

Improving Animal Welfare in Shelter Environments in Northern Cyprus

¹ Laden Tarhun, ² Salar Salah Muhy Al-Din, ³ Ahenk Yilgin Damgaci

¹ Girne American University, Faculty of Architecture, Department of Interior Architecture, 99428 Karmi Campus, Karaoglanoglu, Kyrenia/ N. Cyprus, TRNC
ladentarhun@gmail.com
<https://orcid.org/0009-0002-9098-6370>

² Arkin University of Creative Arts and Design, Faculty of Design, Department of Interior Architecture and Environmental Design, Kyrenia/ N. Cyprus, TRNC
salar.aldin@arucad.edu.tr
<https://orcid.org/0000-0002-0365-8452>

³ Eastern Mediterranean University, Faculty of Architecture, Department of Interior Architecture, 99628 Famagusta, North Cyprus
ahenk.yilgin@emu.edu.tr
<https://orcid.org/0000-0003-4007-8753>

Abstract

Animal shelters are facilities established to meet the shelter needs of animals that have no home or have been abandoned by their owners. Animal shelters in contemporary aim to provide homeless animals with a temporary house and at the same time try to help feed them and healthily care for them. The continuously growing animal population in Northern Cyprus highlights the importance of animal shelter design and operational aspects for animal well-being. Drawing on interdisciplinary principles from interior design, spatial quality, and animal psychology, the study aims to transform shelters from confinement spaces into environments that promote long-term welfare. Using a qualitative, interpretive approach, the research conducts a systematic review of existing literature to analyze shelter conditions, human-animal interactions, and spatial dynamics in current facilities. The implications of this study are expected to make a valuable contribution to the development of design principles and standards that target the improvement of both the physical and psychological living conditions in animal shelters. The goal of the study is to maximize the current state of shelter conditions and lead the way in maximizing animal welfare. These principles aim to provide real solutions to reduce the stress of animals in animal shelters in North Cyprus, to increase adoption rates, and more importantly to develop a humane shelter system. Through the systematic examination of these overlooked concerns, the present study substantially enhances the welfare of animals in shelters while simultaneously optimizing the efficacy of the animal care methodologies.

Keywords: Animal Shelters; Interior Space Quality; Animal Welfare; Environmental Psychology; Northern Cyprus.

Article History:

Received: 31-07-2024

Revised: 08-09-2024

Accepted: 02-10-2024

Available online: 19-11-2024

This article is an open-access
Article distributed under the terms and
conditions of the Creative Commons Attribution
4.0 International (CC BY) license.



The article is published with open access at
www.jsalutogenic.com

Copyright © 2024 by the Author(s)

1. Introduction

Animal Shelters denotes a physical establishment operated by government and non-governmental entities, that offers transitory or enduring accommodation for homeless, forsaken, and mistreated animals. These shelters are intended to take care, protection, and humane treatment of abandoned animals and at the same time try to assist them in finding suitable homes. Animal shelters are sometimes defined as establishments that offer refuge for animals, especially those who suffered physical injury or abandonment.

How to Cite this Article:

Tarhun, L., Muhy Al-Din, S.S., and Damgaci, A.Y. (2024). Improving Animal Welfare in Shelter Environments in Northern Cyprus. *Journal of Salutogenic Architecture*, 3(1), 80-96. https://doi.org/10.38027/jsalutogenic_vol3no1_7

The complexity of shelter conditions, including operational efficiency, psychological well-being, and spatial quality is often ignored. Animal rights protection organizations are humanitarian organizations established in the 18th and 19th centuries to prevent cruelty and mistreatment of animals (Zutphen, 2003, pp. 1-3). The British Royal Society for the Prevention of Cruelty to Animals (RSPCA) and the American Society for the Prevention of Cruelty to Animals (ASPCA) were established in the period spanning from 1824 to 1866, respectively. Looking at these periods, animal shelters have existed in some form in Western society since approximately the mid-1800s. These shelters have existed as an ever-changing space, both for the benefit and detriment of animals over time (Horecka, K., & Neal, S. 2022). When looking at the island of Cyprus, on the other hand, the articulation of animal welfare began in the mid-20th century and the first animal shelters in Cyprus were probably established in the 1950s or 1960s. The Cyprus Society for the Prevention of Cruelty to Animals (CSPCA) is one of the oldest organizations in Cyprus, founded in 1970 (URL1). These historical organizations and institutions have taken many initiatives to protect animals locally as well as globally, but there are still challenges in sheltering, and the growing public awareness of shelter needs, has led to increased participation from many groups in advancing the animal welfare movement. There remains limited knowledge regarding the specific needs and challenges faced by shelters, particularly in Northern Cyprus. Although there is an increasing advocacy for animal welfare, there is already little knowledge regarding the specific needs and challenges encountered by shelters, particularly those located in Northern Cyprus. Globally, there is ongoing work to create scientifically grounded measures for evaluating the well-being of shelter animals. However, there is a lack of research on the influence of the design on both the welfare of animals and the understanding of the public (Arena et al., 2019; Righi et al., 2019). Even though these international initiatives are vital, a large portion of the material now in publication ignores the direct impact that shelter design has on animal welfare and public opinion in particular locales, such as Northern Cyprus. According to James Yeates (2016), the quality of life (QOL) of animals refers to the subjective value each animal places on its own life, independent of its utility to humans. It encompasses both positive and negative aspects of an animal's experiences and behaviors, evaluated from the animal's perspective. Meeting the needs of the animals in shelters is extremely difficult in Northern Cyprus. This study addresses the gap in understanding how architectural design impacts animal welfare, public perceptions, and potential adopter behavior in Northern Cyprus. The primary aim of this study is to pinpoint the deficiencies in the design of current shelters in Northern Cyprus and to propose a novel enhancement to elevate the welfare criteria of the animals residing in the shelter. Furthermore, the study examines strategies to improve animal welfare by addressing their psychological needs and human interactions. At the same time, it looks at Northern Cyprus's current animal shelter design requirements and evaluates how well they meet international standards. Additionally, it also examines the impact of shelter conditions on the psychological well-being of animals and explores how better design can improve human-animal connections, potentially leading to increased adoption rates. The study will be followed by these research questions:

- 1- What are the ongoing conditions of animal shelters in Northern Cyprus, regarding the design standards, and how these conditions will meet international standards?
- 2- To what extent do animal shelters in North Cyprus meet animal welfare and the physical and psychological needs of the animals in the shelter?
- 3- What kind of shelter design guideline solutions can be suggested to increase adoption rates from animal shelters in Northern Cyprus?

The hypothesis of this study proposes that improving the design and management of existing animal shelters in Northern Cyprus will protect and improve animals' welfare standards, change public perception, and at the same time increase adoption rates of shelter animals. This study uses a systematic review of the literature to assess and measure the design and management of existing animal shelters in Northern Cyprus to improve the welfare standards of shelter animals. With the help of a thorough literature assessment on shelter design, animal behavior, and welfare requirements, architectural operational guidelines will be developed to design and build humane shelter habits in Northern Cyprus where all animals can live in peace and health. This study will focus specifically on dogs, which represent a growing population in shelter environments when we compared for the other animals in Northern Cyprus. This focus is essential to effectively address the welfare needs and shelter population.

