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A QUALITY OF LIFE STUDY ON CHILDREN WITH ATOPIC DERMATITIS: AN ASSESSMENT OF THE IMPACT AND EFFECTS OF SEVERITY OF ATOPIC DERMATITIS ON AFFECTED PATIENTS AND THEIR FAMILIES

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A research report submitted to the Faculty of Health Sciences, University of the Witwatersrand, Johannesburg, in partial fulfilment of the requirements for the degree of Master of Medicine in the branch of Dermatology.

Johannesburg

2017

DECLARATION

I, Dr Kiasha Govender, declare that this research report is my own unaided work except to the extent indicated in the reference citation and acknowledgements. It is being submitted for the degree of Master of Medicine in the branch of Dermatology in the University of the Witwatersrand, Johannesburg. It has not been submitted before for any other degree or examination at this or any other University.

Dr Kiasha Govender

……..day of …….2017

Master of Medicine in the branch of Dermatology.

DEDICATION

Dedicated to my parents.

ABSTRACT

Atopic dermatitis is a chronic, debilitating disease affecting children worldwide, with increasing prevalence. It has been shown to be a significant problem leading to a diminished quality of life, for both the affected patient and their families.

Quality of life in Atopic Dermatitis is poorly researched. Few studies have been conducted worldwide. There have been no published reports on QOL in children with atopic dermatitis from South Africa. This study aims to assess and evaluate the clinical severity of atopic dermatitis in children less than 6 years of age and the Quality of Life in these patients and their families, as well as to determine the socioeconomic and clinical factors that predict quality of life in children with atopic dermatitis at Chris Hani Baragwanath Academic Hospital (the busiest paediatric dermatology clinic in South Africa).

The Childhood Atopic Dermatitis Impact Scale (CADIS) and Patient Oriented Eczema Measure (POEM) were given to the primary caregiver and the SCORAD was performed on each child during a single visit to the Paediatric Dermatology Outpatient Clinic at Chris Hani Baragwanath Academic Hospital (CHBAH) in Soweto.

The study parameters show that atopic dermatitis has a negative impact on the quality of life of affected children and their families, in keeping with similar studies internationally. The severity of atopic dermatitis was a significant predictor of quality of life. The poor socioeconomic status was evident in the demographic details of the sample. A significant predictor of quality of life was the age of the affected child, with

a higher impairment in child and family QOL experienced for children less than 1 year of age. The QOL measure showed a higher correlation to the caregiver assessment of severity than to the physician's assessment, suggesting that patient derived outcome measures should be of most importance in adequately assessing disease severity.

There is a need for further research of children in South Africa with atopic dermatitis. This is essential to identify effective interventions to improve disease severity and Q.O.L in these children. This would result in the development of children into healthy adults capable of effective family, community and social interaction.

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LIST OF ABBREVIATIONS

AD	-	Atopic Dermatitis
QOL	-	Quality of Life
SCORAD	-	Scoring System of Atopic Dermatitis
CADIS	-	Childhood Atopic Dermatitis Impact Scale
POEM	-	Patient Oriented Eczema Measure
ETFAD	-	European Tash Force on Atopic Dermatitis
CHBAH	-	Chris Hani Baragwanath Academic Hospital
UK	-	United Kingdom

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Chapter 1: INTRODUCTION

The skin is the largest organ in the body, weighing on average four kilograms. It is a complex structure that forms a protective barrier between the body and the external environment. It is a sensory organ and is involved in the maintenance of water and electrolyte balance, as well as temperature regulation (Hunter et al., 2002).

The skin is a measure and window of one's physical appearance and beauty. Severe dermatological disorders lead to significant impairment in quality of life (QOL) with social embarrassment and a decrease in self-esteem in affected patients.

Impact and burden of the disease

Atopic Dermatitis (AD) is a common cutaneous disorder globally and it affects individuals of all age groups, usually manifesting before 5 years of age (Bolognia et al., 2008).

AD is chronic and debilitating. It not only impacts the affected patient but their immediate families as well. In the past, management and treatment protocols were based exclusively on clinical severity indices which stratified patients into mild, moderate and severe atopic dermatitis (eczema). However, with recent evidence demonstrating the impact on family life and psychosocial functioning (Case et al., 2015, Cheng et al., 2015), it is no longer possible to rely solely on these outcome measures to monitor effectiveness of treatment. Quality of Life (Q.O.L) measures

have been studied to evaluate outcomes for children with chronic health conditions. It is also a good index to monitor patient progress and response to provided treatment.

