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Farees Ahmad Khan, Sarah Alnaher, Muhammad Ismail Ahmad Khan Zalmay& Muhammad Zeshan

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Integrating Animal Therapy into Lifestyle Medicine: A Comprehensive Review

[1]*Farees Ahmad Khan, [2]Sarah Alnaher, [3]Muhammad Ismail Ahmad Khan Zalmay& [4]Muhammad Zeshan

*** Corresponding author's e-mail: ahmadfarees6@gmail.com**

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Abstract

The study sought to explore the potential for integrating animal therapy with the principles of lifestyle medicine. A qualitative research design was employed, focusing on English publications from 2014 to 2024. Recently, animal therapy has emerged as an important intervention in the prevention and treatment of chronic illnesses such as depression, anxiety, mental disorders, hypertension, and diabetes, significantly reducing the physical, psychological, and financial burdens on society. The literature search concentrated on evidence with controversial and debatable themes regarding animal therapy and lifestyle medicine. The study found that animal therapy positively impacts the pillars of lifestyle medicine: physical activity, nonjudgmental social connections, stress, and pain management. Human-animal interaction was shown to modulate hormonal balance by decreasing stress hormone levels and improving the production and circulation of excitatory neurotransmitters. This interaction enhances immune function and activates neurobiological pathways affecting cortisol, dopamine, and beta-endorphin levels, while increasing the activity of the parasympathetic nervous system in humans. For instance, human interaction therapy used among war veterans demonstrated reduced cortisol levels and increased treatment adherence. Animal therapy also motivated physical activity, improved treatment adherence, and enhanced emotional well-being, leading to better health outcomes. The study concludes that integrating animal therapy with various interventions for a healthy lifestyle has the potential to provide significant physical and mental health benefits. Nonetheless, further research is recommended to validate the benefits of combining animal therapy with lifestyle medicine for evidence-based application in clinical practice.

Keywords: *Lifestyle Medicine, Animal Therapy, Chronic Illness Management, Non-Pharmacological Interventions, Emotional well-being*

1.0 Introduction

Lifestyle medicine, a branch of medicine that uses everyday interventions to prevent and treat up to 80% of chronic medical conditions such as hypertension, diabetes mellitus, depression, and obesity, can significantly impact patients' lives by reducing their physical, mental, and financial

suffering [1]. The concept of lifestyle medicine dates back to Hippocrates, who advocated for the favorable effects of a healthy diet, exercise, rest, and overall well-being [2].

Similarly, animal therapy evolved over the centuries. There has been a record as far as 600 BC when the Greek noticed the favorable effects of interacting with horses in the critically ill patients. In recent years, there has been a growing interest in the integration of animal therapy alongside traditional psychotherapy methods for patients dealing with both physical and mental health issues. Evidence suggests that animal therapy can have a positive impact on physical health, mental health, and the enhancement of skills required in various forms of therapy [3].

The primary mechanisms through which lifestyle medicine and animal therapy improve health in humans include stress reduction, enhanced social support, and increased physical activity [4]. A deeper understanding of these mechanisms can provide better insight into their synergistic potential.

This literature review aims to explore how animals can be used in accordance with the principles of lifestyle medicine to help humans manage chronic illnesses and achieve a better quality of life.

2.0 Methodology

The literature search in this study was extensive, drawing on databases such as Google Scholar, PubMed, and ScienceDirect. The following search terms were used: "lifestyle medicine", "animal therapy", "animal-assisted therapy", "pet therapy", "Physical Activity", "Social Support", "Mental Health", "Neurobiological Pathways", "Oxytocin", "Dopamine", "Cortisol". We followed a systematic procedure for data extraction, using predefined criteria for selecting relevant studies. The inclusion criteria for this review comprised peer-reviewed articles published from 2014 to 2024, research conducted in English, and studies focusing on lifestyle medicine and its various components, as well as literature on different types of animal therapy and its application in various treatment groups and potential integration into lifestyle medicine. Exclusion criteria included non-peer-reviewed articles, grey literature, articles published before 2014, and papers in languages other than English. Selected studies were meticulously reviewed, and data were extracted regarding study design and methodology, population and sample size, key findings related to lifestyle medicine and animal therapy, as well as the limitations and strengths of each study. The extracted data were then categorized and synthesized to provide a comprehensive framework for the current state of research on the integration of animal therapy in lifestyle medicine.