2. Literature Review

2.1 Well-being Definition

One of humanity's objectives is the pursuit of well-being. Philosophers have been interested in well-being since the time of ancient Greeks and the idea of well-being has been present for millennia in a variety of contexts (Brey, 2012). In the context of doctoral students' well-being, Medin and Alexanderson's description of "the individual's experience of his or her health" is adopted (Medin & Alexanderson, 2001), recognizing the evolving nature of individuals' experiences and the multidimensional aspect of well-being. The concept

of well-being is complex and lacks a universally accepted definition; however, the Centres for Disease Control and Prevention (CDC) defines, it as “the presence of positive emotions and moods, the absence of negative emotions, fulfillment and positive functioning conducted by Chutiyami et al. (2022). According to Huppert (2009) defines that the feeling of pleasant emotions such as happiness and contentment, together with the realization of one is potential, exerting some control over one’s life, having a sense of purpose, and maintaining positive connections are all integral aspects of well-being. The study conducted by Camfield, Streuli, and Woodhead (2009) revealed the challenge of formulating a unified definition of well-being due to the existing division in the literature on this topic. The two primary indices of well-being are positivity and happiness (Veenhoven, 2008). Within certain publications, the terms “flourishing,” enjoying a good life “happiness” and “life satisfaction.” While having somewhat different meanings and interpretations are frequently used interchangeably with the concept of “well-being” (Carter and Anderson, 2019). Concurrently, there exists a correlation between good mental health and subjective well-being. A state of well-being in which the individual realizes his or her abilities, can cope with the normal stresses of life can work productively and fruitfully, and can contribute to his or her community is how the World Health Organization (2001), defines good mental health. The concept of health has evolved throughout time and currently encompasses knowledge of the connections between medical, social, and psychological elements. According to Huppert and So (2013), two essential components make up the concept of well-being: being happy and doing well. The characteristics of happiness, interest, and participation are indicative of an individual who experiences positive self-perception. Functional well-being is defined by the presence of a sense of purpose, autonomy in the management of one’s life, and positive interpersonal relationships. Key elements of wellness encompass attaining a sense of purpose in life, engaging in meaningful relationships, and exerting a certain level of autonomy over one’s life.

2.1.1 Well-being and Key Factors in Architectural Design

The relationship between architecture and health has historically received little attention, beyond the design requirements of healthy buildings. Recent work has changed this and has established a more holistic awareness of the role of architecture in health (Steemers, K. 2015). Considerable attention has been directed to health issues resulting from environmental elements such as noise, light, air quality, and congestion. Typically, these effects are categorized as both indirect such as through social processes, and direct namely, effects on physical and mental health (Evans, G. 2003). Nonetheless, the concept and research of well-being have placed more emphasis on behaviors than on lionesses. The conceptualization of well-being in the context of architecture may include various components such as Physical Environment, Psychological Factors, Social Interactions, Functional Efficiency, and Environmental Sustainability. Within architectural settings, these components contribute to the overall welfare of an individual.

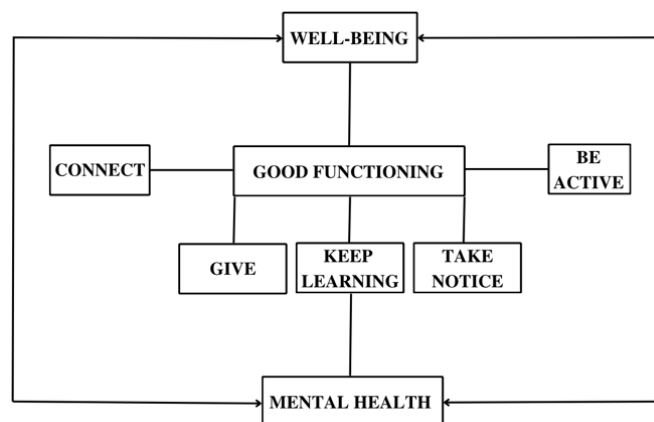


Figure 1. A model describing how the set of actions operates to enhance well-being (Developed by the Author).

The primary physical design components have been associated with the Five Ways to Well-Being (Connect, Keep Active, Take Notice, Keep Learning, and Give), which are correlated with positive mental health outcomes (Steemers, 2015).

Table 1. Components of well-being in Architecture (Steemers, 2015).

Components of Well-being in Architecture	Statements
Physical Environment	“Keep Active” statement, which emphasizes the positive effects of physical activity on mental and physical health.
Psychological Factors	“Take Notice” highlights the importance of mindfulness in reducing symptoms of stress, anxiety, and depression, emphasizing the psychological aspect of well-being.
Social Interaction	This aligns with the “Connect” aspect mentioned, emphasizing the importance of social connections in promoting well-being.
Functional Efficiency	“Keep Learning” Engaging in activities promotes subjective well-being.
Environment Sustainability	“Give” evidence has emerged that pro-social rather than self-centred behaviour has a positive impact on happiness.

According to Table 1. Illustrated the interconnections between each component of well-being in architecture and the provided statements, highlighting the interdependence of these components in promoting general well-being in architectural settings. Chowdhury, Noguchi, and Dolo (2023), argue that architects have applied human-centric design principles to prioritize the physical and psychological well-being of individuals, as evident in their works. One crucial element of wellness is Comfort. This element is an important element of healthy living and encompasses not only physical comfort (such as private spaces, optimal ergonomics, temperature regulation, and air quality) but also mental social comfort, which is essential for social participation and interaction. The fundamental capacity of architecture to negotiate form, space, materials, and design enables us to construct secure, tranquil, and engaging living environments and to exert control over our interactions with others and surroundings. Research undertaken by Chowdhury, Noguchi, and Doli (2023) demonstrated that architecture can enhance our standard of living, expand our outlooks, and enable healthier and more socially involved ways of living.

2.2 Animal Behaviour

According to Walker, Dale, D'Eath, and Wemelsfelder (2019), a significant portion of dogs worldwide are kept in shelters to find their new homes and ensure their long-term well-being. On the other hand, there are increasing attempts globally to establish scientifically based measures to assess shelter dog welfare (Arena, Wemelsfelder, Messori, Ferri & Barnard, 2019). The atmosphere of the shelter itself can be stressful and negatively affect the dogs' welfare (Righi et al., 2019). Welfare metrics must consider both an individual's mental and physical well-being as well as their perception of their living circumstances (Wemelsfelder & Mullan, 2014). Dogs who live in shelters often experience stress and trauma because of sensory overload, social isolation, lack of control over daily routines, and novelty of surroundings. Stress affects a dog's behavior, emotions, and cognitive function among other things. As a result, a standardized behavioral assessment conducted at the shelter could not give a reliable picture of the typical behavior of the dog in a more secure and comfortable home setting (Clay et al., 2020). A crucial aspect of animal sheltering is understanding the natural behavior of animals and the difficulties and intricacies they encounter in a shelter setting. The aim is to enhance the well-being of shelter animals and increase the probability of their adoption or subsequent permanent placement. Analysing and modifying the compartmental patterns of the animals residing at the shelter is of greatest significance.






2.1.2 Animal Behaviour in Shelter Environments

The animal may have been abandoned originally because of their behavioral problems or these behavioral problems might have arisen because of being in a shelter environment. Prolonged residence in insufficiently enriched surroundings often leads to behavioral problems, but even short periods of time spent in a shelter can have a negative impact on an animal's conduct and well-being because of the stress they impose on their physical and mental health. Often, animal conduct reflects its cognitive experiences and might occasionally expose underlying medical disorders. Behavioral responses to difficult events can be classified into two categories: Temporary and Permanent. Short-term reactions, as defined by the WSAVA Animal Welfare Guidelines (2019), encompass alterations in flight posture, whereas long-term responses involve the decrease of typical behaviors or the emergence of stereotyped behavior. According to Hubrecht, Serpell, & Poole, 1992, single-roomed dogs in animal shelters, who are isolated, may engage in stereotyped activities such as digging, circling, licking the ground, and abrupt transitions between different states of locomotion (e.g., walking to jumping, standing to turning and sitting to pacing). These actions may be signs

