

**Companion and Non-Companion Animals' Impact on People
Living with Kidney Disease: A Qualitative Content Analysis**

Tara Jackson

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School of Psychology

University of Adelaide

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Abstract

Chronic Kidney Disease is an irreversible progressive disease, and many people require dialysis which is time-consuming and life-limiting. With a compromised immune system, there is a high risk of zoonotic disease (transferred from animals). Psychosocial impact associated with kidney disease include depression, poorer quality of life, and less autonomy. Literature has shown that companion and other animals promote wellbeing of people living with chronic disease, by assisting emotional regulation, social interaction, and enhancing self-identity. There is research into companion animals and other chronic conditions, however limited exploration of companion and other animals and their role in the lives of people with kidney disease. By analysing 518 posts from an online discussion board using Qualitative Content Analysis, this study aimed to explore the impact animals have on the lives of people with kidney disease. Five main categories were identified: ‘Positive Influence and Connection with Companion Animals’, ‘Risk of Companion Animals’, ‘Human and Animal Adaptation’, ‘Patients’ Point of View’ and ‘Healthcare Professionals’ Point of View’. This study contributes knowledge into how people with kidney disease adapt to maintain relationships with companion animals, reinforcing previous research on the strong bonds between humans and animals. It also reveals insight into the importance and concerns of interacting with animals other than companion animals. Lastly, it highlights a gap between patients’ understanding of infection risk, and healthcare professionals’ advice and opinions. This study’s findings provide insight into possible ways to facilitate better communication between healthcare practitioners and patients in the context of kidney disease and treatment.

Keywords: companion animals, kidney disease, renal, zoonotic disease

Declaration

This work contains no material which has been accepted for the award of any other degree or diploma in any University, and, to the best of my knowledge, this thesis contains no material previously published except where due reference is made. I give permission for the digital version of my thesis to be made available on the web, via the University of Adelaide's digital thesis repository, the Library Search and through web search engines, unless permission has been granted by the School to restrict access for a period of time.

Signature

September, 2020

Contribution Statement

In writing this thesis, my supervisor and I collaborated to generate a research question of interest and design the appropriate methodology. I conducted a literature search and completed the ethics application. My supervisor, co-supervisor and I collaborated on data analysis methods, and I was responsible for collecting and analysing the data. I wrote up all aspects of the thesis.

Signature

September, 2020

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Chapter 1: Introduction

1.1 Kidney Disease and Kidney Replacement Therapy

Kidney disease, also known as renal disease, is a life-limiting condition which may eventually require invasive, time-consuming treatment, along with lifestyle alterations and restrictions. Kidney disease is defined as the loss of normal kidney function over time, and as the main purpose of the kidneys is to filter waste from the blood and excrete through urine, the failure of kidney function results in waste build up in the body, having a detrimental effect on health (Kidney Health Australia [KHA], 2020d). There are two types of kidney disease, one is ‘acute kidney injury’ (AKI), characterised as normal kidney function recovering within three months, or ‘chronic kidney disease’ (CKD), identified as a loss of function for greater than three months, which is irreversible and progresses to kidney failure over five stages (KHA, 2020e).

The global prevalence of CKD is estimated to be between 11% to 13%, and developed countries such as Europe, USA and Canada have higher rates than developing countries such as sub-Saharan Africa and India (Hill et al., 2016). According to the Australian Bureau of Statistics (ABS, 2018), the number of Australians living with kidney disease from 2017 to 2018 was 237,800 (1%) and although the prevalence is only slightly increasing (from 0.8% in 2011 to 2012), this still means a large number of Australians living with this chronic disease. Mortality is also high with the Australian Institute of Health and Welfare (AIHW, 2020) documenting that in 2018, CKD was a contributor in a total of 16,800 deaths (11% of all deaths), and was the underlying cause of 3,600 deaths (21% of CKD deaths). In 2012 to 2013, 18% of Indigenous Australians showed biomedical markers of CKD at rates twice as high as for non-Indigenous adults, and CKD was further associated with the cause of death in 13,200 deaths (79% of CKD

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deaths), the death rate for Indigenous Australians in 2016-2018 was also almost four times higher than non-Indigenous people (AIHW, 2020).

In end-stage kidney disease (ESKD), or stages 4-5, the kidneys no longer function autonomously, and individuals will require kidney replacement therapy in the form of either dialysis or transplant (KHA, 2020a). Dialysis is the process of using a machine to filter toxins, waste, and extra fluid from the blood whilst returning clean blood to the body. The two types of dialysis are haemodialysis (HD), where a needle accesses the circulatory system, and peritoneal dialysis (PD), where a tube is placed through the abdomen to filter dialysis fluid through the body (KHA, 2020b). Dialysis requires significant life adjustment as PD is performed at home, whereas HD can be done either at home or in a clinic. Both require substantial time by either performing dialysis overnight, several times a week, or often several times a day (KHA, 2020b). According to Kidney Health Australia, individuals usually undergo dialysis while they are waiting for a kidney transplant which functions to extend life without dialysis, and if the transplant fails then there is potential for additional transplants (KHA, 2020c). The burden of this disease is considerable, with the number of people in Australia receiving kidney dialysis in 2016 at 12,706, and 11,134 for transplantation (Australia & New Zealand Dialysis & Transplant Registry, 2018).

1.2 Biopsychosocial Consequences of Kidney Disease and Replacement Therapy

As kidney disease affects the body's ability to filter waste from the blood, there are physiological symptoms from the disease and treatment for individuals to cope with. A literature review by Almutary et al. (2013), found kidney disease and treatment cause a high symptom burden, which rarely occur in isolation. The most common symptoms were fatigue, drowsiness, pain, and itchy skin across all stages of kidney disease. Treatment in the form of a kidney

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transplant presents additional complicating factors in terms of infection risk. Infectious pathogens are better able to cause disease due to immunosuppression as a result of required medication, and infection is the most common complication, and the second cause of death in transplant patients (Anastasopoulos et al., 2015). Serious complications can also develop resulting from kidney disease such as cardiovascular disease, anaemia, mineral and bone disorders, and nervous system diseases (Zhou & Yang, 2020). These symptoms and complications can therefore have a consequential effect on the psychological and social aspects of individuals' lives.

A systematic review and meta-analysis on the association of mortality and depression in dialysis patients revealed a lack of wellbeing related to ESKD, linked to depression, which can exacerbate ESKD's effect on quality of life (QOL), and perception of burden of physical symptoms (Farrokhi et al., 2014). Likewise, a study on the association between dialysis patients and QOL also demonstrated that the physical and psychological domains of QOL are significantly lower in CKD patients (Jesus et al., 2019). They found people receiving HD experienced more physical and psychological/emotional distress, and therefore lower life satisfaction with higher levels of anxiety and negative self-image compared to control groups. Treatment also contributed to functional and physical impairment manifesting as sedentarism, loss of autonomy, increased dependence on others, and a need for help with activities of daily living (Jesus et al., 2019).

Other psychosocial impacts of disease and treatment resulting from having to make significant life-long lifestyle changes to allow for treatment and disease management have also been recognised (White & McDonnell, 2014). In HD patients, the consequences of these changes resulted in decreased independence, unemployment, financial difficulties, and a decreased ability

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to fulfil long-range life goals (Cristóvão, 1999). Therefore, the evidence highlights psychosocial impacts of kidney disease and treatment resulting from biological factors, which are then perpetuated within the biopsychosocial relationship.

1.3 Companion and Non-Companion Animals

Companion animal (pet) ownership in Australia is common, suggesting significant reasons for sustaining these human-animal relationships. According to a survey on companion animal ownership, almost two-thirds of households include an animal, and 90% of owners claim they have positive impact on their lives citing love, affection and companionship as the key benefits, with companionship by far the most common reason to acquire an animal (Animal Medicines Australia [AMA], 2019). Relationships with companion animals are meaningful, with over 60% of owners referring to their animals as a member of the family, 64% speaking to them as if they understand, 47% allowing them to sleep in their bed, 37% referring to themselves as their parent, and 36% giving them gifts for special occasions (AMA, 2019). Furthermore, personal benefits of ownership include a calming effect, promoting optimism, providing a sense of purpose, encouraging motivation, contributing to happiness, and having a direct positive impact on experience with depression and anxiety (AMA, 2019).

Not only companion animals impact peoples' lives, and they are not the only opportunity for animal contact. As patients with kidney disease can spend substantial time in dialysis clinics/hospitals, pet therapy, particularly in healthcare settings, is also important to consider. Pet therapy is a therapeutic tool using trained animals to help restore balance to a person's life. This evidence-based therapy aims to reduce stress, enhance mood, reduce pain, anxiety and fatigue, and the animal interactions can increase a sense of belonging and spiritual connection (Phung et al., 2017). Other scenarios where animal contact occurs include agricultural shows, animals

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visiting residential facilities, schools, zoos, petting zoos, pet shops, farms, wildlife sanctuaries and shopping centre exhibits, which is important to consider in the context of people with increased vulnerability to disease (Queensland Health, 2014). Animals are also a feature of many people's gardens – such as birds and lizards – and can be found in parks and nature reserves. As many people receive dialysis in their home, where companion animals are, in addition to any parks and gardens they might visit, it is important to consider what impact this may have on kidney health and treatment, and also mental health and sense of support.

1.4 Human-Animal Relationships

Relationships between humans and animals have been well researched over time, and theories as to the mechanisms and effects that these relationships have on human physical and mental health have been proposed. It has been postulated that the domestication of animals such as cats and dogs has resulted in the selection of animals with certain characteristics by humans, and these animals have therefore been bred to more frequently possess desirable traits which fulfil a need for comfort and social support that humans require to thrive (Beck, 2014). Some of the theories pertaining to human-animal relationships include the human-animal bond, attachment theory and social support theory.

1.4.1 Human-Animal Bond

The human-animal bond (HAB) is a recognised relationship that has existed for thousands of years and is defined by the American Veterinary Medical Association as:

... a mutually beneficial and dynamic relationship between people and animals that is influenced by behaviors essential to the health and wellbeing of both. This includes, among other things, emotional, psychological, and physical interactions of people,

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animals, and the environment. (American Veterinary Medical Association [AVMA], 2020, para. 1)

The term ‘Human-Animal Bond’ was conceived in the late 1970s and encapsulates the consequential relationship between humans and animals, now regarded as a scientific discipline and theoretical construct (Hines, 2003; Zinn & Beck, 2014). Zinn and Beck (2014) emphasise that these bonds also extend to trained animals that assist people with special needs, livestock, and equine-assisted activities and therapies. Research on the topic has had a large focus on exploring the HAB effect in the older adult (Anderson et al., 2015; Curl et al., 2017), and substantially related to dogs (Curl et al., 2017; Irvin, 2014; Kabel et al., 2015; Lafollette et al., 2019; Schneider et al., 2010). Findings regarding the effect animals have on human biological functions include cardiovascular health such as a decrease in blood pressure (BP) (Friedmann, Thomas et al., 2013), decreased cardiovascular disease risk, and predictor of one-year survival post-heart attack, related to companion animals as social supports (Friedmann & Thomas, 1995). In 2013, The American Heart Association issued a scientific statement outlining research related to cardiovascular benefits of companion animals which included decreased BP, lower cholesterol, lower resting baseline heart rate, and reduced cardiovascular reactivity to stress (Levine et al., 2013).