3.0 Results and Discussion

The following Table 1 summarizes key studies on lifestyle medicine and animal therapy included in the review, highlighting their reference, population, type of study, and primary results:

Table 1: Table of Characteristics of the studies included in this system review

Reference	Study Type	Population	Results
Chudasama et al. [5]	Cohort study	480,940 middle-aged adults	Engaging in a healthier lifestyle was associated with up to 6.3 years longer life for men and 7.6 years for women. Current smokers estimated to have a 5 to 6 years reduced life expectancy compared to non-current smokers.
Lane et al. [6]	Systematic Review and Meta-Analysis of Observational Studies	385,541 participants	Bidirectional associations exist between the intake of ultra-processed food and adverse mental health
Estruch et al. [7]	Randomized Clinical Trail	7447 participants	In individuals at high cardiovascular risk, the incidence of major cardiovascular events was lower among those assigned to a Mediterranean diet supplemented with extra-virgin olive oil or nuts than among those assigned to a reduced-fat diet.
Piercy et al. [8]	Literature review	Various	Guidelines and benefits of physical activity
van Oort et al. [9]	Mendelian Randomization Study	Various	This study identified HDL-C, triglycerides, BMI, alcohol dependence, insomnia, and educational level as causal risk factors for hypertension.
Trauer et al. [10]	Systematic Review and Meta-analysis	various	CBT-i is an effective treatment for adults with chronic insomnia
Zhang et al. [12]	Observational study	400 Chinese middle school students	Physical activity was related to mental health indirectly and stress

			management directly affected mental health
Khoury et al. [13]	Meta-analysis	Various	Mindfulness-based stress reduction (MBSR) is moderately effective in reducing stress, depression, anxiety and distress and in ameliorating the quality of life of healthy individuals.
Antoni et al. [14]	Literature review	Cancer Patients	Cognitive-behavioral stress management (CBSM) have been shown to improve the levels of stress and the psychological wellbeing in cancer patients.
Wickramaratne et al. [15]	Literature review	General	Social support has been proven to be a protective factor for symptoms and disorders of depression in humans.
Burlingame et al. [16]	Article from a book	General	Interventions focused on building social connections, have been effective in improving mental health outcomes
Santini et al. [17]	Systematic review	General	Perceived social support and larger, diverse social networks play important protective roles against depression in the general population, including those with chronic somatic illness or disability.
Sahebalzamani et al. [19]	Randomized controlled trial	70 males adults from psychiatric residential care homes in Tehran, Iran	Animal-Assisted Therapy (AAT) was helpful for chronic psychiatric patients living in psychiatric residential care homes and not only made them happy but also increased their quality of life.

McDonough et al. [21]	Cross-sectional study	95 participants aged 20–74	Pet ownership is associated with better cognitive and brain health with the strongest effects for dog owners.
López-Fernández et al. [22]	Prospective, quasi-experimental, non-randomized study	61 patients in pediatric intensive care unit of the Hospital of Madrid, Spain	Animal-assisted therapy is effective for the reduction of pain, fear, and anxiety.
Filan et al. [23]	Literature review	Dementia Patients	Animal therapy can help decrease symptoms of depression and loneliness in the elderly population and promote social interaction and improve overall mood of the nursing home residents
Allen et al. [24]	Randomized control trial	240 married couples	People perceive pets as important, supportive parts of their lives, and significant cardiovascular and behavioral benefits are associated with those perceptions.
Barker et al. [25]	Literature review	Various	Animal therapy has great therapeutic potential in improving psychological wellness.
Wohlfarth et al. [26]	Randomized control trial	12 children, aged 8–12 years old	The presence of a therapy dog has the potential to increase physical activity in obese children.
Peel et al. [27]	Randomized control trial	265 university students	Participants exposed to therapy dogs during the final examination period had a better mood and affect than those who were not exposed.
Guzmán et al. [28]	Randomized control trial	23 children aged 7–13 years	Dog assisted therapy improved emotional self-regulation, attendance rate and self-control and social response in children with mental disorders attending a day hospital.

