

Impact of canine atopic dermatitis on the health-related quality of life of affected dogs and quality of life of their owners

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Abstract

Atopic dermatitis is a chronic or chronically relapsing human and canine skin disease that adversely affects the quality of life of affected individuals. The impact of the disease on affected children and their parents has been extensively studied, but very little is known of its impact on affected animals and their owners. The goal of the present study was to fill this gap. Owners were asked to complete three questionnaires concerning their own quality of life, their perception of the treatment provided and their pets' quality of life. Clinical features, such as severity index, pruritus score and disease duration, were evaluated in parallel and correlated with the questionnaire answers. The study not only demonstrated that canine atopic dermatitis deeply influenced the way of life of the owners of affected dogs but also in which aspects of life the impact was most severe.

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Introduction

Atopic dermatitis (AD) is a chronic or chronically relapsing human skin disease that adversely influences the quality of life (QoL) of affected human individuals.¹ Several questionnaire-based studies have been conducted to assess the QoL of parents of children with AD and the children themselves.^{2–4}

In veterinary medicine, in contrast, QoL is a concept developed initially to measure some aspects of nonphysical animal life and to guide decisions about aggressive treatment or euthanasia.⁵ At present, however, there is

no accepted definition or methodology for its assessment in companion animals. The discussion is further complicated by the unclear use of different terms, such as welfare or wellbeing. Taylor and Mills recently reviewed these concepts and proposed distinct definitions of QoL and health-related QoL (HRQoL).⁶ Quality of life was defined as 'the state of an individual animal's life as perceived by it at any one point in time. It is experienced as a sense of well-being which involves the balance between negative and positive states and any cognitive evaluation of these, where the animal has the capacity', while HRQoL corresponds to 'the individual subjective perception of the impact of health status, including disease and treatment, on physical, psychological and social functioning'.⁶

The goal of the present study was to describe the impact of canine atopic dermatitis on the HRQoL of affected dogs, the QoL of their owners and their confidence in the current and future treatment influencing these two parameters.

Materials and methods

Questionnaires were completed by 98 successive owners of atopic dogs in Hamburg, Germany and Zurich, Switzerland. These were composed of three overall assessment questions (OVA) followed by 36 supplementary questions related to OVA, (see Appendix 1). Questionnaire OVA1 and the first 16 questions were related to the QoL of the owners, while OVA2 and the following 14 questions were designed to assess HRQoL of affected animals. Questionnaire OVA3 and six further questions were aimed at evaluation of the perception of the efficacy of treatment options by the owners. Questionnaires were usually completed during the first consultation at the author's practice and most of the cases were second- or third-opinion referrals. Owners were instructed to base their answers on their most recent perception. In parallel, other aspects of the disease, namely clinical score canine atopic dermatitis extension and severity index (CADESI-03), pruritus score and duration of the disease, were assessed during this initial consultation.^{7,8} Previous and ongoing treatments were recorded. An owner–pet relation score (OPRS) was created in an attempt to evaluate the social link between owner and dog (see Appendix 2). The higher the score (–8 to +8) the tighter the link between them.⁹ The impact of these parameters on QoL and HRQoL, respectively, was studied using Spearman's rank correlation test (Table 1). When a significant correlation was found, percentages from two different severities (CADESI > 60, corresponding to moderate and severe forms; and pruritus > 5, corresponding to severe pruritus), durations (less/more than 18 months) and OPRS groups (OPRS > 3, corresponding to a very tight relationship) were compared (Table 2). In Table 2, answers 'strongly agree' and 'agree' were plotted together in the 'agree' group, while 'strongly disagree' and 'disagree' were plotted in the 'disagree' group. A more detailed presentation of some of the results has been described in a previous study.⁹

Table 1. Correlations between clinical features, owner–pet relation score (OPRS) and owners' answers to QoL questions