The Human Animal Bond Research Institute (HABRI) dedicates its funding to scientific research of human-animal relationships, and the impact on the health of individuals, families, and communities, and develops resources to share information with the public (HABRI, 2020a). HABRI provides evidence of hormone level changes related to well-being resulting from the HAB, such as cortisol, oxytocin, b-endorphin, prolactin, phenylacetic acid and dopamine, some

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of which reduce fear, anxiety, stress, and play a part in bonding and socialisation, and creating calm, comfort and focus (HABRI, 2020b; Miller et al., 2009).

Although it appears there is extensive empirical evidence into the effect the HAB has on physical and psychological health, it is important to note that findings in this area are also equivocal. Chur-Hansen et al. (2010), discuss that although many studies have been undertaken in this area, our understanding about companion animals' benefit on human physical and mental health is incomplete due to weaknesses in studies, and difficulty in controlling for extraneous variables. Studies have shown positive and neutral effects on human physical and mental health, however, others have shown negative effects such as increased BP, risk of falls, behaviour restricting fear of dog attacks, and depressive symptoms in people and methodological issues have provided inconclusive results (Chur-Hansen et al., 2010). More recently, in a systematic review of companion animals and mental and physical health in older adults, although 52 studies found companion animals positively contributed to mental and/or physical health, others did not. Five studies found negative effects, four found no significant effect, and 10 had equivocal results between variables considered (Hughes et al., 2020). In these studies, negative effects included greater association with depression, a negative effect of physical health, and increased cortisol and falls.

1.4.2 Attachment Theory

Humans can develop strong emotional attachment relationships with companion animals, just as they do with other humans. Attachment theory, initially developed by John Bowlby in the 1950s, was focused on human relationships, primarily between infant and parent. The fundamental principle of this theory is that people show a preference for one attachment figure with primary and secondary attachment figures, arranged like a hierarchy (Bowlby & King,

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2004). The theory suggests that characteristics of this attachment include individuals needing a feeling of safety near another person, and that person providing a secure base and showing better abilities to cope with life's stressors (Silcox et al., 2014). In the 1970s, Mary Ainsworth likewise studied attachment behaviour of children with their caregiver or attachment figure (AF), which she classed as secure or insecure, and argued that as children enter adulthood, they can develop attachment relationships with other companions (Meehan et al., 2017).

Since the introduction of attachment theory, it has been applied to research on attachment between animals and humans. Meehan et al. (2017), used a modified version of the attachment behaviours identified by Mary Ainsworth that demonstrate a secure attachment style which are; seeking proximity to and prioritizing nearness to AF, distress at separation from AF, use of the AF for emotional support and comfort where an environment is perceived as threatening, and where AF is perceived as dependable support allowing exploration of the environment. They found that many owners considered companion animals to fulfil all four features of attachment, and where this attachment was stronger, owners ranked them higher in an attachment hierarchy than owners less attached. They also discovered that people ranked their animals at similar levels to human counterparts, being ranked higher than siblings, but lower than romantic partners, parents and close friends (Meehan et al., 2017). Furthermore, according to attachment theory, also related to attachment with an animal, grief at the loss of this relationship can feel almost unbearable and result in a process of mourning, with reactions similar to mourning a human loss (Sable, 2013).

1.4.3 Social Support Theory

Social support theory relating to human-animal relationships was also adapted from theory initially relating to between-human relationships. According to Beck, (2014) "Social

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support is the physical and emotional comfort given to us by our family, friends, coworkers, and others as it is important to people that they are part of a community who love and care for them” (p. 35). In a study into consequences of companion animal ownership, they found that companion animals provided as much overall support as siblings and parents, with owners also reporting greater closeness to, and support from animals than their best friends, parents and siblings, however, these relationships were not at the expense of human relationships, but rather complemented them (McConnell et al., 2011). In the second part of this study, companion animals were found to be a social resource just as other social entities, and as people did not rely on companion animals more if they lacked social interactions with humans and vice versa, this indicated they are social support in their own right. Furthermore, Beck (2014), recognised that experiences had between humans, that are similar to those with companion animals include feelings of being less lonely, finding comfort in touch, joy associated with care and nurturing, being stimulated to exercise, and having reasons to laugh and a focus of attention, all of which decrease feelings of stress.

1.5 Zoonotic Diseases

While the literature demonstrates there are benefits to living with companion animals, animals in general, do not come without risk, and zoonotic diseases are one. Zoonotic diseases, also known as zoonoses, occur when pathogenic agents spread from animal to human via a range of different routes (Centre for Food Security and Public Health [CFSPH], 2008). Routes of entry include direct contact where pathogens enter the body via open wounds, abraded skin, or mucous membranes, aerosol transmission through airborne droplets, and ingesting the pathogen through contaminated food or water. Fomite transmission occurs where inanimate objects carry pathogens then transferred to humans, vector-borne involves transference by an insect carrying

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the pathogen, and environmental where the disease agent lives in soil for example, and is picked up by a host (CFSPH, 2008).

People with kidney disease are at risk of zoonoses, due to immunosuppression, and particularly those receiving PD where peritonitis is a severe complication associated with high morbidity and mortality, often resulting in antibiotic therapy and/or peritoneal catheter removal (Broughton et al., 2010). In the Broughton et al. (2010) review of literature on animal-related peritonitis, the most commonly reported zoonotic infectious organism was *Pasteurella* spp, also known as the ‘cat-bite peritonitis’ agent, found in the mouth and upper respiratory tract of animals such as dogs, cats, birds and hamsters. *Capnocytophaga canimorsus* and *Cynodegmi*, which are normal cat and dog mouth flora were also often implicated in peritonitis and is transmitted via saliva. Cats were particularly problematic because they played with dialysis tubing puncturing it. Other ways PD patients contracted these infections were through bites, scratches, or direct contact and various other bacteria carried by other animals such as rabbits, cows, sheep, and horses were also potentially implicated in infections (Broughton et al., 2010). Therefore while PD patients are at risk of infections through dialysis itself, other portals of entry such as broken skin from biting or scratching are likewise problematic and also relevant to those who are not receiving PD but are still immunocompromised, especially in ESKD.

1.6 Companion Animals in Chronic Disease/Kidney Disease

Companion animal research has extended beyond healthy individuals to chronic illnesses. Brooks et al. (2013), explored companion animals’ role in long-term condition management in people with diabetes and chronic heart disease. The study found that companion animals assisted in managing emotions, enhancing a sense of self-identity, and maintaining and establishing social connections with people. Bradley and Bennett (2015) found in people identifying as

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having a chronic pain disorder, that companion animal owners who actively used human-animal interaction to manage pain rated it as moderately helpful and reported lower levels of pain than non-owners. They did not, however, find significant differences between owners' and non-owners' stress and anxiety levels, and companion animal owners reported more depressive symptoms, but owners with animals perceived as friendlier reported fewer depressive symptoms. Dogs perceived as friendlier were negatively associated with depression and anxiety, and people with more disobedient dogs experienced greater stress (Bradley & Bennett, 2015). Thus, equivocal findings in this area, complicated by numerous mediating variables, are apparent.

In the literature regarding kidney disease and companion animals, human and animal behaviour causing infection has been demonstrated. Research has examined animal-related peritonitis and the effect of patient training on the incidence of peritonitis in PD patients, with a study measuring pre and post-training based around infection risk with dialysis, and people's behaviours with companion animals (Abebe et al., 2014). The study found that post-training, fewer people allowed their animals in the dialysis room, and no infections were reported. Furthermore, there have been case studies investigating causes of zoonotic peritonitis in PD, with cats playing with dialysis tubing (Bluen et al., 2016; Mu et al., 2020), cats, dogs and hamsters scratching and biting, and cats playing with fluid bags causing infections worsened by immunosuppression (Schiller et al., 2011). Another case study found a cockatoo to be responsible for peritonitis when it bit through a transfer set, causing a zoonosis with high mortality (Sedlacek et al., 2008). Therefore, while some impacts of companion animals in kidney disease are known, not much is known about the impact of other animals such as wildlife and therapeutic animals, and the perspectives of people with kidney disease themselves.

1.7 Online Communities

Online communities have existed for over 20 years and are globally one of the most popular online services, described as an online web-based service with features enabling users to communicate with each other (Malinen, 2015). Online communities can include discussion forums, bulletin boards and chatrooms. Participation in these online communities is vital to their sustainability, however, users can be passive, meaning they are a member and merely viewing content, or active, where they are contributing by posting (Malinen, 2015). Both passive and active members derive benefit from online communities with the idea that people can come together and collectively solve each other's problems, or people can benefit from simply viewing shared information (Preece et al., 2004). Blanchard and Markus (2004), found that members of an online community felt a sense of community and emotional attachment to varying degrees depending on their level of participation, citing recognition, having online identities, exchanges in support, personal friendships/relationships, and obligation to 'give back' as reasons for feeling a sense of community online. Likewise, in another study, the four main subtypes of in-person social support were found to exist in online communities, including esteem/emotional support, social companionship, informational support, and instrumental support, and this support appeared to offset some adverse effects of negative life events (Nick et al., 2018). Online communities can therefore be seen as a platform where people can seek and provide support, also potentially providing rich accounts of users' thoughts, feelings, perspectives, attitudes and experiences as communicated to each other online.

1.8 Current Study

People living with kidney disease face burdensome physiological consequences confounded by significant and impactful changes to their life, to engage in treatment and manage

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symptoms. The potential biopsychosocial benefits that come from companion and other animals have been the subject of previous research, as well as studies into psychosocial outcomes for people with chronic illnesses such as diabetes, chronic heart disease, and chronic pain. There have been studies into companion animals and kidney disease, regarding zoonoses, but to our knowledge, none relating to the HAB, attachment and social support. As human-animal relationships have important yet equivocal findings, and people with kidney disease face risks related to zoonoses, it is important to further explore companion and other animals in the context of kidney disease.

The aim of this study is to use qualitative research methods to address the research question “In what ways do companion and other animals impact the lives of people living with kidney disease?”. The study aims to investigate perspectives, attitudes, and experiences around companion and other animals in people living with kidney disease, based on an online forum.

Chapter 2: Method

2.1 Participants (Online forum posters)

Participants of this study were members of an online forum for people with chronic kidney disease who were posting comments in conversations about companion (pets) and other animals. As this study used existing online textual data and no active recruitment was involved, ‘participants’ will be further on referred to as ‘posters’. Some demographic data could be collected from the posts, including sex and identity of the poster; if they were a patient, a wife, or a carer; the type of treatment participants had exposure to, including HD, PD, kidney transplant, and if they were awaiting a kidney transplant. All information collected was relevant at the date of the person’s post.

2.2 Online Discussion Board/Forum Selection

An online discussion board, also known as an online forum, is a website or section of a website where users can have online conversations on a range of topics which are then archived for other people to read (Lee et al., 2014). The series of online message posts forming a discussion is referred to as threaded discussion, and a thread is therefore a series of individual posts by users that build up over time on a topic (Lee et al., 2014).

When searching for online forums for analysis, three expert librarians at the University of Adelaide were consulted regarding effective ways of searching the internet for the most relevant returned results, and how to search for specific content within forums. The Google search engine was used to look for forums about kidney disease. The search terms used were ‘renal discussion board’, ‘renal forum’, ‘kidney discussion board’ and ‘kidney forum’ as these returned the greatest number of relevant results. The Google search returned 178 results for ‘renal discussion board’, 193 for ‘renal forum’, 171 for ‘kidney discussion board’ and 160 for ‘kidney forum’. For each search term, 100 Google results were reviewed noting some duplicates across search terms, totalling 400 return search results. Beyond this number, relevance to the search criteria was lost and no return results produced new renal forums. If Google results included websites with relevant links to other forums, then these links were also followed and reviewed. Google results were excluded if they did not contain forums, or were forums not specific to kidney disease. Sixteen forums were identified relating to renal content; four were excluded because three were for renal cancer and one was a specific type of kidney disease, therefore due to their specificity they did not have sufficient discussion regarding animals. Four were excluded because they were not open access, and one was a question board for medical experts.