The World Health Organisation (WHO) defines Quality of Life as “the individual’s perception of their position in life in the context of culture and value systems in which they live and in relation to their goals, expectations, standards and concerns” (The Whoqol, 1998). Health related Q.O.L measures quality of life only in the context of the patient’s medical condition. Overall Q.O.L encompasses impact on family life, living circumstances and school functioning (Wallander et al., 2001).

Quality of Life studies in atopic dermatitis have largely been conducted in the developed world (Aziah et al., 2002, Ben-Gashir et al., 2002, Balkrishnan et al., 2003, Ben-Gashir, 2003, Ben-Gashir et al., 2004, Beattie and Lewis-Jones, 2006a, Chamlin et al., 2004, McKenna and Doward, 2008), with limited data available in the African setting. To our knowledge, no Quality of Life study has ever been conducted in children in South Africa with AD. Evidence from European and Asian studies suggest that AD has a negative impact on the Q.O.L of affected children (Aziah et al., 2002, Ben-Gashir et al., 2004, Chamlin et al., 2004). Some factors that may affect these children include negative effect on family life, change in family dynamics, poor school performance, stigma associated with the disease and negative self-image (Daud et al., 1993, Su et al., 1997).

A variety of Quality of Life indices is available to assess skin disease in children (Lewis-Jones and Finlay, 1995, Lewis-Jones et al., 2001, McKenna and Doward,

2008). However, most of these tools are not specific to children with atopic dermatitis (Chamlin et al., 2005).

The Childhood Atopic Dermatitis Impact Scale (CADIS) is a validated QOL tool formulated specifically for children less than 6 years of age with atopic dermatitis and their families. It was developed and refined by Chamlin et al, who reviewed previous work published on the topic, and conducted interviews with all role-players including families, nurses and medical professionals. It comprises 45 questions in 5 domains, focusing on child and family welfare (Chamlin et al., 2007).

PROBLEM STATEMENT

Atopic Dermatitis in children has become an increasing psychosocial and financial burden (Carroll et al., 2005). It is important to assess the effect on Quality of Life in these patients and their families in a South African setting, due to its psychosocial and financial burden.

AIM OF THE STUDY

To assess and evaluate the clinical severity of atopic dermatitis in children less than 6 years of age and the Quality of Life in these patients and their families.

STUDY OBJECTIVES

i. To objectively assess the clinical severity of atopic dermatitis in the sample.
ii. To gain a subjective assessment of severity of the affected child's atopic dermatitis from the primary caregiver.

iii. To assess the quality of life as a result of the atopic dermatitis in:

a) the affected patients and

b) parents` and families of the affected patient

iv. To determine whether socioeconomic and demographic parameters predict quality of life.

v. To determine whether clinical severity and perceived disease severity correlates with the degree of impairment in quality of life; and which areas of quality of life are most impacted.

SIGNIFICANCE OF THE STUDY

- Measuring quality of life provides important, additional information to the standard clinical scoring systems for atopic dermatitis. By assessing the Q.O.L of patients and their families, we are able to treat them holistically by adopting a patient and family-centred approach to management of atopic dermatitis.

- The information gathered on quality of life in children and their families will benefit all health care professionals and families involved in the management of children suffering from atopic dermatitis. It would assist in identifying specific areas where intervention can be directed and resources allocated to improve Q.O.L of patients and their families. In addition, specific domains assessed using the Childhood Atopic Dermatitis Impact Scale may highlight specific aspects of quality of life that are consistently affected by atopic dermatitis that may need special consideration.

- There is currently a paucity of data regarding quality of life in children with atopic dermatitis in South Africa. It is also not known whether socioeconomic factors and demographics impact on the perception of quality of life in this setting. The results of this study will help to identify specific areas where intervention can be directed to improve the quality of life of patients and their families afflicted by this disorder in South Africa.

Chapter 2: LITERATURE REVIEW

Studies from Western countries suggest that the prevalence of allergic disease may be reaching a plateau, but it shows that developing nations (especially in Africa) have shown a dramatic increase in these diseases over the last few years (Williams et al., 2008). Nicolaou et al illustrated the increase in allergic diseases associated with increasing urbanization (2005). The United Nations have estimated that by 2030 71.3% of South Africans will live in urban areas. This may well explain the reason why the prevalence of atopic dermatitis in South Africa is rapidly increasing.