of low well-being since they are frequently linked to long-term stress. Normal behaviours, physiology, immune system function, and degree of harm are among the measures of animal behaviours (Broom, 2001; Broom, 2006). The concern is further raised by the fact that dogs who are socially isolated for an extended period exhibit physiological stress reactions (such as elevated urine cortisol-to-creatinine concentration ratios), hormonal and immunological abnormalities (such as neutrophilia), and distressed- and fear-related behaviours (such as low stance, self-grooming, paw lifting, and vocalization) (Beerda et al. 1997). The foremost advantage of behavioural assessment in comparison to physiological wellness metrics lies in its non-invasive characteristic, which facilitates the evaluation process without necessitating alterations in the animals' behavioural patterns. Basic observational techniques can detect any deviations in behaviour, the absence of essential maintenance behaviours such as grooming, challenges in executing customary movements, evasion of certain environmental components, fleeing responses, and variations in an individual's normative behavioural expressions (WSAVA, 2019). These behavioural modifications may function as preliminary indicators of the existence of distress or insufficient welfare within shelter environments. Aggression represents a significant behavioural concern and may be classified as a prevalent behavioural trait in animals (Overall, 2001). The emergence of aggression is attributable to a complex interplay of factors including hormonal influences, situational contexts, genetic tendencies, conditioning experiences, training, and both defensive (reactive) or aggressive (initiative-taking) behaviours (Verga, M., & Michelazzi, M. 2009). Different neurotransmitter systems' roles in the emergence of violent behavior have also been examined in recent studies (Mehlman et al., 1994; Mann, 1995). Anxiety is a major contributing factor in aggression and during a "state of emergency," an anxious or fearful animal may display aggressive behaviour (Reisner, 2003). In addition to aggression, anxiety-related disorders are common in shelter animals. These include generalized anxiety, separation anxiety, phobias, fears, and stereotypical or compulsive behaviours. Anxiety, as described by Vincent (1986), reflects an animal's ability to cope and maintain emotional homeostasis. Emotional homeostasis refers to the capacity of the autonomic nervous system to maintain equilibrium, enabling an animal to adapt and regulate stress. Specifically, Casey (2004), distinguishes between anxiety and fear by defining anxiety as the emotional reaction to stimuli that indicate possible danger, and fear as a direct response to an actual threat. Anxiety-related behaviours in animals can manifest as hyperactivity, panting, salivation, pacing, vocalization, shaking, and other behaviours. Many fear-related behaviours are normal adaptive responses, but when they interfere with behaviour characteristic to their species because of changes in brain anatomy, they can become abnormal. Phobias, especially those related to noise, can escalate if untreated, resulting in severe avoidance behaviours and stress (WSAVA, 2019). A variety of behaviours can be seen in dogs that suffer from phobias, including panting, pacing, shaking, hiding, wanting to be close to their caregivers, vocalizing, excessive salivation, destructiveness, improper elimination, self-trauma, and aggression (Overall, 1997; Casey, 2004). Numerous elements, such as temperament, past experiences, species, breed, age, health, and shelter conditions exert an influence on the behaviour of shelter animals. Nevertheless, numerous animals display typical behavioural reactions to stress at welfare facilities. The responses often adhere to four established patterns: Flight, Fight, Freeze and Fiddle/Fidget and Natural. The term "Flight" denotes efforts to flee from a stressful situation, whereas "Fight" corresponds to defensive or violent reactions. "Freeze" is defined as a state of immobility or a complete absence of reaction to stimuli, while 'fiddle/fidget' refers to repeated or displacement activities such as excessive grooming or pacing. Understanding these behavioural patterns and the factors influencing them is essential for improving the welfare of animals in shelters. Each animal reacts differently to the stress of the shelter environment and careful observation of behaviour can provide valuable insights into an animal's well-being and the changes needed to support better emotional and physical health.

Table 1. Animal Welfare Guidelines Group et al. (2019), provide guidelines for the behaviour assessment of shelter dogs in the shelter environments.

Behaviour	Description	Image

Friendly/Sociable	There are no overt displays of fear or anger; the assessor is greeted and/or approached with a neutral, calm attitude, friendly demeanour, and a relaxed gaze.	
Flight	Symptoms of fear include low or extremely low body postures, frequently shrinking away from the assessor or hiding, ears back, sporadic, or indirect eye contact, and a tucked or low tail between the legs. (e.g. by moving behind the owner or under a table.)	
Fight	Many people have the misperception that a dog is aggressive and does not necessarily be afraid. A dog may display fear in a variety of ways, including aggression. It is crucial to keep in mind for the animal's well-being that if it is growling, snarling, lunging, barking, hissing, spitting, etc., it is probably experiencing extreme fear or anxiety.	
Freeze	Dogs that are frozen will either remain motionless or move in what seems to be slow motion. This is frequently observed in a veterinary context, where it may be misinterpreted as a cooperative or well-behaved pet when it is scared and immobilized, making it receptive to manipulation or examination.	
Fiddle/Fidget	The fidget or fiddle response is a behaviour dogs exhibit when they are anxious or fearful. Common signs include licking their lips without being hungry, yawning without being tired, scratching without being itchy, scanning their surroundings, or shaking their coats as if it is wet. These actions are unrelated to their current situation. This is like how humans might twirl their hair, bite their nails, or laugh nervously when they feel anxious.	

According to Table 2. The Animal Welfare Standards Group et al. (2019) offer extensive standards for evaluating shelter dogs' behavior when they are housed apart. Barrera et al. (2010), research confirms the importance of context in behavior evaluation. Distinct behavioral differences were observed between canines in shelters and those in domestic environments when exposed to unfamiliar individuals. This highlights how important situational factors are when evaluating animals in shelters. The ethical guidelines put forward by Brandi and Norman (2023), for the supervision and training of zoological facilities' wild animals may provide crucial information for the implementation of best practices in shelter settings. These approaches may be modified to enhance the welfare of animals in shelters, even if the particular circumstances can differ. Regardless of any variations in the circumstances, these methods may be adjusted to improve the well-being of animals in shelters. Additionally, Owca (2020) explores how theoretical frameworks in psychotherapy contribute to our understanding of trauma reactions and provide valuable perspectives for developing programs for animals in shelters. The mental health of animals kept in stressful environments may be better addressed by shelter laws as a result of these findings.

2.2 Introduction to Animal Shelter

The definition of "animal shelter" can be found on Dictionary.com, it is an establishment, maintained by local government or supported by charitable contributions, that provides a temporary home for dogs, cats, and other animals that are offered for adoption, and put to sleep homeless animal that has been deemed unsuitable for adoption (URL 2). Animal shelters are typically characterized as establishments that provide sanctuary for animals, particularly those that have experienced physical harm or have been relinquished. Commonly, the complexity of shelter circumstances, encompassing aspects such as operational efficiency, psychological well-being, and spatial quality, is disregarded. Historically, the origins of animal shelters date back to ancient times. At the onset of the 19th century, concomitant with the Industrial Revolution, humanity

encountered a paradigm of industrialization, advancement, and modernization (Alkan, 2016). Presently, a majority of the global populace resides within urbanized environments (Yilmaz and Ciftci, 2011). Nonetheless, the accelerated demographic expansion and progress that accompanied this swift urbanization precipitated significant environmental challenges (Kurt, 2004). Human impacts such as loss of natural habitat, pollution, and traffic are reducing biodiversity (Miller and Hobbs, 2002). Developments in urban areas reduce animal habitats and threaten the lives of stray animals. Since the 19th century, the presence of stray animals in the West, especially in cities, has been perceived as undesirable (Akyüz, 2021). This situation was also shaped by public health and hygiene concerns and various measures were taken (Özmen, 2020). To summarize, the establishment of regular animal shelters in the modern sense generally took place in the late 19th and early 20th centuries. The first animal shelters were usually established to prevent uncontrolled breeding of animals and to protect public health. They were usually run by municipalities or local animal protection associations. In later years, the function of animal shelters was not limited to providing shelter for homeless animals (Tandoğan, 2022). At the same time, these facilities began to offer services to provide health checks, vaccinations, sterilization, and adoption of animals. During this period, the role of animal shelters was more focused on the rehabilitation and adoption of homeless animals (Tandoğan, 2022). Today, animal shelters serve a variety of purposes. These include the care and adoption of stray animals, animal ownership education, community services, emergency animal protection, and temporary shelter. Each animal shelter has a different purpose based on the resources and demands of the area in which it is situated. The history and objectives of animal shelters have changed over time, reflecting the evolution of these important institutions that were founded to aid the homeless of abandoned animals as well as to raise public awareness and sensitization (Miller, P. 2023). Animal shelters come in a variety of forms and serve a variety of purposes all around the world. Community service, adoption and rehabilitation, animal welfare education, and gathering and tending to stray animals are a few examples of these.