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Seven forums met the inclusion criteria, and therefore to determine appropriateness for analysis, a search within the forums was conducted using the search terms ‘pet’, ‘animal’ and ‘companion animal’, as well as the plural equivalent search terms. Inclusion criteria for forums were that they had to contain at least some whole discussion threads about pets or animals, as well as individual posts within other threads not necessarily entirely about pets and/or animals. Three discussion boards met the inclusion criteria, the forum www.davita.com was found within the search term ‘renal discussion board’, www.homedialysis.org was found within ‘kidney discussion board’, and www.ihatedialysis.org was linked from another website within the Google search results.

2.3 Data Collection

Once the three discussion boards were selected, the process of determining the eligibility of posts and collection of the data was then conducted. The Google search engine was used to search within the three forums as it returned more accurate, and a larger number of results than the forum’s search engines. Search terms used to find discussion threads and posts were ‘pet’, ‘animal’, ‘cat’, ‘dog’, ‘horse’ and ‘bird’, as well as the plural equivalent search terms to identify any additional results. These particular search terms were used as according to a survey conducted on companion animal ownership in Australia, 40% of households owned dogs, 27% owned cats, 11% fish, 9% birds, 3% small mammals, and 2% reptiles (AMA, 2019). Similarly, in an American survey of companion animal ownership, 38.4% of households owned dogs, 25.4% owned cats, 2.8% owned birds, and 0.7% owned horses (AVMA, 2018). Although the online content in forums can be accessed globally, these three forums are based in America and it is likely a large percentage of users are American. When considering posts and threads for inclusion for within forum search results, posts that did not address the research question were

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excluded, for example, expressions such as ‘It came from the horse’s mouth’, or discussion about animals that have kidney disease. Search terms ‘pet’ and ‘cat’ also returned a large amount of discussion on medical procedures named ‘CAT scan’ and ‘PET’, which is a medical test related to kidney disease, therefore these search results also were excluded.

Whole threads and individual posts from the three forums that met the inclusion criteria were then copied over to a Microsoft Excel spreadsheet, as well as poster information such as sex, and any medical history or medical information that posters included. In total, 219 posts from www.davita.com, 119 posts from www.homecentral.org, and 518 posts from www.ihatedialysis.com were obtained for analysis.

2.4 Ethical Considerations

Online qualitative psychological research is subject to some unique ethical considerations. Accessing and using publicly available online discourse for research has raised questions about whether informed consent should be obtained, as users are unaware that their posts are being used for such purposes (Burles & Bally, 2018). Discussion regarding whether online communities are considered a public or private space has led some researchers to conclude that websites and online communities can be considered public if they are not password protected (Roberts, 2015). Therefore, for this research, only open access forums that did not require making a user account were considered to protect the privacy of users in closed access communities, and individual informed consent was not deemed necessary for public forums. Forums selected also caution users that any information they share is public, not private and they should not share information they do not want to be seen or used by third parties. Given that participants may be identified by certain aspects of their user profile, low-risk research ethics approval was gained from the University of Adelaide School of Psychology Human Research

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Ethics Committee (approval number 20/34), and as stated in the ethics application, user data were deidentified so posters remained anonymous. This project was also conducted in collaboration and registered with the Central Northern Adelaide Renal and Transplantation Service (CNARTS) Clinical Research Group.

2.5 Data Analysis

First, the posts from all three discussion forums were read through for familiarisation of the extracted data, and during initial analysis, it was identified that saturation of data was reached within www.ihatedialysis.com. Saturation occurs when new data fails to generate any substantially unique ideas (Braun & Clarke, 2013). Therefore, no additional data from www.homedialyssccentral.org and www.davita.com was analysed, and the final data corpus consisted of 518 online forum posts between December 2006 and May 2018 from www.ihatedialysis.com. Posts collected for analysis were between this date range as it consisted of all posts that could be identified using a systematic search of the forum.

Qualitative content analysis (QCA) was used to identify categories of text with similar meanings, to explore what impact companion and other animals have on the lives of people with kidney disease. QCA is a qualitative research method used to subjectively interpret text data by systematically classifying data into codes and then identifying themes or patterns (Hsieh & Shannon, 2005). Manifest and latent content meaning of text can be coded, and manifest refers to surface content of the text, whereas latent refers to the coding of the underlying meaning (Graneheim & Lundman, 2004). The aim of QCA is therefore a high level of description, as well as interpretation of a phenomenon, without a high level of abstraction, and QCA differs from thematic analysis as counts are made of codes (Vaismoradi & Snelgrove, 2019).

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An inductive approach was used in coding the data to identify codes and categories generated from the data, and a deductive approach was used for a deeper analysis of meaning and further development of categories (Braun & Clarke, 2006). Using Microsoft Excel, posts were individually coded by breaking down the relevant text into short strings of words capturing the meaning of participants' expressions, and forum posts were coded into multiple different codes. Posts that did not address the research question, and where meaning could not be determined were excluded from analysis. Codes of similar meaning were collated and sorted into codes and subcodes, then comparable codes/subcodes were further collapsed and analysed to develop higher categories, codes and subcodes. Frequencies of these categories, codes and subcodes were then established. In its preliminary stages, data analyses were presented to a nephrologist who is Chair of the Royal Adelaide Hospital CNARTS Clinical Research Group for expert opinion, consultation and feedback to further guide development of data analysis.

A reality of qualitative research crucial to recognise is the subjective nature of analysis and interpretation, as well as the influence of personal bias in the research process. Reflexivity is the acknowledgement and critical reflection of the personal role researchers have in the production of knowledge, and how this shapes their data collection and analysis (Braun & Clarke, 2013). The researcher is a former nurse with 5 years of practice in acute hospital care and firsthand experience caring for patients with CKD, including minimal but some exposure to in-clinic dialysis. This medical background and knowledge may have influenced how data were selected, coded and categorised. In-depth knowledge was beneficial in understanding specific medical and renal terminology.

To enhance trustworthiness and rigour, 10% of the codes were examined and compared to the raw data by the researcher's supervisor, who is a health psychologist, and 10% were

examined and compared by the co-supervisor, a health psychologist in the CNARTS Clinical Research Group. Additionally, an audit trail was maintained throughout the research to track the analytical decision-making processes to establish trustworthiness. Rogers and Cowles (1993) specify the importance of maintaining notes that are accurate and comprehensive relating to the contextual background of data, and explanation of methodological decision-making rationale to contribute to rigorousness and credibility in qualitative research. Detailed auditing of this information assisted the researcher to track these processes for reflection and to aid in ongoing analysis.

Chapter 3: Results

3.1 Demographics, Treatment Type and Animals

Demographic data were displayed in Table 1. Posters' sex was identified from their public profile or inferred from posts. As shown, the largest portion of posters identified were female, and less than half were male.

Table 1

Sex of Posters to the Online Forum

Sex	Number of posters	% of Total
Female	109	63.4
Male	41	23.8
Unknown	22	12.8
Total	172	100

Note. 'Unknown' refers to posters who did not provide information about their sex.

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Table 2 describes the people who were posting to the online forum. Most posters were people with kidney disease themselves, however, where the poster was not the person with kidney disease, the identity of the poster is in is reference to the person who has the relationship with the person with kidney disease. Most posters other than people with kidney disease were people with a close relationship to them, such as a relative or partner, with one professional who was a renal specific social worker, and one a private cleaner in a patient's home.

Table 2

People Posting to the Online Forum

Identity	Number of posters	% of Total
Patient	121	70.3
Wife	11	6.4
Wife and Carer	5	2.9
Husband	3	1.7
Partner/Fiancé	2	1.2
Sibling	1	0.6
Mother	1	0.6
Offspring	1	0.6
Cleaner	1	0.6
Renal Social Worker	1	0.6
Unknown	25	14.5
Total	172	100

Note. 'Unknown' refers to posters who did not provide information about who they were in their online comments. Where the sex of the person is unknown, the terms 'Sibling' and 'Offspring' are used instead of 'brother' or 'sister', or 'son' and 'daughter'.

Regarding the treatment type that posters had exposure to, whether it be themselves or the person they had a relationship with undergoing treatment, PD and transplant were equally

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most common, HD was second, and various combinations of treatment exposure are further illustrated in Table 3.

Table 3

Treatments for which Posters had Exposure

Type/s of Treatment	Number of posters	% of Total
PD	24	14
Transplant	24	14
HD	20	11.6
HD and Transplant	10	5.8
HD, PD and Transplant	10	5.8
PD and Transplant	5	2.9
HD and PD	4	2.3
HD and Awaiting Transplant	3	1.7
Awaiting Transplant	2	1.2
HD, PD and Awaiting Transplant	2	1.2
PD and Awaiting Transplant	2	1.2
No Treatment Known	66	38.4
Total	172	100

Note. HD = Haemodialysis, PD = Peritoneal Dialysis, ‘Transplant’ refers to a kidney transplant. The treatments people had exposure to also refers to exposure prior to the post, and/or at the time of the post.

When posters were discussing animals, it was either regarding companion animals, or in other contexts such as animals they volunteered with, working with animals, therapy animals, service animals, and wildlife they had contact with. Table 4 shows the range of animals that posters discussed, separated into these two groups.

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Table 4

Animals that Posters Communicated about in Online Discussions

Animals	Number of posters	% of Posters	Total posts discussed in	% of Total Posts
Companion Animal (Pet)				
Cat	110	63.9	238	46
Dog	100	58.1	225	43.4
Bird	27	15.7	44	8.5
Rodent	13	7.6	14	2.7
Fish	6	3.5	6	1.2
Reptile	5	2.9	6	1.2
Horse	4	2.3	8	1.5
Rabbit	1	0.6	1	0.2
Non-Companion Animal				
Horse	11	6.4	15	2.9
Rodent	5	2.9	6	1.2
Bird	4	2.3	4	0.8
Fish	3	1.7	3	0.6
Reptile	1	0.6	1	0.2
Cow	1	0.6	1	0.2