Beetz et al. [33]	Literature review	General	Human-Animal interaction, especially pet-dog, increase oxytocin levels in humans which has many effects.

3.1 Lifestyle Medicine:

The American College of Lifestyle Medicine defines lifestyle medicine as "a medical specialty that uses therapeutic lifestyle interventions as a primary modality to treat chronic conditions including, but not limited to, cardiovascular diseases, type 2 diabetes, and obesity" [1]. The six pillars of lifestyle medicine are a healthy diet, physical activity, good sleep hygiene, stress management, good social support, and avoidance of risky substances. The importance of these pillars has been outlined in various studies. For instance, one study done by Chudasama and companions concluded that individuals at 45 years of age, who led a healthier lifestyle such as engaging in regular physical activity, abstaining from smoking, consuming more than five portions of fruits and vegetables daily, and moderating alcohol intake, extended their average life expectancy by 7.5 years in men and 6.5 years in women, compared to those with an unhealthy lifestyle [5].

3.1.1 Healthy Diet

Keeping a healthy diet is one of the main components of lifestyle medicine. Its importance has been highlighted in a systematic review and meta-analysis done by Lane and colleagues, which provided extensive evidence that the consumption of ultra-processed food is linked with the subsequent development of depression and anxiety symptoms. They also demonstrated an association with stress, trauma, and food and alcohol addiction [6]. An evidence-based intervention is the Mediterranean diet supplemented with extra-virgin olive oil or nuts, which has been shown to reduce the risk of cardiovascular diseases and improve metabolic health [7].

3.1.2 Physical Activity

To keep a healthy lifestyle being physically active is greatly encouraged. Chudasama and companions found that engaging in regular physical activity extended average life expectancy by 7.5 years in men and 6.5 years in women. Regular physical activity was associated with a 1 to 2.5-year increase in life expectancy as compared to those who were inactive [5]. The evidence supports the effectiveness of interventions such as structured exercise programs, which are shown to improve cardiovascular fitness, reduce the risk of chronic diseases, and enhance mental health [8].

3.1.3 Good Sleep Hygiene

One needs to have good sleep hygiene to be physically and mentally healthy. A study was done by Van Oort and colleagues regarding the risk factors associated with the development of hypertension, which can in turn lead to other major disorders such as coronary artery disease, stroke, chronic kidney disease, aneurysm, etc. They found that a sleep duration of less than 7 hours per day was associated with 17% higher odds of developing hypertension as compared to a sleep duration of 7-8 hours per day. Insomnia was also identified as a risk factor for hypertension [9].

Interventions such as cognitive-behavioral therapy for insomnia (CBT-I) have been proven effective in improving sleep quality and duration, reducing the incidence of chronic health conditions [10].

3.1.4 Stress Management

Stress management is an important factor where the physical and mental wellbeing of an individual is concerned. Mental stress can lead to several diseases such as hypertension, depression, anxiety, and addiction disorder [11]. A study by Zhang and companions demonstrated that in adolescents, physical activity was related to mental health indirectly and stress management directly affected mental health [12]. This suggests that stress management might be more important than physical activity when it comes to mental health. Mindfulness-based stress reduction (MBSR) and cognitive-behavioral stress management (CBSM) are evidence-based interventions that have been shown to improve the levels of stress and psychological well-being in healthy individuals [13][14].