Question	CADESI correlation (<i>P</i> -value)	Pruritus correlation (<i>P</i> -value)	OPRS correlation (<i>P</i> -value)	Duration correlation (<i>P</i> -value)
OVA1	0.25 (0.01)	0.11 (n.s.)	0.26 (0.01)	0.14 (n.s.)
Q1	−0.16 (n.s.)	−0.14 (n.s.)	<0.1 (n.s.)	<0.1 (n.s.)
Q2	0.14 (n.s.)	<0.1 (n.s.)	0.13 (n.s.)	<0.1 (n.s.)
Q3	<0.1 (n.s.)	<0.1 (n.s.)	<0.1 (n.s.)	<0.1 (n.s.)
Q4	0.12 (n.s.)	<0.1 (n.s.)	<0.1 (n.s.)	<0.1 (n.s.)
Q5	0.11 (n.s.)	0.2 (0.04)	0.23 (0.02)	<0.1 (n.s.)
Q6	0.13 (n.s.)	<0.1 (n.s.)	<0.1 (n.s.)	<0.1 (n.s.)
Q7	0.25 (0.01)	0.33 (0.0009)	0.19 (n.s.)	<0.1 (n.s.)
Q8	0.29 (0.003)	0.34 (0.0001)	<0.1 (n.s.)	<0.1 (n.s.)
Q9	0.17 (n.s.)	0.15 (n.s.)	<0.1 (n.s.)	<0.1 (n.s.)
Q10	0.13 (n.s.)	<0.1 (n.s.)	<0.1 (n.s.)	<0.1 (n.s.)
Q11	<0.1 (n.s.)	<0.1 (n.s.)	<0.1 (n.s.)	0.22 (0.02)
Q12	0.27 (0.007)	0.11 (n.s.)	<0.1 (n.s.)	0.2 (0.04)
Q13	<0.1 (n.s.)	0.13 (n.s.)	<0.1 (n.s.)	<0.1 (n.s.)
Q14	0.29 (0.003)	0.13 (n.s.)	0.18 (n.s.)	0.11 (n.s.)
Q15	<0.1 (n.s.)	0.17 (n.s.)	<0.1 (n.s.)	<0.1 (n.s.)
Q16	<0.1 (n.s.)	<0.1 (n.s.)	<0.1 (n.s.)	<0.1 (n.s.)
OVA2	0.33 (0.0009)	0.24 (0.02)	0.18 (n.s.)	<0.1 (n.s.)
Q17	<0.1 (n.s.)	0.35 (0.0005)	<0.1 (n.s.)	<0.1 (n.s.)
Q18	<0.1 (n.s.)	0.33 (0.0009)	<0.1 (n.s.)	0.1 (n.s.)
Q19	0.26 (0.01)	0.34 (0.0001)	0.11 (n.s.)	<0.1 (n.s.)
Q20	0.32 (0.001)	0.47 (<0.0001)	<0.1 (n.s.)	<0.1 (n.s.)
Q21	−0.17 (n.s.)	−0.39 (0.0001)	0.11 (n.s.)	<0.1 (n.s.)
Q22	−0.22 (n.s.)	−0.27 (0.007)	<0.1 (n.s.)	0.18 (n.s.)
Q23	−0.2 (n.s.)	−0.39 (0.0001)	0.11 (n.s.)	0.12 (n.s.)
Q24	0.22 (n.s.)	0.28 (0.006)	<0.1 (n.s.)	0.1 (n.s.)
Q25	0.16 (n.s.)	0.35 (0.0005)	<0.1 (n.s.)	<0.1 (n.s.)
Q26	<0.1 (n.s.)	0.42 (<0.0001)	<0.1 (n.s.)	<0.1 (n.s.)
Q27	0.19 (n.s.)	<0.1 (n.s.)	0.29 (0.003)	0.14 (n.s.)
Q28	0.18 (n.s.)	0.28 (0.006)	0.14 (n.s.)	0.15 (n.s.)
Q29	0.11 (n.s.)	<0.1 (n.s.)	−0.2 (0.04)	0.15 (n.s.)
Q30	0.34 (0.001)	0.42 (<0.0001)	<0.1 (n.s.)	0.17 (n.s.)
OVA3	−0.17 (n.s.)	0.32 (0.001)	<0.1 (n.s.)	<0.1 (n.s.)
Q31	0.14 (n.s.)	<0.1 (n.s.)	<0.1 (n.s.)	0.1 (n.s.)
Q32	<0.1 (n.s.)	0.32 (0.001)	0.22 (0.02)	0.15 (n.s.)
Q33	<0.1 (n.s.)	<0.1 (n.s.)	<0.1 (n.s.)	0.11 (n.s.)
Q34	<0.1 (n.s.)	<0.1 (n.s.)	−0.11 (n.s.)	0.12 (n.s.)
Q35	<0.1 (n.s.)	<0.1 (n.s.)	<0.1 (n.s.)	<0.1 (n.s.)
Q36	0.14 (n.s.)	<0.1 (n.s.)	<0.1 (n.s.)	<0.1 (n.s.)