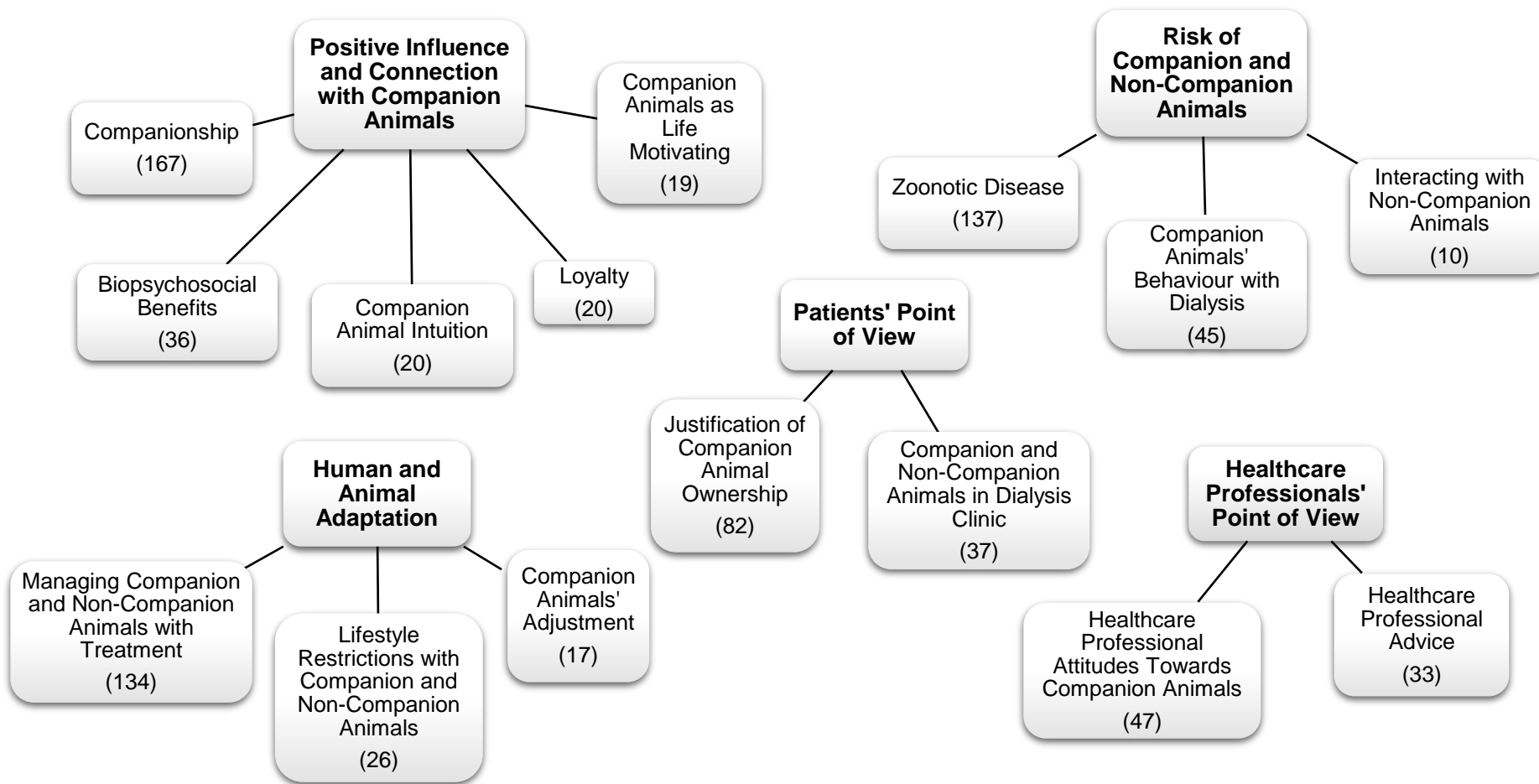
Note. ‘Bird’ includes chicken, ‘Rodent’ includes rat, guinea pig, hamster, gerbil, mouse and squirrel, and ‘Reptile’ includes snake and turtle. Percentages do not add up to 100% as some posters discussed multiple animals, and multiple animals were often discussed in single posts.

3.2 Categories, Codes and Subcodes

From analysis of 518 individual forum posts about animals, five overarching categories were identified, with 15 underlying codes and a further 61 subcodes. Figure 1 illustrates the five categories and their corresponding codes with the frequency of subcodes mentioned in the data. As subcodes could be mentioned more than once, these frequencies exceed the number of subcodes present. The 61 subcodes are listed in detail in the Appendix.

Figure 1

Main Overarching Categories and Accompanying Codes



Note. Numerical values indicate frequencies of subcodes

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The five overarching categories identified, in order of frequency are: ‘Positive Influence and Connection with Companion Animals’, ‘Risk of Companion and Non-Companion Animals’, ‘Human and Animal Adaptation’, ‘Patients’ Point of View’ and lastly ‘Healthcare Professionals’ Point of View’. These five categories are further described in Table 5 with illustrative quotations, frequencies of data within these five categories, and total percentages.

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Table 5

Categories, Companion and Non-Companion Animals

Category	Description	Quotation	Count	% of Total
Positive Influence and Connection with Companion Animals	Relates to attributes and behaviours of companion animals which provide a positive influence on the owner's life and demonstrates attachment to companion animals.	"It's getting harder and harder to find justification for staying alive. I'm not productive anymore as it is. My dog is the only thing that keeps me going. And she's 15+. When she's gone, I can't imagine what would make my life feel meaningful."	262	31.6
Risk of Companion and Non-Companion Animals	Describes the threat companion and non-companion animals do and do not pose for people with kidney disease, including for treatment and possibility of infection.	"Peritonitis is a life threatening condition. Allowing the cats in the room where you will do your exchanges is like playing Russian roulette with a gun which could hold 20 bullets -- better odds than a six-shooter but the risk is still there."	192	23.1
Human and Animal Adaptation	Describes if changes and adjustments have been made by owners and companion animals to accommodate treatment, and types of change/adjustment.	"When I started home hemo, my former craft room became dialysis central, and my kitty was no longer allowed in when anything having to do with dialysis was going on. She learned so quickly that the machine running or my working with the supplies meant "No Entry" that within a couple of weeks, I could leave the door open and she would sit right at the sill and watch me, without setting foot across the threshold.	177	21.3

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Category	Description	Quotation	Count	% of Total
Patients' Point of View	Expressions of opinions on companion and non-companion animals' acceptability with treatment, and views on infection control/risk of animals at in-clinic dialysis.	They may seem set in their ways, but they adapt quickly when they have to." "Not me! I love animals and all, but I am there to save my life not have "fido" lick my toes. Besides the risk of diseases and contamination spreading from the dog could you imagine if something spooked the dog and he went wild and pulled out the patients needles by accident. Oh man the lawyers would be hovering all over that center."	119	14.3
Health Professionals' Point of View	Explains advice given and attitudes portrayed by healthcare professionals towards companion and non-companion animals, as recounted by people living with kidney disease.	"I was on PD for six months and now have a transplant. I've had 3 or more cats and 2 dogs through it. My dialysis team and transplant team have been aware of them through it all. They said they know pets are important and had no objections, other than that I didn't connect or disconnect with them in the room when I was on dialysis, and the transplant team asked that I don't bring additional pets into my home until I was one year post transplant"	80	9.6
Total			830	100

3.2.1 Positive Influence and Connection with Companion Animals

Positive Influence and Connection with Companion Animals was the most predominant of the five categories established from the data. This category had five codes and ‘Companionship’ with the highest frequency count of all codes across the dataset (see Figure 1). This code included subcodes related to reciprocal love and affection, seeking and receiving emotional support and comfort, grief, sadness and fear around missing/losing animals, and referring to them as best friend, family, or soulmate. Owners slept with them on the bed, and spoke about the value and closeness of human/animal relationships, including considering bonds just as strong, or stronger than human relationships:

“I am a real dog person and I understand in the depths of me what a loss you have suffered. I’m so sorry. Dogs are so "naked" and authentic that we tend to be so in their presence. So (some of us) can actually get much closer to dogs than to people and there aren’t the usual barriers that humans tend to put up. Dogs can really get under your skin.”

The second most predominant code was ‘Biopsychosocial Benefits’ which included perceived physiological benefits such as lowering BP, expressions regarding psychological assistance, such as stress relief and relaxation, as well as aiding in social interaction and helping make friends. Beliefs about companion animals being physically healing was another aspect described by posters:

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“I had a cat who I think literally purred me into better health. I was having pains and fevers and chills after dialysis several years ago. I would pick up this cat we used to have and he would purr into my chest. I had enlarged lymph nodes at the time and I really think his loud purring on my chest helped me to heal those lymph nodes. I know I felt like I could breath better after a purr session. And he would sit with me and purr a loud purr into me.”

‘Companion Animal Intuition’ was the third most common code and is categorised by views on companion animals’ ability to understand their owners and what is happening regarding their illness, as well the notion that companion animals are aware when people become unwell and will actively comfort them in response:

“My cat, Sparkle, always knows when someone isn’t feeling well or needs a little extra cuddling. He’s not one to be picked up and cuddled on the average day, but when you need it the most - he is right there snuggling with you.”

The third equally most prominent code was ‘Loyalty’, which demonstrates companion animals’ loyalty to their owner, protective behaviour, as well as owner loyalty to animals, for example, a refusal to give them up for treatment:

“I made up my mind that there were two things I would not give up on dialysis, my daily flat white and my cats.”

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The fifth code in this category was ‘Companion Animals as Life Motivating’. Posters demonstrated their feelings about companion animals being their daily motivation and reason to live, sometimes the only reason to live:

“She’d [nurse] prefer I just got rid of my dog. Only problem with that is that my dog is really my only reason for wanting to live, at this point. So it’s kind of moot. She’s 14 and won’t live for very much longer (I suspect), but then I’ll have to decide if there’s any reason for me to keep going..”

3.2.2 Risk of Companion and Other Animals

Risk of Companion and Other Animals was the second most predominant category, divided into three codes. The most prevalent code was ‘Zoonotic Disease’ which illustrated concerns about infection/peritonitis including factors such as immunosuppression preventing obtaining animals, getting other people to handle kitty litter/animal faeces, and scratching and biting. Other findings included a higher risk considered with birds, reptiles, and rodents, people recognising infections are from animals, and animal disease risk influencing dialysis and transplant treatment:

“I am rethinking a transplant. We live in an OLD house and at the moment, are over run with mice. I’ve been away almost 9 weeks and the little mice have been everywhere. Hubby has done his best to stem the tide but as we are having a bumper season, the mouse population has exploded. This will not be

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good to return to after a transplant. I will be hoping my call comes in a drought, when the mice are better behaved!”

The second most prevalent code was ‘Companion Animals’ Behaviour with Dialysis’ with subcodes demonstrating posters’ observations about whether companion animals are curious about the dialysis machine or process, or if they have no intrigue. Some were not interested, but some were an issue, often related to cats attacking, chewing and chasing bubbles in the dialysis tubing, and playing with the dialysis fluid bag. There were also observations of an affinity for cats to be close to a person’s fistula:

“...before I would stretch my fistula arm out and she would snuggle in and put her head down on the fistula. Definitely think the vibration reminds them of kitten time when their mother would purr at them. It’s so sweet and trusting and gorgeous. Sometimes I’d feel her purring back and that would make me smile happily too.”

The last code in this category was ‘Interacting with Non-Companion Animals’ which details opinions on working with animals and the unlikelihood of infection risk, as well as the perceived infection risk while interacting with non-companion (or wild) animals:

“Please tell people not to deal with animals, it’s not worth the risk. Those who have done it without problems are just lucky, in my opinion. My Hubby fed bird

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& squirrels for 10 years before he caught the fungel [sic] pneumonia and nearly died.”

3.2.3 Human and Animal Adaptation

Human and Animal Adaptation comprised of three codes, with the largest being ‘Managing Companion and Non-Companion Animals with Treatment’. Subcodes for this code related to restrictions around dialysis put in place for companion animals or having no restrictions, managing hygiene precautions around animals, routine modifications to suit the animal or physical adjustments made to allow treatment, and companion animal care to reduce infection risk. Frequently mentioned was restricting animals from the room during dialysis:

“My wife absolutely adores her cats, and loves sleeping with them, so I was worried about what to do with them for the dialysis. I thought about doing just that (with wiring loom) to keep them off the lines. We ended up deciding to keep them (and my dog) out of our bedroom. Just my two cents, but if you’re living situation allows it, I’d think about keeping them out of the room.”

‘Lifestyle Restrictions with Companion and Non-Companion Animals’ contained exchanges about things that posters either felt they could not do anymore, were told they could not do anymore, and what they claim they continue to do regardless of treatment:

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“Because of the placement of transplanted kidney I was advised to ride English and not western due to the horn. But, I rode my horse and all the other stuff to do with horses.”