3.1.5 Good Social Support

Social support whether received or perceived has been proven to be a protective factor for symptoms and disorders of depression in humans [15]. Interventions such as group therapy and community engagement activities, that focus on building social connections, have been effective in improving mental health outcomes [16][17].

3.1.6 Avoidance of Risky Substances

It has been found that abstaining from smoking and moderating alcohol intake extended life expectancy. Smoking was found to have the most profound effect on reducing life expectancy, with current smokers estimated to have a 5 to 6 years reduced life expectancy compared to non-current smokers [5]. Regarding alcohol consumption, Van Oort and colleagues found a 28% increased risk of developing hypertension for every one standard deviation increase in log-transformed alcoholic drinks per week [9]. Smoking cessation programs and interventions to reduce alcohol consumption, such as motivational interviewing and behavioral therapies, have been shown to be effective in clinical practice

3.2 Animal Therapy

Animal Therapy refers to the use of animals as a part of treatment interventions to improve the physical, emotional, or cognitive well-being of individuals. This form of therapy uses the bond between humans and animals to help in the treatment. There are different types of animal therapy, each designed to meet specific therapeutic goals.

3.2.1 Animal-Assisted Therapy (AAT)

Animal-assisted therapy (AAT) is a structured, goal-oriented intervention in which health or human service professionals, according to their expertise integrate animals meeting certain criteria into the therapeutic process, with aims to enhance human physical, social, emotional, and cognitive

functions. It can be implemented in individual or group settings across various environments. The process of AAT is carefully documented and evaluated to ensure its effectiveness [18]. A randomized control trial done in two inpatient psychiatric settings showed that in patients suffering from chronic psychiatric disorders, the scores of happiness levels and quality of life scores were much higher if they were given an animal to take care of [19].

3.2.2 Pet Therapy

Pet therapy, also known as animal-assisted activities (AAA), is a more informal type of animal therapy where animals provide comfort, support, and companionship to individuals in various settings such as homes, hospitals, and nursing homes. Unlike animal-assisted therapy (AAT), pet therapy does not require a structured therapeutic plan nor does it need to be conducted by health professionals. The primary goal of pet therapy is to enhance the overall quality of life and emotional well-being of individuals through interactions with animals [20].

Studies have shown that pet ownership is associated with greater cognitive functioning and brain health in older adults compared to non-pet owners. Specifically, pet owners were found to have larger brain sizes in areas such as the posterior parietal area, which is involved in attention and cognitive processes related to directing focus and managing attention, and the temporal lobe, which is engaged in emotional processing, memory, and social cognition. Additionally, the medial prefrontal and parietal regions, associated with self-referential thinking, daydreaming, and recalling past experiences or simulating future scenarios, were also larger in pet owners [21].

3.3 Benefits of Animal Therapy in Different Population Groups

The benefits of animal therapy in different population groups have been extensively discussed in this section. The core benefits are discussed focusing on children, the elderly and disabled individuals. The discussion is as presented in the subsequent sections;

3.3.1 Benefits of Animal Therapy in Children

Animal therapy is used in the pediatric population to decrease anxiety and provide comfort when undergoing medical procedures. Animals can distract children during these stressful or painful experiences [22].

3.3.2 Benefits of Animal Therapy in the Elderly

Animal therapy can help decrease symptoms of depression and loneliness in the elderly population promote social interaction and improve the overall mood of the nursing home residents [23].

3.3.3 Benefits of Animal Therapy in Disabled Individuals

In individuals with disabilities, the presence of service animals decreases the cardiovascular reactivity to stress, thereby decreasing stress and anxiety. Guide dogs also help people with visual impairments gain more independence and a better quality of life [24].

3.3.4 Benefits of Animal Therapy in Patients with Mental Health Disorders

Animal therapy can decrease symptoms of anxiety, depression, and PTSD in patients. Interactions with therapy animals can increase self-esteem, provide emotional support, and improve social skills. The study emphasizes the therapeutic potential of animals in improving psychological wellness [25].

