distress	2	1
90-99 High to Extreme Distress	0	0
100 Extreme Distress	0	0

environmental factors.

Average post-AAA SUDS ratings were noted to be in the peaceful/calm range (\bar{x} = 24.4; SD = 17.5). Similar to baseline, post-AAA SUDS ratings also reflected a wide range of distress levels across patients (Table 2). The most commonly reported SUDS rating after patients had completed their visit was in the “normal”/no distress range (SUDS = 30–39; n = 25; 26.0%) followed closely by “peaceful”/calm (SUDS = 20–29; n = 23; 24.0%) and complete relaxation (SUDS = 0–9; n = 16; 16.7%). While the majority of patients maintained the same SUDS category range (n = 18; 18.8%) or rated themselves as experiencing a decrease of at least 1 SUDS range post-AAA (n = 75; 78.1%), there were three of the 96 completed visits where a patient had an increase in SUDS. It is noteworthy that two of these visits were completed by the same patient diagnosed with treatment resistant major depression with active suicidal ideation with intent and plan. A patient who endorsed a pre/post-AAA change in SUDS from 10 (very relaxed) to 30 (“normal”) completed the other visit. Looking across the range of distress levels endorsed by patients at both pre- and post-AAA visit, outcomes of the paired sample *t*-test did yield significant decreases in pre- to post-SUDS ratings, $t(95) = 11.4, p < .000, d = 1.18$.

Patient responses to the Likert-type and open-ended questions across the 96 completed pet therapy visits were also analyzed to provide insight into their perceptions of the effectiveness of AAA. In response to the question, “How much did you like interacting with the dog?” all patients indicated they enjoyed the interaction to some extent with the majority (n = 74; 77.1%) circling the highest rating of “it was great.” No patient circled less than an “it was OK” enjoyment rating. With respect to patients being satisfied with the amount of time spent with the therapy dog, most patients circled that “it was just right” (n = 63; 65.6%); however, six patients (6.3%) indicated it was too short and another six (6.3%) felt their visit was too long. To the open-ended question “what could make the visit go better next time,” 66 patient visits provided some sort of response to this question. Collapsing all responses into a few clear categories, the open-ended responses fell into a few distinct areas: no changes needed (n = 33), longer time/more visits (n = 15), tricks/toys/more playful interaction (n = 15), another dog/option of dog (n = 3). One patient stated in the open-ended question, that visiting with “the dog was the highlight of my day. Dogs are calming to me. Quigley made me feel less sad and more hopeful that things can get better.”

3. Discussion

Our results support the feasibility and preliminary positive effects of an AAA on a pediatric behavioral health unit. We demonstrated that we could easily consent patients, and collecting data to (adverse events and patient satisfaction) was feasible. Positive feedback from patients, as well as unit staff and providers further support the feasibility of future research in AAA for youth with acute or worsening behavioral or psychiatric needs. In general, providers and staff endorsed the opinion that AAA was a good idea on the behavioral health unit and believed the therapy dog visits had positive effects on patients. While there was a range of the degree of positive effect on patients endorsed by staff, all believed that the program should continue. Interestingly, a small portion of providers and staff reported that they also received some positive effect through the AAA program. While some reported that just seeing the patients smile was the reason for this effect, many noted that they themselves also received some secondary gain via a personal interaction with the therapy dog or via their own reduction in physiological distress. The program did not directly target staff; however, finding ways to reduce staff stress and burnout is important given the high correlation of staff stress and burnout reported to occur with high needs patients with behavioral health needs (Chung & Corbett, 1998; [11,12]).

Our outcomes are preliminary and caution should be taken when interpreting our results. There are a variety of limitations of this quality

improvement and AAA development project. First, this was a sample of convenience and no data was collected or reported on patients who did not participate. We are unable to compare SUDS ratings for the duration of time when Quigley visited for children who did versus did not participate. Second, we did not collect data on extraneous factors that may have affected baseline SUDS levels such as severity of psychiatric symptoms, a visit from family, or day of admission. We also did not collect data related to medications the child may have received prior to study levels that could have affected distress levels. While the main variable of interest was distress, we did not look at other psychiatric symptoms (e.g., depression, anxiety) or mood/emotion states (e.g., happy, angry, tired, lonely) that may be important predictors of change or response to AAA. Further, the SUDS is a quick tool; however, it may not be a precise measurement, is subjective, and does not allow for evaluating long-term effects of exposure to AAA. We also utilized a study design (pre – post) that does not provide data on whether the benefits of AAA were sustained and/or influenced the patient's further outcomes during the rest of their admission. Finally, despite only reporting the primary diagnosis of concern, the majority of patient participants had more than one psychiatric diagnosis; therefore, it would be difficult to compare findings across diagnostic groups. Due to the limitations listed in addition to the developmental nature (i.e., no control group) of this project, the generalizability of our findings may be limited.