The third code, ‘Companion Animals’ Adjustment’ demonstrates the ability of the companion animal to learn and adhere to new rules and routines imposed for managing dialysis and animals:

“I did home hemo with a cat who patiently waited at the open door to the room while I stuck needles in my arm. As soon as I was done running the machine, she was allowed back in the room.”

3.2.4 Patients’ Point of View

The category Patients’ Point of View included two codes, the largest being ‘Justification of Companion Animals Ownership’. This code represented discussions rationalising and detailing reasons companion animals are an acceptable risk with kidney disease including statements of owning animals previously without infection, and claiming that infections they have had were not caused by their animal. Also, the fact they have been previously exposed to the animal’s germs and their immune system should be accustomed to them, and assertions that animals are fine as long as precautions are taken, mostly concerning hygiene. Some posters even likened infection risk with animals to risk with children:

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“Yeah, there’s no germ factory quite like a kid - especially one in pre-school! But the docs never suggest getting rid of those, do they?”

The second code was ‘Companion and Non-Companion Animals in Dialysis Clinic’ and related to discussions on whether therapy animals, service animals, and companion animals were acceptable in a dialysis clinic. Some posters described the experience of having animals in the clinic as positive, including from a patient who took their cat into a dialysis clinic:

“I was careful thinking about her being close to the machines or needles, so what I did is held her, took her to the patients and held her so they could pat her with their hands. Some of them - specially the older ones - really seemed to like seeing her little face and pat her soft fur. My cat is very docile and didn’t squirm very much or get freaked out by the beeps or noises.”

Other posters expressed their disapproval of animals in the dialysis clinic, often citing disease or hygiene risks, in this case about pet therapy:

“I don’t think a dog should EVER be in a dialysis clinic. EVER. Unless you can poll the total number of patients and screen for allergies, assure the dog has JUST had a good bath, and assure that he has NO pests of any kind, oh and he must be..... I could go on and on. BAD idea... And I am a dog person, and I have a therapy dog. A HUGE yellow Lab, who is the best behaved dog in the world. I would never take him into the clinic.”

3.2.5 Healthcare Professionals' Point of View

The final category was titled Healthcare Professionals' Point of View and was divided into two codes. The most prevalent code was 'Healthcare Professional Attitudes Towards Companion Animals' and included if posters reported healthcare professionals as being approving of companion animals with treatment:

“Well I spoke to my doc today and brought up the question of transplants and pets and he said he couldn't see any reason why I couldn't keep my little sweet cat as long as I was careful with things like the litter tray and not kissing her etc. YAY!!!!”

Posters also reported instances where they felt healthcare professionals were disapproving of companion animals, and there were expressions of animosity towards them for this:

“Unfortunately. my PD nurse is NOT an animal person at all! and she is totally freaked out that I have dog who, god forbid, sleeps with me. I wear a lot of black polar fleece clothing in the cold Northeast winter, and my pale colored dog's fur clings to it even when straight out of the washer. Every time my nurse sees that she re-freaks. So I don't expect to get real unbiased advice from her about orchestrating my life around my dog. She'd prefer I just got rid of my dog.”

The last code in this category was 'Healthcare Professional Advice' which contained descriptions of information provided by doctors, nephrologists, nurses, and transplant teams.

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Advice received included regarding home dialysis and companion animals, which contained instruction that they were no issue. Transplant advice included companion animals being acceptable with this treatment, and directions on not owning new animals for a certain period after transplant:

“Any way I was told a dog was fine and even a cat as long it was a cat you already had before transplant. I was told not to get any new pets after transplant. If I understand right if you’ve had your pet for a while your immune system is kind of used to it as opposed to getting a new pet the your [sic] immune system is not used to.”

Other advice was about not having contact with animals for a period after a transplant, and altogether avoiding animals with a transplant. Some posters also reported not having been told information about avoiding animals with a transplant.

Chapter 4: Discussion

4.1 Overview of Findings

This study aimed to explore the impact companion and non-companion animals had in the lives of people living with kidney disease, from an online forum. Qualitative Content Analysis was utilised for inductive and deductive analysis, which resulted in the identification of five overarching categories. Consistent with previous literature about the HAB, attachment theory and social support theory, the largest category ‘Positive Influence and Connection with Companion Animals’ demonstrated features relevant to all three of these theories. The second-largest category, ‘Risk of Companion and Non-Companion Animals’ was also mostly consistent

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with documented risks associated with animal infection (CFSPH, 2008; Broughton et al., 2010), but with some additional insight into interactions with non-companion animals. New to the literature, however, were most findings in the three remaining categories. The third-largest category, ‘Human and Animal Adaptation’, has findings most of which have not been identified in previous studies, except for the issue of restriction of companion animals near dialysis (Abebe et al., 2014). Further new findings were within the fourth most prominent category, ‘Patients’ Point of View’, as well as the least discussed category which was ‘Healthcare Professionals’ Point of View’.

4.1.1 Human-Animal Bond

The HAB was evident in online discussions, and the present study confirmed that companionship is highly regarded in human-animal relationships, as has been previously recognised (AMA, 2019). Anecdotes of psychosocial benefits of companion animals, as well as reciprocal love, affection and loyalty, support the notion that for a relationship to be considered a ‘bond’, mutual benefit must be a factor (Zinn & Beck, 2014). Although a decreased risk of cardiovascular disease could not be observed in this qualitative study, posters emphasised perceived benefits including BP reduction, also reported in previous research (Friedmann et al., 2013). Posters also expressed beliefs of companion animals being physically healing, such as a cat’s purr healing lymph nodes. While there may be no empirical evidence for physical healing power in this area, beliefs might be related to other evidence of positive physiological changes influenced by animals. These changes include altered hormone levels reducing fear, anxiety and stress (HABRI, 2020b; Miller et al., 2009), and improved cardiac function, and pain reduction in hospitalised patients (Halm, 2008). Posters also spoke about their animals as if they were human, referring to them as a best friend, family member or soul mate, also commenting on animals’

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ability to understand what was happening regarding their kidney disease and deterioration. An explanation for this may be the tendency for humans to anthropomorphise animals, meaning to humanise them, and in a study by Duvall et al. (2010), they found that dog owners who had low levels of human support, and poorer health, had high levels of anthropomorphism, suggesting it to be a coping mechanism.

4.1.2 Attachment

Evidence supporting human attachment to animals was also strengthened by this study. Features of secure attachment style were demonstrated by posters, such as a preference for sleeping with animals on the bed being prominent, aligning with the ‘seeking proximity to and prioritising nearness to attachment figure (AF)’ component of Mary Ainsworth’s attachment behaviours. Seeking emotional support and comfort from AF when presented with a threat which is also a feature of attachment was demonstrated, by emotional support and comfort being sought from animals. In the case of this study, the threat may be considered to be kidney disease and deteriorating health, and similar attachment to animals have been previously reported (Meehan et al., 2017). This research also found expressions of distress about separation from animals, another attachment feature, with posters voicing fears about giving up or losing companion animals, and articulating sadness regarding these thoughts (Meehan et al., 2017). Separation distress in posters demonstrates findings consistent with previous literature about adult separation anxiety when asked about separation from their animal (Dowsett et al., 2020). Grief at losing companion animals featured often in this study, and strong feelings of loss were articulated, much like the unbearable feelings of mourning previously identified (Sable, 2013). Grieving reactions often tied in with feelings of human-animal relationships being as strong or stronger human relationships.

4.1.3 Social Support

Companion animals were perceived to provide emotional support and comfort, consistent with descriptions of social support illustrated in the literature, including reductions in feelings of stress, feelings of joy (Beck, 2014), and making friends with the aid of companion animals (Bradley and Bennett, 2015). Also consistent, was that animals contribute as much social support as some relatives, and often more than humans (McConnell et al. 2011). The current study found some posters to value companion animal relationships similarly highly, and often discussed bonds being stronger than human bonds. Dowsett et al. (2020), found that those with less human social support experienced more separation distress. This, coupled with a strong HAB, may explain why some posters cited their companion animals as their only reason to live. Accounts of companion animals being a reason to live for people in difficult circumstances such as abusive relationships (Fitzgerald, 2007), or chronic disease such as HIV (Hutton, 2019), have also previously been expressed. Likewise, comments on the forum regarding refusal to give up animals for treatment, indicate how important and impactful these relationships are for people.

4.1.4 Zoonotic Disease Risk

As stated in previous literature, there is a risk of zoonoses being transferred from animal to human (CFSPH, 2008), and this study showed the risk to be frequently recognised by posters. The primary worry regarding risk was infection concern, with frequent mentions of peritonitis. Posters made reference to peritonitis being ‘life-threatening’ and made connections between animals and infections. As previously highlighted, peritonitis is particularly dangerous, and posters reported worry about immunosuppression, and animals scratching and biting, which are causes of peritonitis previously implicated in zoonoses in PD patients (Schiller et al., 2011).

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Another risk discussed was a tendency for animals to interfere with dialysis and equipment. Animals who were a risk, exhibited behaviours previously documented to cause infection, including interfering with dialysis tubing and fluid bags (Bluen et al., 2016; Broughton et al., 2010; Mu et al., 2020). Additionally, some posters talked about cats laying on a person's fistula. This behaviour could be considered an infection risk and has not been previously reported in the literature.

Considerable concern was expressed about handling kitty litter and animal faeces, tasks which are strongly advised against for the immunocompromised (CFSPH, 2013b). To manage this risk, people often allocated the responsibility to others. Although some still undertook these tasks, consistent with guidelines, the risk was mostly recognized and avoided.

Posters often rated birds, reptiles and rodents as a big risk. Concern was not unwarranted, as infection-causing fungal agents often found on the feathers and skin of healthy birds, have been associated with a high mortality rate of at least 50% in PD patients who contracted a fungal disease (Sedlacek et al., 2008). Regarding reptiles, as this species of animal carry Salmonella, extra precautions are advised when handling them, particularly for the immunocompromised, supporting posters' claims of significant infection risk (CFSPH, 2013b). Furthermore, posters had substantial concern about infection risk, and some reported contracting zoonoses, however, while research for zoonotic disease prevalence in CKD is limited, it shows that zoonotic peritonitis in ESKD at least is not frequently encountered (Broughton et al. 2010). Therefore the risk, while an important consideration, is sometimes potentially overstated.

4.1.5 New Findings

Some posters discussed the risk of infection influencing the decision to not undergo dialysis and transplant treatment. Previous literature and case studies outlining animal-related

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infections and their consequences provide some justification for infection risk concern (Bluen et al., 2016; Broughton et al., 2010; Mu et al., 2020; Schiller et al., 2011; Sedlacek et al., 2008), however, sometimes potentially at the cost of vital treatment.

Findings relating to how people and animals adapted to their circumstances provide new insight into adjustments made to accommodate animals, treatment, and new routines, most commonly relating to hygiene. This demonstrates that not only do people understand infection risks, but also if they are aware of appropriate precautions, they are often willing to do them, consistent with findings of reduced infection prevalence after training for PD patients regarding hygiene and limiting animal access (Abebe et al., 2014). Modifications to treatment routines, such as treatment times accommodating animals, and physical adjustments likewise demonstrated adaptability and willingness to make changes. Posters also discussing whether they did or did not impose restrictions around animals after beginning dialysis, or receiving a transplant, indicated that they while they were willing to make changes, sometimes they chose not to or felt it unnecessary. Not considering the need to make changes related to non-companion animals as well, including continuing to work with animals and regarding the infection risk as low, an aspect previously absent from the literature.