Table 2. Explanations of different types of Animal shelters in the World (Developed by Author).

Animal Shelter Types	Introduction	References
Municipal Animal Shelter	These shelters are typically operated by local government authorities and are responsible for housing stray, abandoned, or lost animals within their jurisdiction (Schwebadmin, 2023). They often provide services such as animal control, adoptions, and sometimes low-cost veterinary care.	(Schwebadmin, 2023). Pacelle, W. (2007, November 8)
Private Animal Shelters	Non-profit organizations, charities, or animal welfare groups (Ternovska, 2023) usually operate these shelters. They rescue animals from various situations, including abuse, neglect, or surrender by owners, and provide them with care, medical treatment, and opportunities for adoption.	(Ternovska, 2023).
No-Kill Shelters	No-kill shelters, as advocated in The HSUS Shelter Advocate Toolkit 2012 by The Humane Society of the United States, are dedicated to saving the lives of all healthy and treatable animals that come into their care. They do not euthanize animals for reasons such as space constraints or length of stay and instead focus on finding permanent homes or alternative placement options.	Starr, R. (2010, November). The HSUS Shelter Advocate Toolkit 2012
Sanctuary of Rescue Organizations:	These organizations, as outlined in The HSUS Shelter Advocate Toolkit (2012) by The Humane Society of the United States, provide long-term care and refuge for animals that are deemed unadoptable due	The HSUS Shelter Advocate Toolkit (2012) by The Humane Society of the United States

	to medical or behavioral issues, old age, or other reasons. They may offer lifelong care or work to place animals in suitable foster or sanctuary homes.	
Wildlife Rehabilitation Centre's	According to Pat Miller's (20235, March 27) guide on animal shelters, specialize in caring for injured, orphaned, or sick wildlife to rehabilitate them for release back into their natural habitat. They often work closely with wildlife authorities and veterinarians to provide medical treatment and rehabilitation services.	Pat Miller's (20235, March 27).

According to these different kinds of shelters, keeping animals away from the street is beneficial to protect homeless animals from potential threats like being struck by cars, or attacked by vicious humans or other animals. These types of shelters supply animals stay in temporary housing, having problems finding clean food, water, and better safer places. The accommodations provided to stray animals in each of the shelters may vary depending on the country and environment in which they are located. Table 3. Which is above, contains information about numerous shelters that are situated all around the world.

2.3.1 Animal Shelter Facility Design Standards

The architectural guidelines for animal shelters differ based on the authority, establishment, and purpose of the building. Creating an atmosphere that supports the animal's health should be the top focus for animal shelters. The facilities must be suitable for both the number of animals receiving care and their anticipated duration of stay to guarantee the animals' physical and mental well-being (Newbury et al., 2010). Animal shelters should be built with enough space for a range of shelter operations, including intake, examination, holding, adoption, isolation, treatment, food storage, laundry, and euthanasia if needed. The design should also prioritize the health of the animals by classifying them according to age, sex, breed, etc. (Newbury et al., 2010). Movement within the facility ("foot traffic"), entrances and exits, hallways and rooms, and cleaning should be planned so that the sections with the healthiest and/or most sensitive animals move away from those that are most likely to be sources of infectious disease (Newbury et al., 2010). It is advised by numerous authoritative guidelines (New Zealand 1993), that animals identified as having or suspected of possessing infectious diseases be segregated in facilities that utilize a minimum of 10% of their housing capacity. Private animal care providers (including veterinary clinics or spay/neuter initiatives) should ensure the separation of their clients' pets from those residing in shelters.

Table 3. The Guidelines for Standards of Care in Animal Shelters (Newbury et al., 2010) provide comprehensive recommendations for the management and care of animals in shelter environments.

Facility Design and Environment	Explanations	References
Primary Enclosure	A primary enclosure is any area of confinement, such as a cage, run, kennel, stall, or pen, where an animal spends most of its time sleeping, eating, and getting shelter. The main enclosure needs to be structurally stable and kept in a safe and functional state to effectively confine animals, avoid harm, keep other animals out, and allow them to stay dry and clean. A limb or other body part cannot be trapped, nor should there be any sharp edges, gaps, or other flaws that could lead to an injury (Newbury et al., 2010).	(Newbury et al., 2010).
Surfaces and Drainage	All animal spaces should have non-porous surfaces that are readily disinfected and strong enough to resist many cleanings (Newbury et al., 2010). Flooring is best done on an impermeable, sealed surface like epoxy or sealed concrete (New Zealand 1993). It is not acceptable for wastewater to leak into nearby kennels or communal spaces. Sufficient drainage must be established (New Zealand 1993). Before permitting animal access, extra	(New Zealand 1993). (Newbury et al., 2010).

	care must be taken to sterilize and disinfect any communal areas where drains are situated.	
Heating, Ventilation, and Air Quality	Each primary enclosure must enable an animal to comfortably maintain a normal body temperature; requirements for temperature and humidity vary depending on the kind of animal being kept (AVMA 2008a; New Zealand 1993). Within the animal's enclosure, temperature and humidity levels should be assessed at the animal's body level. In addition to preventing the transmission of infectious illnesses, fresh air is crucial for maintaining health and well-being (CFA 2009).	(AVMA 2008; New Zealand 1993). (CFA 2009).
Light	Buildings must be planned to let in as much natural light as feasible. In terms of time and intensity, artificial light should closely mimic natural light when employed (CFA 2009; Griffin 2006; New Zealand 1993; Patronek 2001). It is important to deliver light and darkness in a way that supports the body's natural circadian cycles of awake and sleep. For efficient animal monitoring, adequate illumination is also required (AAEP 2004).	(CFA 2009; Griffin 2006; New Zealand 1993; Patronek 2001). (AAEP 2004).
Sound Control	A suitable sound environment is necessary for the health and well-being of animals. Reduced noise is preferable in places with animals. Since the hearing of dogs and cats is more sensitive than that of humans, it stands to reason that noise levels that cause discomfort to people will also cause discomfort to animals. The usage of power hoses, forced air circulation, barking dogs, non-porous construction materials, metal kennel gates, and metal food bowls are just a few of the prevalent elements of animal shelters that raise noise levels. Negative behavioral and physiological effects are exacerbated by excessive noise (Spreng 2000).	(Spreng 2000).
Drop Boxes	The usage of unsupervised "drop boxes," where live animals are deposited by the public in containers for later intake, may result in animal suffering or death and should be avoided, even if shelters sometimes experience difficulties due to limited operation hours for public access. There should be options available (such as drop-off locations at veterinary emergency clinics or police departments). Public access to information about these options is necessary.	(Newbury et al., 2010).

According to the Table 4. Outlines crucial guidelines for the design and care of animal shelters to ensure the health, safety, and well-being of the animal housed. To reduce stress and disease, it emphasizes the necessity of safe primary enclosures, non-porous surfaces with appropriate drainage, controlled temperature, ventilation, and air quality. Natural rhythms should be supported by adequate illumination and sound control is crucial to lessen the tension that comes with loud noises, it also promotes safer intake options by cautioning against unattended drop boxes.