3.4 Intersection of Lifestyle Medicine and Animal Therapy

Lifestyle medicine and animal therapy both use non-pharmacological means to improve human health. The three main modalities that are common among both are physical activity, good social connection, and stress management. The integration of these two approaches has the potential to have a stronger effect on promoting comprehensive health and well-being.

Incorporating animal interaction into lifestyle medicine would make these intentions more effective and sustainable by providing additional motivation as well as emotional support to the people. For example, participants will be more motivated to take part in physical activities if therapy dogs are also involved in the exercise programs. Wohlfarth and colleagues conducted a study in which they studied the difference in physical activity in obese children in the presence of therapy dogs versus a friendly adult [26]. They found out that when the children were in the presence of the therapy dogs, they were more intrinsically motivated which means that they received more pleasure from the activity.

Making healthy lifestyle choices can be difficult; animals can be a source of support and help us manage stress during these times can make the journey easier and less isolated. A study carried out among university students suggested that interaction with therapy dogs has a significant impact on their moods and reduces the symptoms of anxiety greatly, especially during exams [27].

Furthermore, animals can provide comfort making it easier to adhere to lifestyle interventions. It has been proven that animal therapy improves treatment adherence. A study by Guillen Guzmán and companions showed that among children who participated in the study, there were higher attendance rates on days animal therapy was offered resulting in higher therapeutic adherence [28].

3.5 Mechanisms and Pathways

The following subsections explore how both lifestyle interventions and animal therapy contribute to health improvements by impacting stress hormones and immune function. Studies indicate that these approaches can significantly reduce stress hormones and enhance immune system performance, leading to better overall health outcomes.

3.5.1 Stress Hormones:

Studies have shown that activities such as exercise, adequate sleep, a balanced diet, and stress management can decrease the stress hormones- epinephrine, norepinephrine, and cortisol in the body [29][30]. Chronically high levels of stress hormones have been linked with high blood pressure, high blood sugar, high cholesterol, and triglyceride levels which lead to chronic illnesses such as hypertension, coronary artery diseases, diabetes, and mental health disorders such as

depression and anxiety. Similarly, interaction with animals has been shown to decrease cortisol levels thereby decreasing blood pressure and promoting a sense of calm and relaxation [31].

3.5.2 Immune Function:

Lifestyle interventions such as regular exercise, good sleeping habits, and a balanced diet full of vitamins and minerals are critical to a healthy immune system. Similarly, animal therapy can boost the immune system by decreasing stress in individuals. Studies have shown increased levels of immunoglobulin A (IgA), an antibody that plays a crucial role in immune function after people interact with animals [32].

3.6 Neurobiological Pathways Involved in the Human-Animal Bond and Its Implications for Health

This section delves into the biochemical and physiological mechanisms through which lifestyle interventions and animal therapy promote emotional and physical well-being. Specifically, the subsequent subsections explore the roles of oxytocin release, dopamine and beta-endorphin pathways, and parasympathetic nervous system activation in enhancing mood, reducing stress, and improving overall health.

3.6.1 Oxytocin Release:

Research has shown that interaction between humans and animals causes the release of oxytocin in both humans and animals especially when the interaction involves physical contact and when the human and animal already have an established relationship. Oxytocin has a position effect on social interaction such as increasing eye contact, trust, social skills, face memory, positive self-perception, empathy, and generosity, and decreases depression. Oxytocin has an anti-stress effect, that is it decreases glucocorticoid levels in the blood; and decreases heart rate and blood pressure. Oxytocin also raises the pain threshold and has an anxiolytic effect [33].