Another novel discovery was changes that companion animals made when faced with new circumstances, learning new rules and adjusting behaviour to new routines. This may be partially attributed to the HAB, as because domestic animals bond to humans, they are more likely to learn from and pay attention to humans (Price, 2015). This indicates that not only are humans willing to adapt for companion animals, animals are also willing to adapt for their owners.

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Perspectives from people living with kidney disease found in this study, give previously unreported expressions of justifications of owning companion animals. Justifications were prominent, potentially accounted for by confirmation bias, which is a tendency to seek, recall or favour information that confirms what is already believed as true, and interpreting information in a way that suits one's idea or cause (Jeanes, 2019). Posters used evidence from prior experiences, examples of similar scenarios, and interpreted certain information as evidence, such as previous exposure to companion animal germs as immunoprotective.

Literature has investigated risks and benefits of animals for humans, however, it has not explored opinions of people regarding animals in dialysis clinics. This study uncovered thoughts on whether companion, therapy, and service animals should be in clinics, and patients' fear of infection was evident in these discussions. There was both acceptance of and disagreement about animals in clinics, suggesting the perceived benefits of animals in the clinic were often counterbalanced by concerns about the perceived risks.

Posters also had views on health professionals' acceptance of companion animals and often expressed animosity towards their attitudes if they did not align with their own, exposing dynamics between patient and healthcare professionals not previously reported. The likely rationale behind them not approving of companion animals is they know the infection risk, however, they may not understand the power of the HAB. Blazina et al. (2011), underscoring the importance of understanding the psychological significance of the HAB and its complexity, argue that it is a competency for professional practice for mental health professions. This likewise should apply to professionals in clinical and community settings. However, while this study shows that some health professionals disapproved, a survey of American GP's found that 97% believed in health benefits from owning companion animals, 75% saw overall health

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improvement in one or more patients, and 87% said patients' mood or outlook improved (HABRI, 2014), demonstrating a positive attitude towards companion animals. However this survey only included doctors, and in this study posters talked about nurses' attitudes as well. Therefore, views of nephrologists and nurses could be further studied.

An observation of this study was the varied advice given to people with kidney disease about animals when living with transplant and dialysis. Health professionals did not say companion animals were unacceptable with home dialysis, and there was advice about companion animals being acceptable with a transplant. While some people felt health professionals were disapproving, discussions around advice given suggested there mostly was not an expectation for people to surrender animals, but some advice regarding avoiding animals.

4.1.6 Online Forum

The forum was created in 2006 by an American dialysis patient wanting a place for people to share their experiences of dialysis freely, without being censored by corporate-run or sponsored websites (I Hate Dialysis, n.d.). This description gives insight as to why people may post to this forum, because often as well as social support, people seek anonymity when discussing sensitive topics (Hether et al., 2014). Furthermore, in this study, 63% of posters identified as female, consistent with findings from a study on social presence in an online forum for university students, where females (63%) were more likely to engage and support one another (Thayalan & Shanthi, 2011). It is important to note, however, not all forum users seek support, some are passive members who may or may not derive benefit (Malinen, 2015). Although there are benefits of online forums, there are also drawbacks, such as in the absence of traditional forms of medical expertise, health misinformation putting people at risk (Bakke, 2018). Posts about companion and other animals discontinued from May 2018, and as the I Hate

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Dialysis forum is still active, there were no data addressing the research question from this date onwards. Why this topic was discontinued is unclear.

4.2 Strengths

The qualitative approach was a strength of this research as it provided rich descriptions and accounts of online discourse regarding thoughts and feelings about animals and kidney disease. The researcher was able to access naturalistic data, unedited by external sources, and uninfluenced by the researcher. These discussions were unfiltered and uncensored, providing a more transparent view of posters' thoughts and feelings. Another strength was that an audit trail was maintained to enhance trustworthiness and rigour in the collection and interpretation of the data. The researcher also practised reflexivity, taking into account personal experiences and opinions that may influence analysis, to reduce bias. Furthermore, 20% of the data were checked by two health psychologists, enhancing the trustworthiness and rigour of this study.

4.3 Limitations and Further Research

This research was not without limitations. The nature of online content means that people from all over the world have access and could be from any country. It was evident that at least two posters were Australian. As there was limited demographics for posters, it is not a representative sample, and no generalisations can be made. However, there were comparable codes to findings from the Australian national pet survey, indicating similarities existed, suggesting the HAB applies across countries. There were no active participants for the study, and the researcher was an observer of the posts, not an active participant, and so no follow up or clarification questions could be asked. It is also unknown whether any posters were Indigenous Australians, which is important because as previously discussed, Indigenous Australians are

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more likely to be affected by kidney disease (AIHW, 2020), and insights into animal relationships would be valuable.

Recommendations for future research include qualitative interviews with patients with kidney disease, and professionals such as nurses, doctors, nephrologists, social workers, psychologists, and other allied health professionals. Data from opinions and experiences with companion and other animals, and knowledge and perspectives on infection risk, could be then triangulated with the current study. Other future research should include qualitative interviews with Indigenous Australians to obtain unique perspectives and experiences on this topic.

4.4 Implications

This study highlights the value of companion and other animals, and that some health professionals do not necessarily understand or appreciate the HAB, which means there are implications for people living with kidney disease, health professionals, and healthcare providers. Bringing awareness to health professionals will demonstrate that sometimes companion animals need to be considered an important part of a patient's treatment plan. Also salient, is recognition of the disconnect between patients' understanding of healthcare professional attitudes and opinions about companion and other animals, and the reality of them. Furthermore, it should be recognised that there is some confusion regarding companion and other animals and kidney disease, and some people are seeking clarification online about information that should be obtained from appropriate professionals.

Healthcare professionals could be informed of the impact and role companion and other animals have in the lives of people with kidney disease, for a more meaningful understanding, and to facilitate better patient relationships. Healthcare providers could provide resources for accurate information about zoonoses, immunosuppression and risks involved, as well as

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appropriate precautions. Screening of animals and the risks they pose to patients could be implemented, and more comprehensive information and clearer advice could be provided by healthcare professionals.

4.5 Conclusions

This research contributes to the literature gap regarding experiences of people living with kidney disease, and companion and other animals. The findings of this study reinforce understanding of the strength of the HAB and contribute evidence that humans form secure attachments to animals. It emphasises the biopsychosocial benefits provided by companion animals and gives support to the notion that people rely on companion animals for emotional support to help cope with their chronic illness.

This study highlights the fact there is considerable concern with infection risk, and while the risk exists, it may be overstated. The study uncovered a willingness for people to make adaptations because relationships with companion animals are so highly valued, and animals equally adapt to new circumstances. It also shows that people are willing to take risks to their health for the sake of animals and will justify ownership of companion animals to preserve these relationships.

This research is useful as it helps inform health professionals of the importance and issues of human-animal relationships, helping to facilitate addressing concerns and misunderstandings.

References

- Abebe, M., Laveglia, C., George, S., & Wadhwa, N. K. (2014). Pet-related peritonitis and its prevention in peritoneal dialysis: A case study. *Peritoneal Dialysis International*, 34(4), 466-468. <https://doi-org.proxy.library.adelaide.edu.au/10.3747/pdi.2013.00054>
- Almutary, H., Bonner, A., & Douglas, C. (2013). Symptom burden in chronic kidney disease: A review of recent literature. *Journal of Renal Care*, 39(3), 140-150. <https://doi-org.proxy.library.adelaide.edu.au/10.1111/j.1755-6686.2013.12022.x>
- American Veterinary Medical Association. (2018). *2017-2018 AMVA pet ownership and demographics sourcebook*. Retrieved from <https://www.avma.org/resources-tools/reports-statistics/us-pet-ownership-statistics#companion>
- American Veterinary Medical Association. (2020). *Human-animal bond*. Retrieved from <https://www.avma.org/one-health/human-animal-bond>
- Anastasopoulos, N-A., Duni, A., Peschos, D., Agnatis, N., & Dounousi, E. (2015). The spectrum of infectious diseases in kidney transplantation: A review of the classification, pathogens and clinical manifestations. *In Vivo*, 29(4), 415-422. <http://iv.iijournals.org/content/29/4/415.long>
- Anderson, K. A., Lord, L. K., Hill, L. N., & McCune, S. (2015). Fostering the human-animal bond for older adults: Challenges and opportunities. *Activities, Adaptation & Ageing*, (39)1, 32-42. <https://doi-org.proxy.library.adelaide.edu.au/10.1080/01924788.2015.994447>

ANIMALS IN RENAL DISEASE

Animal Medicines Australia. (2019). *Pets in Australia: A national survey of pets and people*.

Retrieved from [https://animalmedicinesaustralia.org.au/wp-content/uploads/2019/](https://animalmedicinesaustralia.org.au/wp-content/uploads/2019/10/ANIM001-Pet-Survey-Report19_v1.7_WEB_high-res.pdf)

[10/ANIM001-Pet-Survey-Report19_v1.7_WEB_high-res.pdf](https://animalmedicinesaustralia.org.au/wp-content/uploads/2019/10/ANIM001-Pet-Survey-Report19_v1.7_WEB_high-res.pdf)

Australian Bureau of Statistics. (2018). *National health survey: First results, 2017-18*, cat. no.

4364.0.55.001. Retrieved from

[https://www.abs.gov.au/ausstats/abs@.nsf/Lookup/by%20Subject/4364.0.55.001~2017-](https://www.abs.gov.au/ausstats/abs@.nsf/Lookup/by%20Subject/4364.0.55.001~2017-18~Main%20Features~Kidney%20disease~65)

[18~Main%20Features~Kidney%20disease~65](https://www.abs.gov.au/ausstats/abs@.nsf/Lookup/by%20Subject/4364.0.55.001~2017-18~Main%20Features~Kidney%20disease~65)

Australian Institute of Health and Welfare. (2020). *Chronic kidney disease*. Retrieved from

[https://www.aihw.gov.au/reports/chronic-kidney-disease/chronic-kidney-](https://www.aihw.gov.au/reports/chronic-kidney-disease/chronic-kidney-disease/contents/deaths-from-chronic-kidney-disease)

[disease/contents/deaths-from-chronic-kidney-disease](https://www.aihw.gov.au/reports/chronic-kidney-disease/chronic-kidney-disease/contents/deaths-from-chronic-kidney-disease)

Australian & New Zealand Dialysis & Transplant Registry. (2018). *Chapter 2: Prevalence of*

end stage kidney disease (40th Report). Retrieved from [https://www.anzdata.org.au/](https://www.anzdata.org.au/report/anzdata-40th-annual-report-2017/)

[report/anzdata-40th-annual-report-2017/](https://www.anzdata.org.au/report/anzdata-40th-annual-report-2017/)

Bakke, A. (2018). Trust-building in a patient forum: The interplay of professional and personal

expertise. *Journal of Technical Writing and Communication*, 49(2), 156-182. [https://doi-](https://doi.org.proxy.library.adelaide.edu.au/10.1177/0047281618776222)

[org.proxy.library.adelaide.edu.au/10.1177/0047281618776222](https://doi.org.proxy.library.adelaide.edu.au/10.1177/0047281618776222)

Beck, A. M. (2014). The biology of the human-animal bond. *Animal Frontiers*, 4(3), 32-36.