2.3.2 Animal Shelter Facility Design Standards

Animal well-being is conceptualized as the subjective interpretation of an animal regarding its environment. It is characterized by positive mental states, such as fulfillment and contentment. It is crucial to differentiate well-being from mental health, the latter of which encompasses both admirative and adverse emotional states and is defined objectively, as noted by Clay, L. (2024). While there exists a correlation between physical and mental well-being, the way animals are treated exerts a more pronounced influence on the latter rather than the former. Certain theoretical frameworks consider "well-being" and "welfare" as synonymous, particularly in discourses about animals. Given the circumstances, the emphasis on animal well-being is on the subjective experience that is shaped not only by the physical condition of the animal

but also by its treatment and surroundings. Animal well-being refers to the physical and mental state of an animal about the conditions in which it lives and dies. According to Clay, L. (2024), the framework used to assess and manage the welfare of animals is called the Five Domains model for animal welfare assessment. It is divided into five primary domains: Nutrition, Physical Environment, Health, Behavioural Interactions and Mental States. It encompasses both the absence of disturbances, as outlined in principles such as the Five Freedoms (Farm Animal Welfare Council, 2009), and the realization of physical and mental states that contribute to the animal's overall welfare (American Veterinary Medical Association, 2019). This includes aspects such as health, comfort, nutrition, safety, freedom from unpleasant states like pain and distress (Farm Animal Welfare Council, 2009), and the ability to express important behaviours (American Veterinary Medical Association, 2019). Animal welfare is widely recognized as a human responsibility involving various factors such as disease prevention, veterinary treatment, appropriate shelter, nutrition, and human handling (Sandoe & Christiansen, 2008). The Five Domain Model is described in Mellor and Beausoleil (2015) and offers fundamental applications and practical elements of managing and evaluating animal wellbeing. A positive welfare state addition to this model was also suggested by Mellor (2017). Following that, the 2020 iteration of the Five Domains Model, which addresses interactions between humans and animals was presented by Mellor et al. Additionally, Mellor (2016) adds to the conversation by arguing in favour of an evolution in animal welfare philosophy that goes beyond the traditional Five Freedoms to advance "A Life Worth Living".

Table 5. Five Freedoms for Animal Welfare (Farm Animal Welfare Council, 2009; Newbury et al., 2010).

Five Domains Model for Animal Welfare	Explanation	References
Nutrition (Freedom from Hunger and Thirst)	by ready access to fresh water and a diet to maintain full health and vigor	(Mellor, 2017; Mellor, and Beausoleil, 2015)
Physical Environment (Freedom from Discomfort)	by providing an appropriate environment including shelter and a comfortable resting area	(Mellor, et al., 2020)
Health (Freedom from Pain, Injury or Disease)	the animal's physical health through disease prevention, veterinary care, and prompt treatment of ailments. by prevention or rapid diagnosis and treatment	(Mellor, 2016)
Behavioural Interactions (Freedom to Express Normal Behavior)	by providing sufficient space, proper facilities, and company of the animal's kind, including opportunities for exercise, socialization, and mental stimulation.	(Newbury et al., 2010).
Mental State (Freedom from Fear and Distress)	by ensuring conditions and treatment that avoid mental suffering (including reducing stress, providing enrichment activities, and fostering positive emotional experiences).	(Farm Animal Welfare Council, 2009)

3. Methodology

"Animal shelter" denotes a physical establishment operated by government and non-governmental entities, which offers transitory or enduring accommodation for homeless, forsaken, and mistreated animals. To ensure the physical and emotional wellness of the animals, the facilities must be adequate for the number of animals getting cases as well as the length of time the animals are expected to stay. The most obvious characteristics that an animal shelter must have to provide all of these are the animals' behaviour, the standard of their housing, and most importantly a few essential elements that ensure their welfare. The scope of this study is limited to the region of Northern Cyprus animal shelters. In Northern Cyprus, animal shelters need improvements and serious actions to be developed for the future design it is going to be applied in the case study. In this study systematic review approach is used, drawing heavily on the body of the current literature review. The general welfare of animals housed in shelters is the goal of this study. Examining animal behaviour in shelter settings and comprehending the variables that affect it over time are crucial steps toward realizing this objective. Determining the precise design elements that must be considered in this process, as well as how to enhance shelter conditions without endangering animal's health, is equally crucial. It should be mentioned that the study's focus is on these elements because they all have an impact on animal welfare. To sum up, the study's objective is to use the data gathered to create a set of guidelines that apply to all shelters in Northern Cyprus to be developed. This study will focus

specifically on dogs as they comprise many animals in shelters in Northern Cyprus. Focusing on dogs allows for a more effective assessment of their unique welfare needs. Following the above-mentioned methods, an awareness of animal behaviour and welfare concerns informs the architectural design principles:

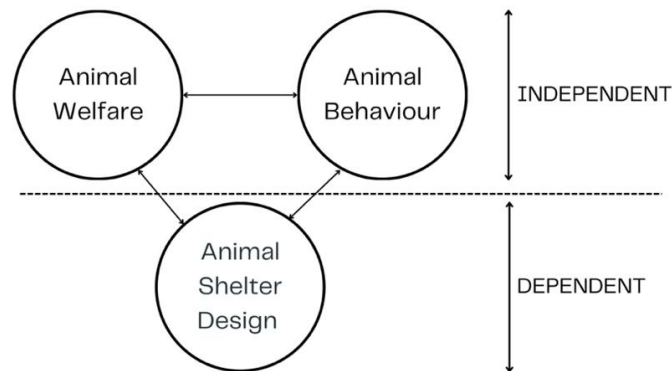


Figure 2. Methodology Diagram (Developed by Author).

The literature was thoroughly reviewed for this investigation. The primary focus of the Literature review has been the pursuit of well-being as one of humanity's goals. Positive thinking and happiness are the main indicators of well-being. Important components of well-being include having a life purpose, being in meaningful relationships, and feeling somewhat in control of one's life (Veenhoven, 2008). Consequently, the need for enjoyment, well-being, and contentment in life has grown in importance within the architectural field. The relationship between architecture and health has not received much attention in the past when it comes to the design requirements of healthy buildings. When defining well-being in the context of architecture, Table 1. Lists several factors to consider such as the physical surroundings, psychological characteristics, social interaction, functional efficiency, and environmental sustainability. Accordingly, the notion of well-being that is employed in the architectural context is crucial for animal shelter designs. Animal behavior is closely correlated with their surroundings. Animals' well-being may suffer from the stressful environment of shelter (Righi et al., 2019). Due to sensory overload, social isolation, lack of control, over daily routines, and novelty surroundings; animals living in shelters frequently suffer from stress and trauma. The way animals behave in shelter environments very based on their temperament, past experiences, and surrounding circumstances. Considering this, frequent behavioral patterns include Flight, Fighting, Freezing, and natural movement as seen in Table 2. These prevalent behavioural problems have a significant impact on both the animals' well-being and the layout of the shelter. Regulations regarding animal shelter architecture differ depending on the authority, organization, and building's intended use. Creating an atmosphere that promotes the animal's health ought to be the aim of animal shelters. The design elements, displayed in Table 4. provide us with comprehensive instructions for the basic maintenance and oversight required for a shelter. Animal welfare is greatly impacted by these methods and recommendations. One approach for assessing and managing animal welfare is the Five Domain Model. It is divided into five main categories, as Table 5 Illustrates: Physical the realization of physical and mental states that contribute to the overall welfare of animals, and as well as the absence of interruptions, as mentioned in the Five Freedoms principles.