Spearman's rank correlation; *P*-value < 0.05 considered significant; n.s., not significant.

Results

Information about the study population

Owners of 98 successive atopic dogs completed the questionnaire. Age, CADESI-03, pruritus score, OPRS and duration of the disease were recorded for each dog and are summarized in Table 3. The male:female ratio was 47:51, and there were 14 different breeds. Most of the dogs were receiving treatment at the start of the study. Treatments included systemic and topical glucocorticoids, allergen-specific immunotherapy, ciclosporin, tacrolimus, topical and systemic antibiotics, topical and systemic anti-fungal drugs, essential fatty acids, shampoos, anti-histamines and homoeopathy, alone or in combination.

Owners' quality of life

Questionnaire OVA1 showed that 48% of the owners considered that atopic dermatitis had an impact on their own QoL. Answers were correlated with the clinical score (the higher the CADESI, the higher the impact on the QoL) and the OPRS (the closer the relationship, the

more affected the QoL), but not by the pruritus or the duration of the disease. Sixty-two per cent of the owners of dogs with a CADESI score higher than 60 and 58% of those having an OPRS above 3 considered that the disease in their dog had an impact on their own QoL. Considering individual questions (Table 2), 80% of the owners were sad (question 7) because of the dog's disease. This figure reached 89% when the pruritus score was higher than 5. Interestingly, very few owners (≤1%) regretted having the dog or considered euthanasia as an option (questions 6 and 10). Furthermore, the disease rarely (<10%) affected the positive feelings associated with the presence of the dog (questions 1–3). Normal family life and leisure activities (questions 8 and 12) were equally affected by the disease (15–17% of the owners), and 35% stated that the disease disturbed their sleep (question 5). Sleep disturbances were more obvious in owners of dogs with pruritus scores above 5 or OPRS above 3 (very often dogs sleeping in the owner's bedroom). The disease did not deeply affect the relationships (question 11) with friends or the leisure activities (question 9), nor