<https://doi.org/10.2527/af.2014-0019>

Blanchard, A. L., & Markus, M. L. (2004). The experienced "sense" of a virtual community:

Characteristics and processes. *The Data Base for Advances in Information Systems*,

35(1), 67-78. <https://doi.org/10.1145/968464.968470>

ANIMALS IN RENAL DISEASE

- Blazina, C., Boyraz, G., & Shen-Miller, D. (2011). Introduction: Using context to inform clinical practice and research. In C. Blazina., G. Boyraz., & D. Shen-Miller (Eds.), *The psychology of the human-animal bond: A resource for clinicians and researchers* (pp. 3-24). Springer. <https://doi-org.proxy.library.adelaide.edu.au/10.1007/978-1-4419-9761-6>
- Bluen, B., Kiljanek, L., Schlecht, H., Fuentes, M., Krevolin, K., & Krevolin, L. (2016). Peritoneal dialysis and pet bite-related peritonitis: First reported case of Rhizobium radiobacter infection from a cat bite. *American Journal of Kidney Diseases*, 69(4), A30-A30. <https://coek.info/pdf-peritoneal-dialysis-and-pet-biterelated-peritonitis-first-reported-case-of-rhizo.html>
- Bowlby, R., & King, P. (2004). Fifty years of attachment theory: The Donald Winnicott memorial lecture. Taylor & Francis Group.
<https://ebookcentral.proquest.com/lib/adelaide/detail.action?docID=689890&pq-origsite=primo>
- Bradley, L., & Bennett, P. C. (2015). Companion-animals' effectiveness in managing chronic pain in adult community members. *Anthrozoös: A Multidisciplinary Journal of The Interactions of People & Animals*, 28(4), 635-347. <https://doi-org.proxy.library.adelaide.edu.au/10.1080/08927936.2015.1070006>
- Braun, V., & Clarke, V. (2006). Using thematic analysis in psychology. *Qualitative Research in Psychology*, 3(2), 77-101. <https://doi.org/10.1191/1478088706qp063oa>
- Braun, V., & Clarke, V. (2013). *Successful qualitative research: A practical guide for beginners*. SAGE.

ANIMALS IN RENAL DISEASE

- Brooks, H. L., Rogers, A., Kapadia, D., Pilgrim, J., Reeves, D., & Vassilev, I. (2013). Creature comforts: Personal communities, pets and the work of managing a long-term condition. *Chronic Illness*, 9(2), 87-102. <https://doi.org/10.1177/1742395312452620>
- Broughton, A., Verger, C., & Goffin, E. (2010). Pets-related peritonitis in peritoneal dialysis: Companion animals or trojan horses? *Seminars in dialysis*, 23(3), 306-316. <https://doi-org.proxy.library.adelaide.edu.au/10.1111/j.1525-139X.2010.00726.x>
- Burles, M. C., & J. M. G. Bally. (2018). Ethical, practical, and methodological considerations for unobtrusive qualitative research about personal narratives shared on the internet. *International Journal of Qualitative Methods*, 17(1). <https://doi.org/10.1177/1609406918788203>
- Center for Food Security and Public Health. (2008). *Routes of disease transmission: Companion animals* [Pamphlet]. Iowa State University. http://www.cfsph.iastate.edu/Zoonoses_Textbook/Assets/routes_of_disease_transmission_CA.pdf
- Center for Food Security and Public Health. (2013a). *Zoonotic disease precautions for immunocompromised individuals* [Pamphlet]. Iowa State University. http://www.cfsph.iastate.edu/Zoonoses_Textbook/Assets/additional_precautions_immunocompromised.pdf
- Center for Food Security and Public Health. (2013b). *Zoonotic disease precautions for pet reptile and amphibian owners* [Pamphlet]. Iowa State University. http://www.cfsph.iastate.edu/Zoonoses_Textbook/Assets/general_precautions_for_pet_reptile_owners.pdf

ANIMALS IN RENAL DISEASE

- Chur-Hansen, A., Stern, C., & Winefield, H. (2010). Gaps in the evidence about companion animals and human health: Some suggestions for progress. *International Journal of Evidence-based Healthcare*, 8(3), 140-146. <https://doi.org/10.1111/j.1744-1609.2010.00176.x>
- Cristóvão, F. (1999). Stress, coping and quality of life among chronic haemodialysis patients. *Journal of Renal Care*, 25(4), 36-39. <https://doi.org/10.1111/j.1755-6686.1999.tb00062.x>
- Curl, A. L., Bobbo, J., & Johnson, R. A. (2017). Dog walking, the human-animal bond and older adults' physical health. *The Gerontologist*, 57(5), 930-939. <https://doi-org.proxy.library.adelaide.edu.au/10.1093/geront/gnw051>
- Dowsett, E., Delfabbro, P., & Chur-Hansen, A., (2020). Adult separation anxiety disorder: The human-animal bond. *Journal of Affective Disorders*, 270, 90-96. <https://doi.org/10.1016/j.jad.2020.03.147>
- Duvall Antonacopoulos., N. M., & Pychyl, T. A. (2010). The possible role of companion-animal anthropomorphism and social support in the physical and psychological health of dog guardians. *Society & Animals*, 18(4), 389-395. <https://doi-org.proxy.library.adelaide.edu.au/10.1163/156853010X524334>
- Farrokhi, F., Abedi, N., Beyene, J., Kurdyak, P., & Jassal, D. V. (2014). Association between depression and mortality in patients receiving long-term dialysis: A systematic review and meta-analysis. *American Journal of Kidney Diseases*, 63(4), 623-635.
- Fitzgerald, A. J. (2007). "They gave me a reason to live": The protective effects of companion animals on the suicidality of abused women. *Humanity & Society*, 31(4), 355-378. <https://doi-org.proxy.library.adelaide.edu.au/10.1177/016059760703100405>

ANIMALS IN RENAL DISEASE

- Friedmann, E., & Thomas, S. A. (1995). Pet ownership, social support, and one-year survival after acute myocardial infarction in the Cardiac Arrhythmia Suppression Trial (CAST). *The American Journal of Cardiology*, *76*(17), 1213-1217. [https://doi.org/10.1016/s0002-9149\(99\)80343-9](https://doi.org/10.1016/s0002-9149(99)80343-9)
- Friedmann, E., Thomas, S., Son, H., Chapa, D., & McCune, S. (2013). Pet's presence and owner's blood pressures during the daily lives of pet owners with pre- to mild hypertension. *Anthrozoös: A Multidisciplinary Journal of The Interactions of People & Animals*, *26*(4), 535-550. <https://doi.org/10.2752/175303713X13795775536138>
- Graneheim, U. H., & Lundman, B. (2004). Qualitative content analysis in nursing research. Concepts, procedures and measures to achieve trustworthiness. *Nurse Education Today*, *24*(2), 105-112. <https://doi.org/10.1016/j.nedt.2003.10.001>
- Halm, M. A. (2008). The healing power of the human-animal connection. *American Journal of Critical Care*, *17*(4), 373-376. <http://dx.doi.org.proxy.library.adelaide.edu.au/10.4037/ajcc2008.17.4.373>
- Hether, H., Murphy, S. T., & Valente, T. W. (2014). It's better to give than to receive: The role of social support, trust, and participation on health-related social networking sites. *Journal of Health Communication*, *19*(12), 1424-1439. <https://doi-org.proxy.library.adelaide.edu.au/10.1080/10810730.2014.894596>
- Hill, N.R., Fatoba, S. T., Oke, J. L., Hirst, J. A., O'Callaghan, C. A., Lasserson, D. S., & F. D. R. Hobbs. (2016). Global prevalence of chronic kidney disease – A systematic review and meta-analysis. *PLoS ONE*, *11*(7), 1932-6203. <https://doi.org/10.1371/journal.pone.0158765>

ANIMALS IN RENAL DISEASE

- Hines, L. M. (2003). Historical perspectives on the human-animal bond. *American Behavioral Scientist*, 47(1), 7-15. <https://doi-org.proxy.library.adelaide.edu.au/10.1177/0002764203255206>
- Hsieh, H. F., & Shannon, S. E. (2005). Three approaches to qualitative content analysis. *Qualitative Health Research*, 15(9), 1277-1288. <https://doi.org/10.1177/1049732305276687>
- Hughes, M. J., Verreynne, M-L., Harpur, P., & Pachana, N. A. (2020). Companion animals and health in older populations: A systematic review. *Clinical Gerontologist*, 43(4), 365-377. <https://doi-org.proxy.library.adelaide.edu.au/10.1080/07317115.2019.1650863>
- Human Animal Bond Research Institute. (2014). *Family physician survey: Pets and health*. Retrieved from <https://habri.org/2014-physician-survey>
- Human Animal Bond Research Institute. (2020a). *About HABRI*. Retrieved from <https://habri.org/about/>
- Human Animal Bond Research Institute. (2020b). *Research: Understanding the human-animal bond*. Retrieved from <https://habri.org/research/>
- Hutton, V. (2019). *A reason to live: HIV and companion animals*. Purdue University Press. <https://www.jstor.org/stable/j.ctvh9w1pp>
- I Hate Dialysis. (n.d.). *About*. Retrieved September 16, 2020, from <http://ihatedialysis.com/about.htm>
- Irvin, S. (2014). The healing role of assistance dogs: What these partnerships tell us about the human-animal bond. *Animal Frontiers* 4(3), 66-71. <https://doi.org/10.2527/af.2014-0024>

ANIMALS IN RENAL DISEASE

Jeanes, E. (2019). *A dictionary of organizational behaviour* (1st ed.). Oxford University Press

<https://doi.org/10.1093/acref/9780191843273.001.0001>

Jesus, N. M., de Souza, G.F., Mendes-Rodrigues, C., de Almeida Neto, O. P., Rodrigues, D. D.

M., & Cunha, C. M. (2019). Quality of life of individuals with chronic kidney disease on dialysis. *Brazilian Journal of Nephrology*, *41*(3), 364-374. <https://doi.org/10.1590/2175-8239-jbn-2018-0152>

Kabel, A., Khosla, N., & Teti, M. (2015). The dog narratives: Benefits of the human-animal

bond for women with HIV. *Journal of HIV/AIDS & Social Services*, *14*(4), 405-416.

<https://doi.org/10.1080/15381501.2013.860069>

Kidney Health Australia. (2020a). *Choosing your treatment*. Retrieved from

<https://kidney.org.au/your-kidneys/treatment>

Kidney Health Australia. (2020b). *Dialysis: Key facts*. Retrieved from

<https://kidney.org.au/your-kidneys/treatment/dialysis-key-facts>

Kidney Health Australia. (2020c). *Kidney transplants*. Retrieved from

<https://kidney.org.au/your-kidneys/treatment/kidney-transplants>

Kidney Health Australia. (2020d). *New to kidney disease*. Retrieved from

<https://kidney.org.au/your-kidneys/what-is-kidney-disease>

Kidney Health Australia. (2020e). *Types of kidney disease*. Retrieved from

<https://kidney.org.au/your-kidneys/what-is-kidney-disease/types-of-kidney-disease>

LaFollette, M., Rodriguez, K. E., Ogata, N., & O'Haire, M. (2019). Military veterans and their

PTSD service dogs: Associations between training methods, PTSD severity, dog

ANIMALS IN RENAL DISEASE

behavior, and the human-animal bond. *Frontiers in Veterinary Science*, 6(23).

<https://doi.org/10.3389/fvets.2019.00023>

Lee, J. T., Yang, M. C., & Rim, H. C. (2014). Discovering high-quality threaded discussions in online forums. *Journal of Computer Science and Technology*, 29(3), 519-531.

<https://doi.org/10.1007/s11390-014-1446-5>

Levine, G. N., Allen, K., Braun, L. T., Christian, H. E., Friedmann, E., Taubert, K. A., ... Lange, R. A. (2013). Pet ownership and cardiovascular risk: A scientific statement from the American Heart Association. *Circulation*, 127(23), 2353-2363.