Atopic Dermatitis is a chronic medical condition affecting adults and children. The chronic nature of the disease and its increasing prevalence highlights its relevance in clinical medicine and the resources that need to be allocated to it. It has therefore become increasingly important to study the quality of life in children living with this condition. Using Q.O.L as a research tool, we are able to assess the effectiveness of treatment and services on the paediatric population.

This literature review discusses the concepts of Quality of Life and the factors impacting on Q.O.L in patients with eczema and their families. Key concepts discussed include epidemiology, pathogenesis, clinical features of atopic dermatitis as well as severity assessment and scoring systems. Standard texts, Pubmed and Medline searches were referenced.

2.1 Introduction

Atopic dermatitis (or atopic eczema) is a chronic, pruritic skin disorder affecting both adults and children. A chronic childhood disease, as defined by Mokkink et al (2008), is one that fulfils four criteria i.e.

(1) The age of the child must be younger than 18 years

(2) The diagnosis of the disease is made by the use of scientific knowledge and can be reproduced using valid tools and methods

(3) At the time of diagnosis, the disease has no known cure

(4) The duration of the condition is more than 3 months

The above definition looks at the medical aspects of a condition only and does take into consideration the broader impact the disease may have on the child. Perrin et al (1993) researched the level of functional impairment caused and the amount of medical care needed for a chronic childhood disease. By considering these two concepts, it is clear why atopic dermatitis is classified as a chronic childhood illness.

The following paragraphs will focus on epidemiology, pathogenesis and clinical features of AD to understand the nature of the disease as well as severity scoring systems and quality of life issues to elucidate the clinical significance of atopic dermatitis.

2.2 Epidemiology

Most studies in atopic dermatitis have been performed in children. Evidence suggests it affects up to 3% of adults and approximately 20% of children, with prevalence varying greatly throughout the world (Nutten, 2015).

The most extensive AD prevalence and trend data have emerged from the International study of Asthma and Allergies in childhood (ISAAC), which analysed data from nearly 2 million children in 100 countries. It showed that for children 6-7 years of age, the prevalence ranged from 0.9% in India to 22.5% in Ecuador. For the 13-14 year age group, the prevalence ranged from 0.2% in China to 24.6% in Columbia (Odhiambo et al., 2009).

The most recent data from phase three of the ISAAC study shows there to be a plateau (or even a slight decline in some countries) in AD prevalence in first world countries with the highest prevalence, but an increase in prevalence in the developing world (Williams et al., 2008).

In Africa the highest prevalence of AD, according to the ISAAC phase three study, occurred in Morocco (23% prevalence in Casablanca and 20.5% prevalence in Marrakech), Ethiopia (19% prevalence in Addis Ababa), Guinea (18.8% prevalence in Condkry), and Ivory Coast (18.2% in Urban Cote d'Ivore) (Odhiambo et al., 2009).

There are few studies on the prevalence of atopic dermatitis in South Africa. The ISAAC phase 1 study showed there to be an 8.3% prevalence rate of AD symptoms in schoolchildren aged 13 – 14 in Cape Town (Manjra et al., 2005). The ISAAC phase three study done 10 years later illustrated an increased prevalence rate of 13.3% in Cape Town for children of the same age (Odhiambo et al., 2009). The prevalence of AD in the same age group of children in Polokwane in the ISAAC phase three study was 11.2%. No prevalence data is available for Gauteng.

While AD may affect patients of all ages, the peak age of onset is below 3 months (McNally et al., 1998). Both males and females are affected with studies showing a slight female predominance. Female to male ratios vary from 1:1 published by Turner et al in 1997 to 1.7:1 as reported by Larsson et al in 1994 (Ring et al., 2006). The reason for this trend is unknown.

2.3 Pathogenesis

Atopic dermatitis is a hypersensitive state, subject to genetic predisposition that manifests as a chronic inflammatory skin disorder (Sinclair et al., 2008).

The aetiopathogenesis of atopic dermatitis is complex and multifactorial, involving an interplay of genetic, immune, neuroendocrine and environmental factors (Wolff and Fitzpatrick, 2008). Studies have implicated mutations in the filaggrin gene on chromosome 1q21 in European and Japanese patients leading to a defective barrier function in the stratum corneum. This leads to increased transepidermal water loss and enhanced penetration of environmental allergen resulting in increased inflammation and sensitivity (van den Oord and Sheikh, 2009).