Table 2. Answers of owners to QoL questionnaire

Question	All dogs (n = 98)		Disagree (%)	Agree (%)	CADESI ≤60 (n = 48) %dis;%agr	CADESI >60 (n = 50) %dis;%agr	Pruritus ≤5 (n = 37) %dis;%agr	Pruritus >5 (n = 61) %dis;%agr	OPRS ≤3 (n = 43) %dis;%agr	OPRS >3 (n = 55) %dis;%agr	Duration ≤18 months (n = 39) %dis;%agr	Duration >18 months (n = 59) %dis;%agr
OVA1	36	48			50;35	22;62	-	-	47;29	35;58	-	-
Q1	1	97			-	-	-	-	-	-	-	-
Q2	0	100			-	-	-	-	-	-	-	-
Q3	3	90			-	-	-	-	-	-	-	-
Q4	50	32			-	-	-	-	-	-	-	-
Q5	57	35			-	-	68;22	51;44	77;23	45;45	-	-
Q6	96	0			-	-	-	-	-	-	-	-
Q7	10	80			10;81	8;90	19;65	8;89	-	-	-	-
Q8	63	17			67;6	54;30	76;3	57;28	-	-	-	-
Q9	66	16			-	-	-	-	-	-	-	-
Q10	99	1			-	-	-	-	-	-	-	-
Q11	97	2			-	-	-	-	-	-	100;0	95;3
Q12	77	15			83;6	58;24	-	-	-	-	87;8	69;20
Q13	94	2			-	-	-	-	-	-	-	-
Q14	91	7			96;2	84;14	-	-	-	-	-	-
Q15	73	11			-	-	-	-	-	-	-	-
Q16	40	41			-	-	-	-	-	-	-	-
OVA2	8	73			12;77	3;94	14;73	5;93	-	-	-	-
Q17	42	42			-	-	50;30	39;49	-	-	-	-
Q18	48	43			-	-	57;32	43;49	-	-	-	-
Q19	85	11			73;12	22;66	92;0	70;16	-	-	-	-
Q20	29	60			96;2	76;20	38;40	20;74	-	-	-	-
Q21	13	69			-	-	0;86	20;61	-	-	-	-
Q22	8	86			-	-	5;92	10;83	-	-	-	-
Q23	16	70			-	-	0;89	26;61	-	-	-	-
Q24	65	13			-	-	76;5	61;18	-	-	-	-
Q25	61	25			-	-	78;11	51;34	-	-	-	-
Q26	58	22			-	-	78;11	50;31	-	-	-	-
Q27	8	85			-	-	-	-	7;88	9;83	-	-
Q28	49	36			-	-	59;22	34;41	-	-	-	-
Q29	88	13			-	-	-	-	84;16	93;7	-	-
Q30	45	28			60;21	36;32	68;15	36;33	-	-	-	-
OVA3	20	52			-	-	5;62	28;38	-	-	-	-
Q31	3	80			-	-	-	-	-	-	-	-
Q32	36	43			-	-	46;27	28;48	-	-	-	-
Q33	33	47			-	-	-	-	-	-	-	-
Q34	14	70			-	-	-	-	-	-	-	-
Q35	29	36			-	-	-	-	-	-	-	-
Q36	94	0			-	-	-	-	-	-	-	-

Percentages corresponding to different severity, duration or OPRS groups were compared only if a significant correlation between the question and the parameter had been uncovered (Table 1). The percentages disagreeing (%dis) or agreeing (%agr) are percentages of the whole sample.

Table 3. Information about the atopic dog population

	Mean	Standard deviation	Range
Age (years)	5.6	3.4	0.5–14
CADESI-03	70.7	58.3	4–280
Pruritus	5.8	2.09	2.5–10
OPRS	3.76	1.9	1–7
Duration (months)	28.1	27.2	3–144

OPRS, owner-pet relationship score

did it seem to limit the social interactions of the dog itself (question 13); in fact, only two out of 98 owners (2%) answered 'agree' or 'strongly agree' to these questions.

The appearance of the dog (question 14) embarrassed in total only 7% of the owners; it showed, however, a clear relationship to CADESI. Behaviours associated with pruritus made 11% of the owners more aggressive (question 15). Finally, the disease influenced the QoL of owners in two other aspects: the treatment was considered a major burden for 32% of them (question 4), and 41% had to limit other expenses (question 16).

Dog's quality of life

Questionnaire OVA2 demonstrated that 73% of the owners considered that the disease had a major impact on the HRQoL of their dogs. This perception was affected by the extent of pruritus and CADESI but not by the OPRS or the duration of the disease. In fact, more than 90% of the owners of dogs with CADESI higher than 60 and/or a pruritus score above 5 stated that the disease impacted on the HRQoL of their pets. The normal activities of the dog were differently affected (questions 17–20); very few owners (11%) remarked that the dog interrupted eating because of the pruritus, while quite a lot (42, 43 and 60%) saw a negative influence of the pruritus on playing, walking and sleeping, respectively. This perception was generally worse in owners of severely affected dogs. Despite these latter remarks, owners considered their pets in general to be happy and playful (questions 21 and 22). Disease negatively affected the behaviour and mood of the dog for 13 of 98 owners, while 22 (question 26) and 25 (question 25) considered that their dog was tired or restless, respectively. The more severe the pruritus, the more often were these behavioural changes reported. The HRQoL of dogs was also affected by the disapproval (question 27) of their owners (85%) and the reduced duration or frequency (question 29) of walks (13% of the owners). Last but not least, 36% of the owners considered that treatment was a major burden for their dog and 28% observed side effects (questions 28 and 30). These proportions increased with the severity of pruritus.

