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Original article

Dog-assisted intervention significantly reduces anxiety in hospitalized patients with major depression

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Abstract

Introduction: Animal-assisted therapies involve interaction between patients and an animal with the aim of improving mental wellbeing and diminishing anxiety and agitation in patients. To date, few pilot studies focusing on animal-assisted therapeutic effects have met minimal standards of research design and have included standardized outcome variables or physiological measures, depicting the need for scientific research on animal-assisted therapy.
Methods: In this pre- and post-treatment controlled crossover study we measured state anxiety with the State-Trait Anxiety Inventory (STAI), a brief, easy-to-administer self-report measure that is widely used in research and clinical practice. Twelve acutely depressed patients (six male; age: 40.5 ± 10 years) participated after giving written informed consent in accordance with the Declaration of Helsinki after the study had been explained in detail.
Results: The STAI state score was significantly reduced after the presence of a dog (47.0 ± 11 versus 42.2 ± 10) ($Z = -2.402$; $p = 0.016$) which was not the case after the control condition without the presence of a dog (50.41 ± 10 versus 48.0 ± 9) ($Z = -0.981$; $p = 0.327$).
Conclusion: This finding suggests that animal-assisted therapy causes highly significant reductions of state anxiety. Presence of dogs may offer an additional therapeutic benefit that might decrease anxiety and enhance psychotherapeutic strategies and motivation of patients and therapists.

Keywords: Major depression; Dogs; Animal-assisted therapy; Anxiety; Pets

Introduction

Major depressive disorder is the most common of all psychiatric disorders and ranks among the leading causes of disease burden worldwide [1]. Accordingly, about 1 in 5 people will experience a major depressive episode at some point in their lives [1]. However, a complex relationship between neurotransmitter dysbalance, hypersensitivity to stress, stressful life events, and genetic vulnerability has been suggested in the development of depressive symptoms [2]. Recent discussions on the clinical effectiveness of antidepressant drugs especially in mild depressive disorders have raised the need for alternative and additional treatments with fewer side effects [3].

Investigators have hypothesized that companion animals may serve to lower levels of stress and anxiety [4–7]. As domesticated dogs have been protecting their human companions for about 15,000 years, it seems plausible that dogs provide a feeling of safety and comfort not found in more traditional inpatient therapies. In a first published pilot study, depressed patients waiting for electroconvulsive therapy were found to have a significant reduction in fear (37% from baseline) after spending 15 min with a therapy dog and its owner [6]. Moreover, a reduction of anxiety in mood disorder patients has been observed in comparison with relaxation training [6].

Several authors have reported lower blood pressure readings among patients when a previously unknown

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companion animal is present during various stressful activities [7–9]. In addition, stress parameters such as cortisol have been shown to decrease after a 15 min dog interaction [10]. Hypercortisolism has been linked to depression and anxiety where the dysregulation of the hypothalamic–pituitary–adrenal axis is a well-observed pathophysiological factor [11,12]. Although introduced to clinical practice in the early 1960s, animal-assisted activities and therapies have not been scientifically tested until today with the exception of a handful of pilot studies [6].

In this pre- and post-treatment controlled crossover study we therefore addressed the question whether state anxiety measured with the State-Trait Anxiety Inventory (STAI) might decrease in acutely depressed hospitalized patients in the presence of a friendly dog.

Patients and methods

A controlled crossover design was used in which subjects served as own controls. A total of 12 acutely depressed patients (six male, six female, age: 40.5 ± 10 years) were recruited for this study at Charité University Medicine Berlin. Disease onset (age: 25.5 ± 11 years) was comparable in all participating patients. The number of previous hospitalizations was 4.1 ± 2. The local ethics committee approved the study and written informed consent was obtained accordingly from all subjects. Patients met DSM-IV criteria for unipolar major depression. Diagnosis was confirmed on the basis of the Structured Clinical Interview from the Diagnostic and Statistical Manual of Mental Disorders [13]. Exclusion criteria were dog phobia and known allergy or aversion against dogs. The Beck depression inventory (BDI), first published in 1961 and then revised several times, contains 21 questions, each answer being scored on a scale value of 0–3 [14]. The second edition of the BDI was used in this study.