Despite these limitations, developing innovative and low cost ways to provide care on pediatric behavioral health units is paramount to assisting with reducing recidivism and improving their long-term outcomes. While research in the application of AAA for youths with significant behavioral or psychiatric needs is scant, data does support the use of therapy dogs in increasing positive coping and in a variety of patient populations. The aim of this project was to develop a program whereby youth could engage in a positive and therapeutic activity to reduce distress during an acute psychiatric admission. While we are unable to determine the long-term effects of the participants involvement in a one-time (or more for a small percentage of patients) AAA interaction with a therapy dog, it is clear that patients did report a decline in distress, and the patients, staff, and providers involved in this project reported that the program should continue. More research in the application of short-term AAA for youth with behavioral health needs is necessary to ensure that the inclusion of animal-assisted interaction could be an appropriate and effective complimentary therapy during an acute psychiatric admission. Future studies should include a comparison to treatment as usual, as well as include additional physiologic parameters (galvanic skin response, cortisol, blood pressure) or an assessment of demographic variables that may influence outcomes.

Conflicts of interest

Authors have no declarations/conflicts of interest.

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Appendix A. Supplementary data

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References

- [1] R.Z. Shen, P. Xiong, U.I. Chou, B.J. Hall, "We need them as much as they need us": a systematic review of the qualitative evidence for possible mechanisms of effectiveness of animal-assisted intervention (AAI), *Complement. Ther. Med.* 41 (2018) 203–207, <https://doi.org/10.1016/j.ctim.2018.10.001>.
- [2] J.A. Griffin, S. McCune, V. Maholmes, K. Hurley, Human-animal interaction research: an introduction to issues and topics, in: P. McCardle, S. McCune, J.A. Griffin, V. Maholmes (Eds.), *How Animals Affect Us: Examining the Influence of Human–Animal Interaction on Child Development and Human Health*, American Psychological Association, Washington, DC, 2011, pp. 3–9, <https://doi.org/10.1037/12301-000>.
- [3] K.A. Kruger, J.A. Serpell, Animal-assisted interventions in mental health: definitions and theoretical foundations, in: A.H. Fine (Ed.), *Handbook on Animal-Assisted Therapy: Theoretical Foundations and Guidelines for Practice*, third ed., Academic Press, San Diego, 2010, pp. 33–48, <https://doi.org/10.1016/b978-0-12-381453-1.10003-0>.
- [4] S.S. Sharfstein, Goals of inpatient treatment for psychiatric disorders, *Annu. Rev. Med.* 60 (2009) 393–403, <https://doi.org/10.1146/annurev.med.60.042607.080257>.
- [5] K.E. Hoagwood, M. Acri, M. Morrissey, R. Peth-Pierce, Animal-assisted therapies for youth with or at risk for mental health problems: a systematic review, *Appl. Dev. Sci.* 21 (1) (2017) 1–13, <https://doi.org/10.1080/10888691.2015.1134267>.
- [6] M.G. Jones, S.M. Rice, S.M. Cotton, Incorporating animal-assisted therapy in mental health treatments for adolescents: a systematic review of canine assisted psychotherapy, *PLoS One* 14 (1) (2019) e0210761, <https://doi.org/10.1371/journal.pone.0210761>.
- [7] M.E. O'Haire, N.A. Guérin, A.C. Kirkham, Animal-assisted intervention for trauma: a systematic literature review, *Front. Psychol.* 6 (2015) 1121, <https://doi.org/10.3389/fpsyg.2015.01121>.
- [8] K. Hinic, M.O. Kowalski, K. Holtzman, K. Mobus, The effect of a pet therapy and comparison intervention on anxiety in hospitalized children, *J. Pediatr. Nurs.* 46 (2019) 55–61, <https://doi.org/10.1016/j.pedn.2019.03.003>.
- [9] J. Wolpe, *Behavior Therapy in Psychiatric Practice*, Elsevier, 1976, <https://doi.org/10.1016/c2013-0-05756-8>.
- [10] P.A. Harris, R. Taylor, R. Thielke, J. Payne, N. Gonzalez, J.G. Conde, Research electronic data capture (REDCap)—a metadata-driven methodology and workflow process for providing translational research informatics support, *J. Biomed. Inform.* 42 (2) (2009) 377–381, <https://doi.org/10.1016/j.jbi.2008.08.010>.
- [11] N.P. Hanrahan, L.H. Aiken, L. McClaine, A.L. Hanlon, Relationship between psychiatric nurse work environments and nurse burnout in acute care general hospitals, *Issues Ment. Health Nurs.* 31 (3) (2010) 198–207, <https://doi.org/10.3109/01612840903200068>.
- [12] K. O'Connor, D.M. Neff, S. Pitman, Burnout in mental health professionals: a systematic review and meta-analysis of prevalence and determinants, *Eur. Psychiatry* 53 (2018) 74–99, <https://doi.org/10.1016/j.eurpsy.2018.06.003>.