Perceptions about treatment

Questionnaire OVA3 showed that only 52% of the owners considered that the treatment was able to improve the dog's condition permanently, while 20 of 98 were of the opposite opinion. The proportion of confident owners decreased dramatically when owners of severely pruritic dogs were considered separately (dogs with higher pruritus scores). Most of the owners were convinced that the treatment was effective (question 31; 80% answered

'agree' or 'strongly agree'), but many were concerned about side effects (question 32; 42 of 98). Most of the owners had understood and accepted that atopic dermatitis would require a life-long treatment (question 34; 70%), but many owners felt uncertain about which method of treatment was the right one (question 35; 35 of 98 answered 'agree' or 'strongly agree'). As mentioned above, treatment costs were a concern for about 47% of the owners (question 33; 46 of 98).

Discussion

This study confirms the impression of most veterinary dermatologists and general practitioners that canine atopic dermatitis deeply and negatively influences the HRQoL of affected dogs and the QoL of many owners.

The study clearly shows that the QoL of atopic dogs' owners is affected in various ways by the disease and is significantly correlated to the clinical severity and the strength of relationship. Most owners are sad when they think of their dog's disease. Additionally, sleep disturbance, as has been shown in parents of atopic children, has a strong impact on the QoL and is consequently dependent on the tightness of the owner–pet relationship (especially whether or not the dog sleeps in the bedroom) and the pruritus score.⁴ Although only few owners complained about major disturbances of their social or family life, the burden and cost of the treatment itself cause major concerns. It must be emphasized that the burden of treatment may correspond to various aspects, ranging from difficulty to administer medications (pills, shampoos) to time-consuming procedures.

As far as the dog itself is concerned, duration of the disease did not dramatically influence the HRQoL, whereas the intensity of pruritus and the clinical severity negatively affected it. Owners clearly consider pruritus as the major burden. Most observed that some normal activities, such as playing, walking or sleeping, are disturbed, although interestingly, eating seems to be less affected. This could be due, at least in glucocorticoid-treated dogs, to the effects of this form of therapy. Owners also considered the treatment or its associated consequences (side effects) affected the HRQoL of their pet. Moreover, the HRQoL can be affected by more indirect consequences of the disease, such as more punishment, irritability of the owners or less time dedicated to walks.

The confidence in the treatment is important for the owners and certainly influences treatment compliance. Overall, 50% of the owners believed that previous treatments did not provide long-term improvement in the dog's condition, and this figure increased to 62% with a pruritus score above 5. It is noteworthy that 30% of the owners have not 'accepted that their dogs will require life-long treatment/care'. This shows that the communication on atopic dermatitis by the previous veterinarians was probably not adequate and may explain, at least partly, these answers. Conversely, the fact that 80% of the owners were confident that future treatment would be effective reflects the special situation in which the study was undertaken, because owners came to a specialized clinic and drew new hope of relief for their dogs.

Nevertheless, a substantial number of owners (36%) felt uncertain of the best therapeutic option for their pet and were concerned about treatment side effects. Also, the costs of therapy were of major concern in about 50% of the owners.

Overall, it is interesting that owners did not regret having the dogs because of the disease and almost none considered euthanasia as an option (0–1%). These figures may be different in first-opinion practices, because owners visiting referral centres are usually more motivated.

It is important to notice some limitations of the present study. First, at least some of the findings of the study are probably common to all chronic disease and should not be regarded as specific for atopic dermatitis. Second, ongoing treatment may have influenced the perception of the disease by the owner. Unfortunately, the great diversity of these treatments at inclusion prevented any analysis of this factor.

The dogs in this study were chronically affected by atopic dermatitis. Although duration did not seem to be a major influence on the perception of the burden of disease, a study of more acutely affected dogs and their owners is needed.