Two 30 min sessions were conducted with each patient. In a crossover design patients were randomly assigned to either the animal-assisted interview or the control interview at the first of the two sessions. The treatment condition consisted of 30 min of interaction with a dog and research assistant. Although physical interaction with the therapy dog such as petting and hugging was permitted, it was not suggested, and patients were allowed to determine the level of interaction themselves. The control condition consisted of a 30 min talk with the same research assistant about the patient's experience with pets and the patient's history.

For each session, state anxiety was measured before and after the session. The sessions took place in the same quiet room, at approximately the same time of the day. In one patient group the first session was without, in the other group the first session was conducted in the presence of the dog. In both sessions, patients were encouraged to talk about their hobbies, attitude towards dogs and other pets, and their previous experience with dogs. Spielberger's state anxiety inventory (STAI) was completed by all patients before and after both sessions.

Statistical analysis

Wilcoxon test for matched pairs was employed to test for influences of the assistance of dogs in the interview. Results are presented as means ± one standard deviation. Analyses were computed using statistical software (SPSS 16.0®). A p value of $p < 0.05$ was considered significant while $p < 0.10$ was accepted in order to detect trends.

Results

At the time of the study, all patients were hospitalized with major depression at the Charité Campus Mitte hospital, most of them because of suicidality. No participants had to be excluded according to the exclusion criteria. Mean Beck depression inventory score of patients was 24.5 ± 8. Some low scores were possibly due to a problem of self-reporting. Mean STAI score before the control session was 50.41 ± 10 and after the control session it was 48.0 ± 9. Mean STAI score was 47.0 ± 11 before the animal-assisted session and 42.2 ± 10 after the session with the dog. After the assisted animal condition, the STAI score was found to be significantly decreased ($Z = -2.402$; $p = 0.016$) while it remained statistically unchanged in the control session ($Z = -0.981$; $p = 0.327$) (Fig. 1).

Discussion

A 30 min intervention in the presence of a dog significantly reduced state anxiety in acutely depressed patients in our study, compared to a control intervention.

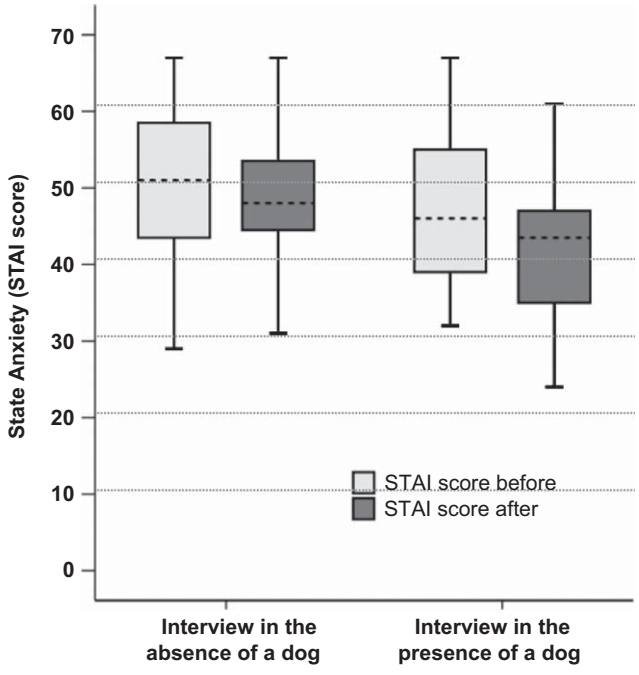

Fig. 1.

Our result is in line with one previous pilot study with inpatients in an acute psychiatric setting that also found significant reductions in anxiety after 30 min with a therapy dog [6]. Moreover, in otherwise healthy adults using wheelchairs, implementation of service dogs has shown to decrease negative affect and depressive symptoms [15].

In line with our observation, another study showed that patients waiting for electroconvulsive therapy were found to have a significant reduction in fear after spending 15 min with a therapy dog and its owner [16]. However, in this study fear had been measured with a visual analogue scale and the results regarding the STAI score could not be reproduced [16], which could be at least partly due to a shorter time of exposition to the dog. However, stress reduction in healthcare professionals may occur after as little as 5 min of interaction with a therapy dog, which is reflected in significant reductions in serum and salivary cortisol [17].