<https://doi.org/10.1161/CIR.0b013e31829201e1>

Malinen, S. (2015). Understanding user participation in online communities: A systematic literature review of empirical studies. *Computers in Human Behaviour*, 46, 228-238.

<https://doi.org/10.1016/j.chb.2015.01.004>

McConnell, A., Brown, C., Shoda, T., Stayton, L., & Martin, C. (2011). Friends with benefits: On the positive consequences of pet ownership. *Journal of Personality and Social Psychology*, 101(6), 1239–1252. <https://doi.org/10.1037/a0024506>

Meehan, M., Massavelli, B., & Pachana, N. (2017). Using attachment theory and social support theory to examine and measure pets as sources of social support and attachment figures. *Anthrozoös: A Multidisciplinary Journal of The Interactions of People and Animals*, 30(2), 273-289. <https://doi.org/10.1080/08927936.2017.1311050>

Miller, S. C., Kennedy, C. C., DeVoe, D. C., Hickey, M., Nelson, T., & Kogan, L. (2015). An examination of changes in oxytocin levels in men and women before and after interaction

ANIMALS IN RENAL DISEASE

with a bonded dog. *Anthrozoös: A Multidisciplinary Journal of The Interactions of People & Animals*, 22(1), 31-42. <https://doi.org/10.2752/175303708X390455>

Mu, H., Yang, M., Zhang, Y., Zhang, Y., Wang, J., Yuan, W., & Rong, S. (2020). Pet-related *Pasteurella multocida* induced peritonitis in peritoneal dialysis: a case report and review of the literatures. *BMC Nephrology*, 21, 1-8. <https://doi.org/10.1186/s12882-020-01765-1>

Nick, E. A., Cole., D. A., Cho, S. J., Smith, D. K., Carter, G., T., & Zelkowitz. (2019). The online social support scale: Measure development and validation. *Psychological Assessment*, 30(9), 1127-1143. <https://doi.org/10.1037/pas0000558>

Phung, A., Joyce, C., Ambutas, S., Browning, M., Fogg, L., Christopher, B-A., & Flood, S. (2017). Animal-assisted therapy for inpatient adults. *Nursing*, 47(1), 63-66. <https://doi.org/10.1097/01.NURSE.0000504675.26722.d8>

Preece, J., Nonnecke, B., & Andrews, D. (2004). The top five reasons for lurking: Improving community experiences for everyone. *Computers in Human Behaviour*, 20(2), 201-223. <https://doi.org/10.1016/j.chb.2003.10.015>

Price, V. L. (2015). Learning and behavior modification. In J. Shaw & D. Martin (Eds.), *Canine and feline behavior for veterinary technicians and nurses* (pp. 113-144). John Wiley & Sons, Inc. <https://ebookcentral.proquest.com/lib/adelaide/detail.action?docID=1816954#>

Queensland Health. (2014). *Animal contact guidelines – reducing the risk to human health*, 2014. Retrieved from https://www.health.qld.gov.au/__data/assets/pdf_file/0023/444371/zoo-guidelines.pdf

ANIMALS IN RENAL DISEASE

Roberts, L. D. (2015). Ethical issues in conducting qualitative research in online communities.

Qualitative Research in Psychology, 12(3), 314-325.

<https://doi.org/10.1080/14780887.2015.1008909>

Rogers, B. L., & Cowles, K. V. (1993). The qualitative research audit trail: A complex collection of documentation. *Research in Nursing & in Health*, 16(3), 219-226.

<https://doi.org/10.1002/nur.4770160309>

Sable, P. (2013). The pet connection: An attachment perspective. *Clinical Social Work Journal*, 41(1), 93-99. <https://doi-org.proxy.library.adelaide.edu.au/10.1007/s10615-012-0405-2>

Schiller, B., Alcaraz, M., Hadley, K., & Moran, J. (2011). Peritonitis and zoonosis: Your best friend sometimes isn't! *Peritoneal Dialysis International*, 31(2), 127-130. <https://doi-org.proxy.library.adelaide.edu.au/10.3747/pdi.2009.00266>

Schneider, T. R., Lyons, J. B., Tetrick, M. A., & Accortt, E. E. (2010). Multidimensional quality of life and human-animal bond measures for companion dogs. *Journal of Veterinary Behavior*, 5(6), 287-301. <https://doi.org/10.1016/j.jveb.2010.06.002>

Sedlacek, M., Cotter, J. G., Suriawinata, A. A., Kanecko, T. M., Zuckerman, R. A., Parsonnet, J., & Block, C. A. (2008). Mucormycosis peritonitis: More than 2 years of disease-free follow-up after posaconazole salvage therapy after failure of liposomal amphotericin B. *American Journal of Kidney Disease*, 51(2), 302-306.

<https://doi.org/10.1053/j.ajkd.2007.09.026>

Silcox, D., Castillo, Y. A., & Reed, B. J. (2014). The human animal bond: Applications for rehabilitation professionals. *Journal of Applied Rehabilitation Counseling*, 45(3), 27-37.

<https://doi.org/10.1891/0047-2220.45.3.27>

ANIMALS IN RENAL DISEASE

Thayalan, X., & Shanthi, A. (2011). Qualitative assessment of social presence in online forums.

IEEE Colloquium on Humanities, Science and Engineering (CHUSER), 407-711.

<https://doi.org/10.1109/CHUSER.2011.6163761>

Vaismoradi, M., & Snelgrive, S. (2019). Theme in qualitative content analysis and thematic

analysis. *Forum: Qualitative Social Research*, 20(3). [https://doi.org/10.17169/fqs-](https://doi.org/10.17169/fqs-20.3.3376)

20.3.3376

White, C., & McDonnell, H. (2014). Psychosocial distress in patients with end-stage kidney

disease. *Journal of Renal Care*, 40(1), 74-81. [https://doi-](https://doi-org.proxy.library.adelaide.edu.au/10.1111/jorc.12054)

[org.proxy.library.adelaide.edu.au/10.1111/jorc.12054](https://doi-org.proxy.library.adelaide.edu.au/10.1111/jorc.12054)

Zhou, Y., & Yang, J. (2020). Chronic kidney disease: Overview. In J. Yang & W. He (Eds.),

Chronic kidney disease: Diagnosis and treatment (1st ed., pp. 3-12). Springer. [https://doi-](https://doi-org.proxy.library.adelaide.edu.au/10.1007/978-981-32-9131-7_1)

[org.proxy.library.adelaide.edu.au/10.1007/978-981-32-9131-7_1](https://doi-org.proxy.library.adelaide.edu.au/10.1007/978-981-32-9131-7_1)

Zinn, S. A., & Beck, A. M. (2014). From the Editors: The human-animal bond and

domestication: Through the ages ... animals in our lives. *Animal Frontiers*, 4(3), 5-6.

<https://doi-org.proxy.library.adelaide.edu.au/10.2527/af.2014-0016>

ANIMALS IN RENAL DISEASE

Appendix: Categories, Codes and Subcodes, Companion and Non-Companion Animals

Category	Code	Subcode	Count	% of Total	
Positive Influence and Connection with Companion Animals	Companionship	Love/Affection Towards Owner	32	3.9	
		Best friend/Like Family/Soulmate	30	3.6	
		Grieving Companion Animal	26	3.1	
		Sleeping in Bed with Companion Animal	26	3.1	
		Emotional Support/Comfort	17	2	
		Love/Affection Towards Companion Animal	14	1.7	
		Sadness/Fear about Giving Up/Losing Companion Animal	11	1.3	
	Biopsychosocial Benefits	Relationship with Companion Animal as Strong/Stronger than People	6	0.7	
		Importance of Companion Animal	5	0.6	
		Psychological Benefit	16	1.9	
		Companion Animals are Healing	12	1.4	
		Physiological Benefit	6	0.7	
		Social Benefit	2	0.2	
		Loyalty	Refusal to Give up Companion Animal	11	1.3
			Loyalty to Owner	6	0.7
Companion Animal Being Protective	3		0.4		

ANIMALS IN RENAL DISEASE

Category	Code	Subcode	Count	% of Total
	Companion Animals'	Companion Animal Knows When Owner Unwell	11	1.3
	Intuition	Companion Animal Understands	9	1.1
	Companion Animals as Life	Companion Animal a Reason to Live	13	1.6
	Motivating	Companion Animal Motivating	6	0.7
Risk of Companion and Non- Companion Animals	Zoonotic Disease	Concern for Infection/Peritonitis	29	3.5
		Kitty Litter/Animal Faeces	22	2.7
		Birds, Reptiles and Rodents Big Risk	21	2.5
		Hair/Dander	20	2.4
		Animals are Dirty/Carry Disease	19	2.3
		Immunosuppression	10	1.2
		Animal Biting and Scratching	9	1.1
		Contracted Companion Animal Related Infection	4	0.5
		Animal Influencing Treatment Decision	3	0.4
	Companion Animals'	Companion Animal Curious About Home	26	3.1
	Behaviour with Dialysis	Dialysis/Interfere with Equipment		
		Companion Animal Not Curious About Home	15	1.8
		Dialysis/Do Not Interfere with Equipment		
		Cat Likes to Lay on Fistula	4	0.5
	Interacting with Non- Companion Animals	Interacting with Wildlife Risky for Infection	6	0.7
		Working with Animals No Issue	4	0.5

ANIMALS IN RENAL DISEASE

Category	Code	Subcode	Count	% of Total	
Human and Animal Adaptation	Managing Companion Animals with Treatment/Transplant	Managing Hygiene Precautions Around Companion and Other Animals	65	7.8	
		Restricting Companion Animals Near Dialysis	36	4.3	
		Routine Modifications/Physical Adjustments to Allow Companion Animals and Treatment	17	2	
		Companion Animals Allowed Near Dialysis	10	1.2	
		Companion Animal Care to Reduce Infection Risk	6	0.7	
		Lifestyle Restrictions with Companion and Non-Companion Animals	17	2	
		Now Restricted from Doing Still Doing	9	1.1	
		Companion Animals' Adjustment	17	2	
	Patients' Point of View	Justification of Companion Animal Ownership	Owned Companion Animals with No Infection	37	4.5
			Pets Acceptable with Dialysis/Transplant Given Precautions	16	1.9
		Infection Not Caused by Companion Animal	11	1.3	
		Children/People an Equal or Greater Infection Risk	10	1.2	
		Previously Exposed to Companion Animal Germs	8	0.9	
		Companion and Non-Companion Animals in Dialysis	10	1.2	
		Acceptance of Therapy Animals in Dialysis Clinic	8	0.9	
		Acceptance of Service Animals in Dialysis Clinic	7	0.8	

ANIMALS IN RENAL DISEASE

Category	Code	Subcode	Count	% of Total
		Disagreement with Companion Animals in Dialysis Clinic	5	0.6
		Acceptance of Companion Animals in Dialysis Clinic	4	0.5
		Disagreement with Service Animals in Dialysis Clinic	3	0.4
Health Professionals' Point of View	Health Professional Attitudes Towards Companion Animals	Health Professional Accepting of Companion Animals	20	2.4
		Health Professional Disapproving of Companion Animals	18	2.2
		Animosity Towards Healthcare Professionals' Attitude Towards Companion Animals	9	1.1
	Health Professional Advice	Companion Animals Acceptable with Transplant	17	2
		No Animal Contact/New Companion Animals for a While After Transplant	10	1.2
		Never Told to Avoid Animals with Transplant	3	0.4
		Avoid Animals with Transplant	2	0.2
		Companion Animals Acceptable with Home Dialysis	1	0.1
Total			830	100

Note. Percentage rounded to 100%.