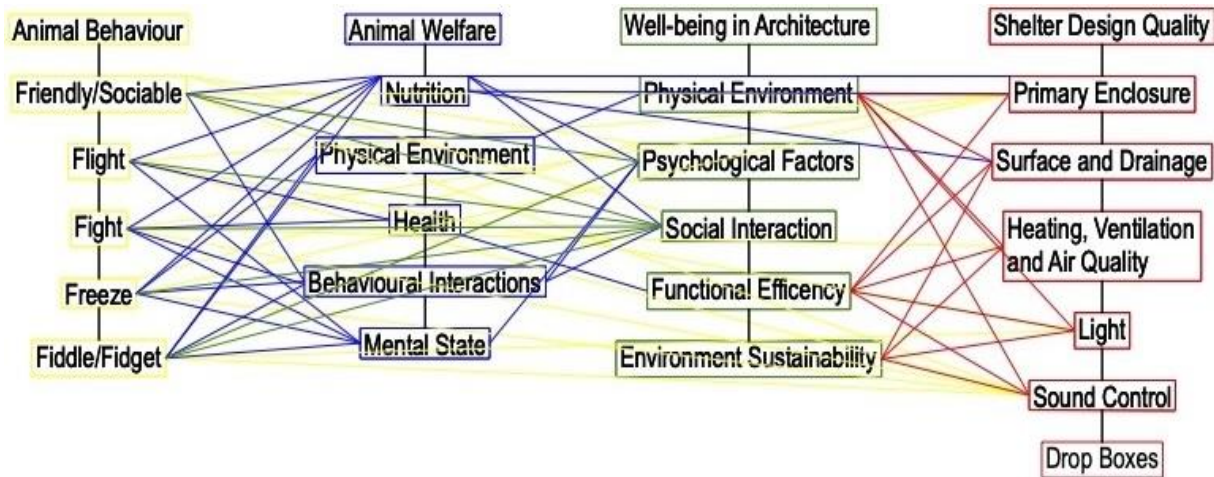


Figure 3. Relationships between all factors in Shelter Design (Developed by Author).

Figure 3. shows the tight relationships between animal well-being, animal shelter design, animal behaviour, and architectural welfare. The importance of physical surroundings, psychological characteristics, social interactions, functional efficiency, and environmental sustainability in animal shelters lies in their interconnectedness, each influencing the others to create a holistic environment that promotes animal welfare. Physical surroundings: including the design layout and material used, significantly affect an animal's comfort and stress levels. For instance, a well-ventilated and spacious area can reduce anxiety and encourage natural behaviours. This, in turn, impacts physiological characteristics; when animals are housed in a nurturing environment, their mental well-being improves, leading to healthier behaviours and emotional states. Furthermore, social interactions are essential for the emotional health of animals, as many species thrive on companionship. The physical layout must facilitate positive interactions among animals, enhancing their overall happiness and reducing stress. Additionally, functional efficiency is crucial, as an organized and effective shelter operation ensures that animals have access to resources like food, water, and enrichment, promoting a sense of control and security. This efficient management reinforces the animals' psychological well-being and encourages social interactions. Lastly, environmental sustainability connects all these factors by ensuring that shelters utilize resources responsibly and maintain a healthy habitat for the animals. Sustainable practices can lead to better physical conditions, fostering a positive environment that supports social interactions and enhances overall well-being. In essence, these elements work synergistically, creating a nurturing atmosphere that maximizes the welfare of animals in shelters. The guide created in this direction will be an invaluable tool that can be utilized in all shelters that are developing or that need to be developed, as you can see in Table 6.

Table 6. Guidelines for Shelter Design and Management (Developed by Author).

Guidelines for Shelter Design and Management		Yes	No
Nutrition	Ensure to access fresh water, food, and balanced feeding schedules.		
Physical Environment	Provide sleeping and resting areas. Design a stable, safe, and easy-to-clean enclosure.		
Health	Prioritize diseases and regularly veterinary care. Establish procedures for prompt treatment.		
Behavioral Interactions	Environments to facilitate natural behaviors and provide space and facilities for socialization.		
Mental State	Minimize stressors and provide enrichment activities. Create environments free from fear and distress.		
Facility Design	Maintaining proper heating, ventilation, and lighting. Optimizing environmental conditions for animal comfort.		
Sound Control	Minimize noise levels within the shelter environment. Use sound-absorbing materials and design features.		
Behavioral Assessment	Regular assessments to monitor animal welfare. Use behavioral indicators to inform adjustments.		
Drop Boxes	Avoid unsupervised drop boxes for animal intake. Provide alternative surrender options with clear communication.		
Environment Sustainability	Sustainable practices in operations and facilities. Sustainable materials to use energy consumption and eco-friendly materials in construction.		

3.1 Evaluation Method

This guideline recommendation was created based on the literature reading study that was done. The evaluation method is designed to assess animal shelters based on a set of comprehensive guidelines that ensure the welfare of the animals housed within. This method employs a point-based system, allowing for a straightforward and quantifiable assessment of each shelter's adherence to established welfare standards. According to the point-based assessment, each guideline area is evaluated with a simple "Yes" or "No" response. A "Yes" earns one point, while a "No" earns zero. The binary scope allows for quick evaluations while maintaining clarity on compliance. The assessment covers critical aspects of shelter management including Nutrition, Physical Environment, Health, Behavioural Interactions, Mental State, Facility Design, Sound Control, Behavioural Assessment, Drop Boxes, and Environmental Sustainability. The total score derived from the evaluation indicates the shelter's level of compliance with the guidelines. Zero points indicate that the shelter fully meets the highest welfare criteria across all categories, suggesting exemplary practice in animal care. 6-7 points, reflect adequate welfare conditions; however, specific areas require improvement to enhance overall animal care. 3-4 points, signify serious shortcomings, highlighting immediate areas needing attention and potential renovation to meet basic welfare standards. Zero points, demonstrate a significant violation of animal welfare regulations, indicating an urgent need for intervention and remedial action. To demonstrate the applicability of these guidelines, a hypothetical evaluation was conducted on a shelter (referred to as Shelter X). This example serves to illustrate how the scoring system works in practice, providing insights into the shelter's operational strengths and weaknesses. By identifying specific areas of concern through this evaluation method, shelter management can prioritize improvements, allocate resources effectively, and enhance the overall welfare of the animals in their care. Ultimately, this systematic approach ensures that shelters are held accountable for maintaining high standards of animal welfare, fostering a more humane environment for all residents.

To illustrate the practical implementation of the established strands, a hypothetical shelter assessment was conducted utilizing the proposed point-based approach, this example demonstrates how a shelter in Northern Cyprus may be evaluated and enhanced utilizing the criteria.

Shelter X Evaluation:

Guidelines for Shelter Design and Management		Yes	No
Nutrition	Ensure to access fresh water, food, and balanced feeding schedules	1	
Physical Environment	Provide sleeping and resting areas. Design a stable, safe, and easy-to-clean enclosure.	1	
Health	Prioritize diseases and regularly veterinary care. Establish procedures for prompt treatment.		1
Behavioral Interactions	Environments to facilitate natural behaviors and provide space and facilities for socialization.		1
Mental State	Minimize stressors and provide enrichment activities. Create environments free from fear and distress.		1
Facility Design	Maintaining proper heating, ventilation, and lighting. Optimizing environmental conditions for animal comfort.		1
Sound Control	Minimize noise levels within the shelter environment. Use sound-absorbing materials and design features.		1
Behavioral Assessment	Regular assessments to monitor animal welfare. Use behavioral indicators to inform adjustments.	1	
Drop Boxes	Avoid unsupervised drop boxes for animal intake. Provide alternative surrender options with clear communication.		1
Environment Sustainability	Sustainable practices in operations and facilities. Sustainable materials to use energy consumption and eco-friendly materials in construction.		1

Total Score: 3/10

Total score of 3, Shelter X is a significant area needing improvement. Immediate action should be taken to address deficiencies in behavioral enrichment, mental health support, and facility design. Implementing these changes would improve animal welfare and increase the overall efficiency of the shelter.

4. Results and Discussion

4.1 Results

The result section highlights the outcomes derived from the compressive development of guidelines based on an extensive literature review, specifically designed to enhance animal welfare in shelters by addressing crucial aspects such as architectural design, environmental conditions, and operational practices. Developed guidelines emphasize thoughtful architectural planning that promotes natural behaviours, enhances comfort, and facilitates easy cleaning, aligning with research that shows well-designed environments significantly reduce stress in animals. Attention to environmental factors, such as lighting, temperature, ventilation, and sound control is crucial for animal health and emotional well-being, as optimal conditions foster positive behavioural outcomes. Additionally, effective operation practices, including nutrition, health care, behavioural assessment, and enrichment activities are essential for maintaining high standards of care. By integrating these evidence-based strategies, shelters can not only meet basic needs but also promote psychological well-being. The guidelines also provide actionable strategies for shelters to implement these principles effectively, engaging with staff training, community involvement, and partnership to enhance resource availability. Ultimately, these guidelines serve as a framework for improving animal welfare in shelters in Northern Cyprus, aligning local practices with global standards and significantly enhancing the quality of life for animal residents.