The study demonstrates the importance of measuring HRQoL of dogs and QoL of owners not only in the context of clinical trials but also in daily practice. They could provide a means for better owner support and improved evaluation of treatment options.

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Résumé La dermatite atopique est une dermatose humaine et canine chronique ou chroniquement récidivante qui affecte la qualité de vie des individus atteints. L'impact de la maladie sur les enfants et leurs parents a été largement étudié mais les conséquences sur les animaux atteints et leurs propriétaires sont très peu connues. Le but de cette étude était de combler ce manque. Les propriétaires ont complété trois questionnaires concernant leur propre qualité de vie, leur perception du traitement fourni et la qualité de vie de leur animal. Les caractéristiques cliniques telles que l'index de sévérité, le score de prurit et la durée de la maladie ont été estimés en parallèle et corrélés avec les réponses aux questionnaires. L'étude a montré que la dermatite atopique affectait profondément la qualité de vie des propriétaires et, également, sur quels aspects de la vie cet impact était le plus important.

Resumen La dermatitis atópica es una enfermedad crónica recidivante de la piel de humanos y perros que afecta de forma adversa la calidad de vida de los individuos afectados. El impacto de la enfermedad en niños afectados y sus padres ha sido estudiado de forma exhaustiva, pero se conoce poco a cerca del impacto en animales afectados y sus propietarios. El propósito del presente estudio fue llenar ese vacío. Los propietarios rellenaron tres cuestionarios acerca de su calidad de vida, la percepción acerca del tratamiento recibido y acerca de la calidad de vida de las mascotas. Se evaluaron en paralelo características clínicas como el índice de severidad, el valor de prurito y la duración de la enfermedad, y éstos se correlacionaron con las respuestas del cuestionario. El estudio no solo demostró que la dermatitis atópica canina afecta profundamente la forma de vida de los propietarios de los perros afectados, sino también en que aspectos de su vida el impacto fue mas severo.

Zusammenfassung Die atopische Dermatitis ist eine chronische oder chronisch wiederkehrende Hauterkrankung von Mensch und Hund, die die Lebensqualität der Betroffenen nachteilig beeinflusst. Die Auswirkung dieser Erkrankung auf die betroffenen Kinder und ihre Eltern wurde umfangreich untersucht, während sehr wenig über die Auswirkungen der Erkrankung auf die betroffenen Tiere und ihre BesitzerInnen bekannt ist. Das Ziel der vorliegenden Studie war es, diese Wissenslücke zu füllen. Die BesitzerInnen wurden gebeten, drei Fragebögen über ihre eigene Lebensqualität, über ihr Empfinden im Bezug auf die erhaltene Behandlung und über die Lebensqualität ihres Haustiers auszufüllen. Klinische Charakteristika wie Schweregrad (Severity Index), Bewertung des Pruritus und die Dauer der Erkrankung wurde parallel dazu erhoben und mit den Antworten der Fragebögen in Zusammenhang gebracht. Diese Studie zeigte, dass die canine atopische Dermatitis nicht nur die Lebensweise der BesitzerInnen der betroffenen Hunde gravierend beeinflusste, sondern auch welche Aspekte des Lebens am meisten beeinträchtigt waren.

要約 アトピー性皮膚炎は罹患した個人の生活の質を損なう、慢性または慢性に再発するヒト¹と犬の皮膚疾患である。罹患した子供とその両親への影響は幅広く調査されているが、罹患した動物とその飼い主への影響はほとんど知られていない。この研究のゴールはこそのギャップを埋めることである。飼い主には彼ら自身の生活の質、行っている治療に対する認識、ペットの生活の質に関する3つの質問を行った。重症度、そう痒スコア、疾患の持続期間などの臨床症状を等しく評価し、質問の回答との相関性を評価した。この研究により、犬のアトピー性皮膚炎は罹患した犬の飼い主の生活様式に大きく影響を与えるということを示しただけではなく、生活に対する考え方という点でその影響は最も深刻である。

Appendix 1

Quality of life questionnaire

Please rate all of the statements below. When doing so, please think of your feelings and experiences during the time since the last visit to the veterinarian.