3.6.2 Dopamine and Beta Endorphins Pathways:

Enjoyable activities such as interaction with pets have been shown to increase the levels of beta-endorphins and dopamine in the brain. Beta endorphins bind to the opioid receptors in the brain which lowers stress and helps with pain management. Beta endorphins also decrease the release of aminobutyric acid (GABA), a dopamine antagonist in the brain, which causes the levels of dopamine to increase in the brain [34]. Dopamine is usually known as the ‘feel-good’ hormone. Dopamine is the neurotransmitter that when in an appropriate amount is responsible for happiness, motivation, alertness, and focus [35]. Thus, by enhancing these pathways, both animal therapy and lifestyle interventions can decrease the symptoms of anxiety and depression and improve the mood of the individual.

3.6.3 Parasympathetic Nervous System Activation:

Interaction with animals has been shown to activate the parasympathetic nervous system, the system responsible for the body’s ‘rest and digest response’ [36]. This system counteracts the

activation of the sympathetic nervous system in response to stress, resulting in lower heart rate, lower blood pressure, and a general sense of calm and safety [37].

3.7 Practical Implications and Barriers to Integrating Animal Therapy into Lifestyle Medicine

Our findings indicate that animal therapy has a positive impact on several pillars of lifestyle medicine, including physical activity, social connections, and stress management. These results have significant practical implications for clinical practice and public health policy. For example, the integration of therapy animals into exercise programs could be one approach to increasing patient motivation and adherence. However, integrating animal therapy fully into lifestyle medicine will require the conquering of many barriers, including those of risks of infection, cost and cultural acceptance.

There are some concerns that human-animal interaction can lead to spread of pathogens either from the human to the therapy animal or vice versa [38]. While evidence of such occurrences is minimal, this issue warrants further investigation, and appropriate preventative measures should be implemented.

Another potential problem is the additional expenses that pet owners have to face in order to take care of their pets including food, health expenses etc. It might not be feasible for a lot of people.

Another issue that can arise is the potential ethical implications of animal therapy. There are concerns that non-domestic animals like dolphins or monkeys might not be able to deal with human interactions, leading to a cause of stress for the animal involved [39]. There is also concern that special populations like the elderly and people with disabilities might not be able to take care of their pets' needs such as appropriate diet and exercise. Residentially housed therapy animals may face exhaustion in visitation programs, indicating a need for regulated interaction schedules [39].

Future research should focus on addressing these barriers while validating the combined benefits of such interventions, ensuring the ethical treatment of therapy animals, and exploring cost-effective solutions to make animal therapy accessible to a broader population.

4.0 Conclusion

The study concludes that integrating animal therapy into lifestyle medicine holds immense potential for enhancing health and well-being. Lifestyle medicine emphasizes the importance of a healthy diet, physical activity, stress management, good social connections, proper sleep hygiene, and avoidance of substance abuse to prevent and treat chronic illnesses. Animal therapy, which includes both animal-assisted therapy and pet therapy, leverages the human-animal bond to help individuals overcome various mental and physical challenges.

Both animal therapy and lifestyle medicine share common mechanisms that facilitate their combination for greater health benefits. These modalities decrease stress hormone levels, boost the immune system, and activate neurobiological pathways that regulate emotions and maintain good social connections. The release of oxytocin, the increase in dopamine and beta-endorphin levels, and the activation of the parasympathetic nervous system through animal interaction complement the benefits provided by lifestyle medicine.

Studies have shown that animal therapy enhances the efficacy of therapeutic interventions by providing motivation for treatment programs, emotional support, and a sense of responsibility,

thereby improving adherence to prescribed therapies. Interaction with animals can make physical activities more enjoyable and encourage active engagement. Additionally, the presence of therapy animals helps individuals embrace and maintain new healthy lifestyle choices, leading to better health outcomes.

Lifestyle adjustments combined with animal therapy offer a comprehensive approach to fostering human well-being. Utilizing research-supported lifestyle modifications and engaging in activities involving human-animal interactions can lead to improved emotional and physical health, thereby enhancing the quality of life. Future studies are needed to further validate the combined advantages of these techniques and maximize their application in clinical practice and public health interventions.

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