4.2 Discussion

As a result of this study, we have developed guidelines aimed at improving the design of animal shelters and addressing the welfare needs of animals. This guideline is based on a literature review and will be applied to all shelters in Northern Cyprus to assess the improvements needed in shelter infrastructure and manage animal behavior and welfare. Due to the limited time available in this research, only a guideline with principles and a rating system has been produced. However, these guidelines serve as a valuable template for designers who wish to raise the criteria for shelter design to a higher standard and thus provide optimal welfare conditions for animals in the shelter environment in Northern Cyprus. The developed guidelines are aligned with the current body of literature and aim to set a clear standard for improving shelter design and management in Northern Cyprus. The discussion below focuses on how these guidelines contribute to advancing animal welfare and addresses the key issues identified in the literature review. Specifically, the guidelines advocate for the creation of spaces that allow for natural behaviors, emphasize the importance of environmental factors that influence animal health, and recommend operational practices that ensure comprehensive care. Furthermore, the guidelines' rating system enables shelters to self-assess their compliance and identify areas for improvement, fostering a culture of continuous enhancement in animal welfare practices. As shelters adopt these guidelines, we anticipate that they will lead to significant advancements for the animals housed with them. Ultimately, the successful implementation of these guidelines has the potential to transform the landscape of animal shelter design and management in Northern Cyprus, setting a precedent for future initiatives aimed at improving animal welfare on a broader scale.

5. Conclusions

The primary objective of this study was to examine the design requirements of animal shelters in Northern Cyprus, evaluate how shelter design affects animal welfare and animal behavior, on the other hand, try to make suggestions for better shelter design and management techniques. This study is significant because inadequate shelter facilities can severely compromise the welfare of animals, leading to increased stress, health issues, and behavioral problems. As such, it is crucial to address these design flaws to promote a more humane shelter environment. Through the literature review and analysis, we created a set of principles for shelter design and maintenance that directly address these challenges. The findings underscored several key factors affecting animal welfare; the physical environment, which includes the spatial layout and structural design; operational practices, such as routine health checks and staff training; and the provision of behavioral enrichment opportunities, which are essential for mental stimulation and socialization. These factors are critical to shaping the behavior and overall well-being of sheltered animals, indicating the necessity for well-thought-out design and management strategies. In answering the research questions posed in the introduction, the study found that shelter design significantly impacts both the physical and psychological health of the animals. Specifically, features like spacious enclosures, adequate ventilation, natural lighting, and noise control were linked to reduced stress levels and improved welfare outcomes. Furthermore, the research revealed that operational practices, including regular veterinary care and behavioral assessments, play a pivotal role in enhancing the quality of care provided to animals. These insights align with current literature, which emphasizes that environments conducive to natural behaviors and well-managed operational practices foster better animal welfare. The developed guidelines include a

point-based assessment system, which serves as a valuable tool for shelters to identify areas needing improvement and promote the adoption of best management practices. This systematic approach enables shelter operators to evaluate their facilities against established welfare standards, ensuring responsiveness to the evolving needs of animals in their care. The guidelines not only serve as a checklist but also encourage shelters to implement innovative design solutions that enhance animal welfare. Additionally, the study emphasizes the necessity of continuously evaluating and improving shelter design to ensure adherence to changing welfare requirements. Future investigations should focus on tracking the effectiveness of these established protocols in enhancing both human attitudes towards animal care and overall animal welfare over the long term. Conducting longitudinal studies can provide deeper insights into how consistent application of these guidelines influences shelter operations and animal outcomes. On the other hand, it might also be beneficial to explore how advanced sustainable practices affect shelter design. In summary, this study offers a useful foundation for enhancing animal shelters in Northern Cyprus, aiming to improve living conditions for animals while promoting a more efficient and compassionate shelter system. By addressing the identified design requirements and operational practices, we can work towards fostering an environment that prioritizes animal welfare and meets the evolving needs of the community.

Acknowledgments

The authors wish to thank Nikki Clark for the English proofreading.

Funding

This research did not receive any specific grant from funding agencies in the public, commercial, or not-for-profit sectors.

Conflicts of interest

The Authors declare that there is no conflict of interest.

Data availability statement

The original contributions presented in the study are included in the article/supplementary material, further inquiries can be directed to the corresponding authors/s.

References

- Animal Protection of New Mexico. (2012). *Recommended minimum standards for animal shelters in New Mexico*. Report submitted to the Animal Sheltering Board. <https://apnm.org/wp-content/uploads/2016/11/Final-Recommended-Minimum-Shelter-Standards-revised-6-2012.pdf>
- Arena, L., Wemelsfelder, F., Messori, S., Ferri, N., & Barnard, S. (2019). Development of a fixed list of terms for the qualitative behavioural assessment of shelter dogs. *PLOS ONE*, 14(10), e0212652. <https://doi.org/10.1371/journal.pone.0212652>
- Association of Shelter Veterinarians. (2022). *Guidelines for standards of care in animal shelters* (2nd ed.). Author. <https://jsmcah.org/index.php/jasv/article/view/42/19>
- Bautista, T. G., Roman, G., Khan, M., Lee, M., Sahbaz, S., Duthely, L. M., Chuang, K.-H., Rinaldi, D., Sarma, A., & Bredella, M. A. (2023). What is well-being? A scoping review of the conceptual and operational definitions of occupational well-being. *Journal of Clinical and Translational Science*, 7, e227. <https://doi.org/10.1017/cts.2023.648>
- Beerda, B., Schilder, M. B. H., Bernadina, W., van Hooff, J. A. R. A. M., de Vries, H. W., & Mol, J. A. (1999). Chronic stress in dogs subjected to social and spatial restriction. II. Hormonal and immunological responses. *Physiology & Behavior*, 66(2), 243–254. [https://doi.org/10.1016/S0031-9384\(98\)00290-X](https://doi.org/10.1016/S0031-9384(98)00290-X)
- Beerda, B., Schilder, M. B. H., van Hooff, J. A. R. A. M., & de Vries, H. W. (1997). Manifestations of chronic and acute stress in dogs. *Applied Animal Behaviour Science*, 52, 307–319. [https://doi.org/10.1016/S0168-1591\(96\)01131-8](https://doi.org/10.1016/S0168-1591(96)01131-8)
- Boissy, A., Manteuffel, G., Jensen, M. B., Moe, R. O., Spruijt, B., Keeling, L. J., Winckler, C., Forkman, B., Dimitrov, I., Langbein, J., Bakken, M., Veissier, I., & Aubert, A. (2007). Assessment of positive emotions in animals to improve their welfare. *Physiology & Behavior*, 92(3), 375–397. <https://doi.org/10.1016/j.physbeh.2007.02.003>
- Budaev, S., Kristiansen, T. S., Giske, J., & Eliassen, S. (2020). Computational animal welfare: Towards cognitive architecture models of animal sentience, emotion, and wellbeing. *Royal Society Open Science*, 7(4), 201886. <https://doi.org/10.1098/rsos.201886>
- Commission for Architecture and the Built Environment. (2009). *Sustainable places for health and well-being*. https://www.designcouncil.org.uk/fileadmin/uploads/dc/Documents/future-health-full_1.pdf