Example of how to select your answer:

Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree
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Overall assessment (OVA) questions:

OVA 1. Has the disease of my dog impaired my own quality of life or those of my family?

OVA 2. Has the disease of my dog impaired its quality of life?

OVA 3. Could the ongoing treatment improve my dog's skin condition in the long term?

Section 1 – Questions referring to you or to your family

1. My dog makes me feel good.
2. It is a pleasure to spend time with my dog.
3. Thanks to my dog, I am more active.
4. Caring for my dog's skin disease is a major burden to me.
5. My dog's skin disease disturbs my sleep.
6. I regret having this dog because of his/hers disease.
7. The disease of my dog makes me sad.
8. My dog's skin disease has changed my normal family life.
9. My dog's skin disease has changed my leisure activities.
10. Sometimes I think it would be better to put my dog down because of its illness.
11. I am seeing friends/relatives less often because of my dog's illness.
12. I cannot let others look after my dog because of the skin disease.
13. I avoid places where I might meet other dog owners because of the skin disease.
14. I am embarrassed about my dog's appearance and smell.
15. My dog's scratching, chewing or licking is making me aggressive.
16. I have to limit other expenses in order to pay for my dog's treatment.

Section 2 – Questions referring to your dog

17. My dog interrupts playing in order to scratch, lick, bite or chew itself.
18. My dog interrupts walking in order to scratch, lick, bite or chew itself.
19. My dog interrupts eating in order to scratch, lick, bite or chew itself.
20. My dog interrupts sleeping in order to scratch, lick, bite or chew itself.
21. My dog is happy.
22. My dog is playful and active.
23. My dog sleeps well.
24. The skin disease has changed my dog's behaviour for the worse
25. My dog is restless.
26. My dog is tired because of his disease
27. I reprove my dog for its chewing licking and scratching.
28. The treatment itself (shampoos, pills) is a major burden to my dog.
29. I have reduced the frequency or the duration of walking my dog.
30. The treatment causes side effects to my dog.

Section 3 – Questions referring to your dog's treatment

31. I am confident that the treatment is effective.
32. I am concerned about side effects (short or long term).
33. I am concerned about the cost of treatment (short or long-term).
34. I have accepted that my dog will require life-long treatment/care.
35. I feel uncertain, which method of treatment is the right one.
36. I am thinking about euthanasia because of my dog's skin disease.

Appendix 2

Questionnaire about the pet owner and their relationship with their dog: owner–pet relation score (OPRS)

Please fill in this questionnaire before starting with the therapy. Tick the answer that best describes your situation. There are no right or wrong answers. All questions must be answered. Should you have any questions, please do not hesitate to contact the clinic staff.

1. Where does your dog live most of the time?	
a. He is most of the time/always in-house	+1
b. He is most of the time inside but has free access outside	0
c. He is most of the time/always outside	–1
2. How many hours a day do you spend together with your dog during which <u>you</u> observe <u>your</u> dog?	
a. Less than 2 h	–1
b. 2–4 h	0
c. More than 4 h	+1
3. Do you feed your dog yourself?	
a. Never	–1
b. Sometimes	0
c. In most instances	+1
4. Do you walk your dog yourself?	
a. Never	–1
b. Sometimes	0
c. In most instances	+1
5. Does your dog sleep in your bedroom?	
a. Yes	+1
b. No	–1
6. How many people live in your household?	
a. I live alone	+1
b. Two people	0
c. More than two people	–1
7. How many dogs and cats live in your household?	
a. One dog	+1
b. One dog and one cat	0
c. Two dogs	0
d. More than two animals (either dogs or cats)	–1
8. Which of the following statements best describes what you consider your dog(s) to be to you?	
a. My dog is like a family member	0
b. My dog is an animal	–1
c. My dog is like a child	+1
9. How old are you?	
a. Less than 30 years old	
b. Between 30 and 60 years old	
c. More than 60 years old	
10. Are you...?	
a. Male	
b. Female	