Within the last two decades, studies supporting the health benefits of companion animals have emerged mostly focusing on cardiovascular effects [9]. For this reason, the stress responsive biological parameters dopamine, cortisol, pulse, and blood pressure have been measured over time and have been shown to change after a 15 min dog interaction [10]. All these biological variables are gaining relevance for anxiety and depressive states. Hypercortisolism has been linked to depression and anxiety where the dysregulation of the hypothalamic–pituitary–adrenal axis is a well-observed pathophysiological factor [11,12]. Moreover, there is evidence for raised blood pressure and pulse in severely depressed individuals [18] as well as changes in the dopaminergic system [19]. Controlled scientific examination of the biological changes following animal-assisted interventions in psychiatric patients might focus on these hormones and mechanisms.

Compared to normative patients with a depressive reaction, depressed patients in our study showed comparable mean pre-treatment scores of state anxiety [20]. State anxiety was also slightly increased at the beginning of the control interview versus the animal intervention interview (50 versus 47), which might be due to an anticipatory effect of the dog's presence.

Our finding is not only statistically highly significant, but also clinically important. Recent discussions about the clinical effectiveness of antidepressant drugs have evolved partly based on a meta-analysis of Kirsch et al. [3], who showed that complete datasets including unpublished data revealed an overall effect of new-generation antidepressant medications below recommended criteria for clinical significance. Moreover, meta-analyses of antidepressant treatment trials show benefits that are statistically significant but of marginal clinical significance [21]. Even concerning the "most invasive" treatment of depression, electroconvulsive therapy, several authors claim that there is no study demonstrating a significant difference between real and sham therapy at 1 month post-treatment [22].

Alternative treatments provide at least a placebo benefit and produce fewer side effects. Although introduced to clinical practice in the early 1960s, animal-assisted activities and therapies have not been scientifically tested until today with the exception of a handful of pilot studies [6]. There are few studies focusing on animal-assisted therapeutic effects that meet minimal standards of research design and include standardized outcome variables or physiological measures. Accordingly, in a recent meta-analysis including 165 articles about the therapeutic effects of animal-assisted therapy and animal-assisted activities in depressive patients, 105 articles were summaries and theoretical or anecdotal papers not presenting any data [23]. Of the 60 remaining studies, approximately half did not include a measure of depression and only five met the selection criteria set for this meta-analysis [23]. These selection criteria were random assignment, inclusion of a control group, exposure to some forms of animal-assisted therapy or animal-assisted activities, and a standardized measure of depressive symptoms [23]. Therefore, further controlled randomized studies are needed to test the practical significance of this intervention and its possible role in clinical daily routine.

There are important limitations to this study that include the small number of subjects, a potential bias due to the crossover design and the self-rated anxiety assessment.

Self-rating may be influenced by the lack of blinding and by social desirability. Indeed, all of the patients stated that dogs improve the therapeutic setting. Therefore, a blinded observer rating should be considered in further studies.

Another limitation in terms of therapeutic outcome is the fact that we measured an anxiolytic rather than an antidepressant effect that might not lead to relevant long-term clinical changes in a patient.

Irrespective of gender, age, and whether or not patients kept a pet, depressed patients seemed to benefit from this very brief and easily administered interaction. Anxiety reduction in a hospital setting is clinically important because anxiety can contribute to non-compliance with treatment, interfere with motivation and trust, and disrupt the doctor/patient relationship.

Finally, although the results provide evidence of the immediate effect of a single session of animal-assisted therapy on state anxiety, further studies are needed to replicate the finding of our study and to determine biological mechanisms underlying the anxiolytic properties of interaction with a dog. Further studies should also raise the question of whether animal-assisted therapy has long-term effects on depression and anxiety. These studies could considerably advance our understanding of the therapeutic benefits of human–animal interaction.

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Conflict of interest

Undine E. Lang received a travel award from Janssen-Cilag and speaker honoraria from AstraZeneca, Lundbeck and Eli Lilly & Co and travel expenses from AstraZeneca. The other authors declare that, except for income received from their primary employer, no financial support or compensation has been received from any individual or corporate entity; and there are no personal financial holdings that could be perceived as constituting a potential conflict of interest.

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