- Camfield, L., Streuli, N., & Woodhead, M. (2009). What is the use of 'well-being' in contexts of child poverty? Approaches to research, monitoring, and children's participation. *The International Journal of Children's Rights*, 17(1), 65–109. <https://doi.org/10.1163/157181808X357330>
- Carter, S., & Andersen, C. (2024). *Wellbeing in educational contexts*. LibreTexts. <https://libretexts.org>
- Chowdhury, S., Noguchi, M., & Doloi, H. (2023). Methodological approach to environmental experience design to enhancing occupants' well-being, Bangladesh. *Buildings*, 13(2), Article 542. <https://doi.org/10.3390/buildings13020542>
- Clay, L. (2024). One welfare approach: Wellbeing in shelters. *Today's Veterinary Nurse*, Spring 2024, 59. <https://todaysveterinarynurse.com>
- Clay, L., Paterson, M. B. A., Bennett, P., Perry, G., & Phillips, C. C. J. (2020). Do behaviour assessments in a shelter predict the behaviour of dogs post-adoption? *Animals*, 10(7), Article 1163. <https://doi.org/10.3390/ani10071225>
- Coria-Avila, G. A., Pfaus, J. G., Orihuela, A., Domínguez-Oliva, A., José-Pérez, N., Hernández, L. A., & Mota-Rojas, D. (2022). The neurobiology of behavior and its applicability for animal welfare: A review. *Animals*, 12(7), Article 928. <https://doi.org/10.3390/ani12070928>
- Department of Agriculture, Philippines. (2004, June 11). *Administrative Order No. 14: Rules and regulations on kennels—Basic policy and objectives*. Department of Agriculture. https://paws.org.ph/downloads/ao_14- rules & regulations on kennels .pdf
- Evans, G. W. (2003). The built environment and mental health. *Journal of Urban Health: Bulletin of the New York Academy of Medicine*, 80(4), 536–555. <https://doi.org/10.1093/jurban/ijtq063>
- Freeman, L., Becvarova, I., Cave, N., Mackay, C., Nguyen, P., Rama, B., Takashima, G., Tiffin, R., Tsujimoto, H., & van Beukelen, P. (2011). WSAVA nutritional assessment guidelines. *Journal of Small Animal Practice*, 52(7), 385–396. <https://doi.org/10.1111/j.1748-5827.2011.01079.x>
- Gallagher, M. W., Lopez, S. J., & Preacher, K. J. (2009). The hierarchical structure of well-being. *Journal of Personality*, 77(4), 1025–1050. <https://doi.org/10.1111/j.1467-6494.2009.00573.x>
- Gannon, W. L. (2009). [Review of the book *Ethics of Animal Use*, by P. Sandøe & S. B. Christiansen]. *Journal of Mammalogy*, 90(6), 1495–1497. <https://doi.org/10.1644/09-MAMM-R-211R.1>
- Herron, M. E., Kirby-Madden, T. M., & Lord, L. K. (2014). Effects of environmental enrichment on the behavior of shelter dogs. *Journal of the American Veterinary Medical Association*, 244(6), 687–692. <https://doi.org/10.2460/javma.244.6.687>
- Horecka, K., & Neal, S. (2022). Critical problems for research in animal sheltering: A conceptual analysis. *Frontiers in Veterinary Science*, 9, Article 804154. <https://doi.org/10.3389/fvets.2022.804154>
- Huppert, F. A. (2009). Psychological well-being: Evidence regarding its causes and consequences. *Applied Psychology: Health and Well-Being*, 1(2), 137–164. <https://doi.org/10.1111/j.1758-0854.2009.01008.x>
- Huppert, F. A., & So, T. T. C. (2013). Flourishing across Europe: Application of a new conceptual framework for defining well-being. *Social Indicators Research*, 110(3), 837–861. <https://doi.org/10.1007/s11205-011-9966-7>
- Hubrecht, R. C., Serpell, J. A., & Poole, T. B. (1992). Correlates of pen size and housing conditions on the behavior of kennelled dogs. *Applied Animal Behaviour Science*, 34, 365–383. [https://doi.org/10.1016/S0168-1591\(05\)80096-6](https://doi.org/10.1016/S0168-1591(05)80096-6)
- Jaramillo, F. M., Oliveira, T. M., Silva, P. E. A., & Trindade, P. H. E. (2023). Development of a fixed list of descriptors for the qualitative behavioral assessment of Thoroughbred horses in the racing environment. *Frontiers in Veterinary Science*, 10, Article 1189846. <https://doi.org/10.3389/fvets.2023.1189846>
- Mellor, D. J. (2017). Operational details of the Five Domains Model and its key applications to the assessment and management of animal welfare. *Animals*, 7(8), Article 60. <https://doi.org/10.3390/ani7080060>
- Mellor, D. J., & Beausoleil, N. J. (2015). Extending the 'Five Domains' model for animal welfare assessment to incorporate positive welfare states. *Animal Welfare*, 24(3), 241–253. <https://doi.org/10.7120/09627286.24.3.241>
- Mellor, D. J., Beausoleil, N. J., Littlewood, K. E., McLean, A. N., McGreevy, P. D., Jones, B., & Wilkins, C. (2020). The 2020 Five Domains Model: Including human–animal interactions in assessments of animal welfare. *Animals*, 10(10), Article 1870. <https://doi.org/10.3390/ani10101870>
- Miller, P. (2023, March 27). What you should know about animal shelters. *Whole Dog Journal*. <https://www.whole-dog-journal.com/lifestyle/adoption/what-you-should-know-about-animal-shelters/>
- Newbury, S., Blinn, M. K., Bushby, P. A., Cox, C. B., Dinnage, J. D., Griffin, B., Hurley, K. F., Isaza, N., Jones, W., Miller, L., O'Quin, J., Patronek, G. J., Smith-Blackmore, M., & Spindel, M. (2010). *Guidelines for standards of care in animal shelters*. Association of Shelter Veterinarians. <https://jsmcah.org/index.php/jasv/article/view/42/20>

- Righi, C., Menchetti, L., Orlandi, R., Moscati, L., Mancini, S., & Diverio, S. (2019). Welfare assessment in shelter dogs by using physiological and immunological parameters. *Animals*, 9(6), Article 340. <https://doi.org/10.3390/ani9060340>
- Stemers, K. (2015, September). Architecture for well-being and health [Conference presentation]. 6th VELUX Daylight Symposium, London, United Kingdom. <http://thedaylightsite.com/wp-content/uploads/2015/09/Architecture-for-Wellbeing-and-Health.pdf>
- Stemers, K. (2015, September). [Presentation]. 6th VELUX Daylight Symposium, London, United Kingdom. University of Cambridge Department of Architecture. <https://press.velux.com/6th-velux-daylight-symposium/>
- The Humane Society of the United States Shelter Services. (2001, January–February). *Shelter design*. The Humane Society of the United States. <https://humanepro.org/sites/default/files/documents/hsus-shelter-design-packet.pdf>
- Cyprus Mail. (2004, March 26). Society must take its responsibility over stray dogs. *Cyprus Mail*. <https://archive.cyprus-mail.com/2004/03/26/society-must-take-its-responsibility-over-stray-dogs/>
- Verga, M., & Michelazzi, M. (2009). Companion animal welfare and possible implications on the human–pet relationship. *Italian Journal of Animal Science*, 8(Suppl. 1), 231–240. <https://doi.org/10.4081/ijas.2009.s1.231>
- Webber, S., Cobb, M. L., & Coe, J. (2022). Welfare through competence: A framework for animal-centric technology design. *Frontiers in Veterinary Science*, 9, Article 885973. <https://doi.org/10.3389/fvets.2022.885973>
- Wunderlich, N. V., Mosteller, J., Beverland, M. B., Downey, H., Kraus, K., Lin, M.-H., & Syrjala, H. (2021). Animals in our lives: An interactive well-being perspective. *Journal of Macromarketing*. Advance online publication. <https://doi.org/10.1177/0276146720984815>
- World Health Organization. (2001). *The world health report 2001: Mental health: New understanding, new hope*. Author. <https://iris.who.int/handle/10665/42390>