According to the 2005 South African Consensus Document on atopic eczema, exacerbating factors for episodes include colonisation by microbial agents especially staphylococcus aureus, certain environmental exposures, disruption of the cutaneous barrier, exposure to allergies and stress (Manjra et al., 2005).

2.4 Clinical features and symptoms

Atopic dermatitis can be divided into acute, subacute and chronic stages. The acute stage is characterised by the presence of vesicles, crusts, exudate, oedema and erythema. In subacute dermatitis there are erythematous papules that may scale and become excoriated. The characteristic lesion of chronic AD is thickened plaques with lichenification (exaggeration of skin markings) with or without fibrotic papules (Wolff and Fitzpatrick, 2008). Lesions from all three stages may co-exist in the same patient. Dry, dull skin is seen in all stages of AD.

Atopic dermatitis shows distinctive appearance and distribution of lesions at various ages. In infancy, it usually involves the face and extremities. In childhood and adulthood, the flexural areas are the most common sites. Chronic hand eczema is common in adults. However, generalised involvement may also occur at any age (Wolff and Fitzpatrick, 2008).

Pruritis is the most common symptom experienced by patients and may be so severe that it leads to insomnia and secondary infection of open excoriations caused by scratching. Pruritis occurs throughout the day but is usually worse in the early evenings and at night (Bolognia et al., 2008).

Secondary bacterial and viral infection may lead to pruritis, pain and scarring. 50% to 80% of patients with AD develop allergic rhinitis or asthma later in childhood (Wolff and Fitzpatrick, 2008).

2.5 Diagnostic criteria

The Hanifin and Rajka criteria was the first diagnostic criteria for AD and was introduced in 1980 (Bolognia et al., 2008). It included 4 major and 23 minor criteria and proved to be too time-consuming and unmanageable in clinical settings (Samochocki and Dejewska, 2012). Various other diagnostic criteria have been proposed worldwide, however no ideal or uniform set of diagnostic criteria has been established. In South Africa, the most widely used is the reviewed criteria proposed by the South African childhood Atopic Eczema working group in 2005, i.e.

Major criterion (must have):

Pruritis

Minor criteria (must have >=3 of the following):

i. History of involvement of skin creases (flexural eczema)
ii. History of generally dry skin in the past year
iii. Personal history of asthma or hay fever
iv. Onset under the age of 2 years
v. Visible flexural eczema(Manjra et al., 2005)

These diagnostic criteria were used in the current study.

2.6 Management of Atopic Dermatitis

The management of atopic dermatitis involves individualised care and is dependent on age of the patient, severity of disease and patient affordability amongst other factors. The approach involves:

(i) General measures
(ii) Adjuvant measures

(iii) Anti-inflammatory therapy

(i)*General measures*

- Since atopic dermatitis is a clinically hypersensitive state, various factors have been implicated in exacerbation of disease. Control of these aggravating factors significantly improves signs and symptoms of the dermatitis.
- “Over bathing” has been associated with excessive loss of moisture from the cutaneous surface. Whilst patients are advised to bath regularly (once daily), over cleansing should be avoided (Manjra et al., 2005).
- Patients are advised to avoid extremes of temperature as well as non-cotton fabrics on the skin as these may cause flares of eczema. 80% of infants with AD test positive for food allergy (Sampson, 1997a, Sampson, 1997b, Sampson and Ho, 1997). Certain foods have been implicated in aggravating allergies in patients, especially in young infants. Screening tests in the form of Fx 5e CAP followed by specific IgE CAP RAST for individual allergies, if the former is positive, is advised for young infants with chronic atopic dermatitis (Manjra et al., 2005).
- Inhaled allergen screens may also be useful especially in patients with sensitivity to house dust mite. In these patients avoidance measures may significantly reduce symptoms. These measures include use of mite-impermeable mattress covers and bedding, regular vacuuming, regular linen changes and 60 degree Celsius hot washing of bedding (Williams et al., 1999).

(ii) *Adjuvant measures*

- Soap substitutes are advised in place of ordinary soap. Options include pure glycerine soaps or other moisturising cleansers. Anti-bacterial cleansers should be avoided as they may lead to bacterial resistance (Manjra et al., 2005).
- Bleach baths in some severely affected individuals have been shown to aid with infection and inflammation from cutaneous flares.
- Treatment of any infections should be instituted as soon as they occur.
- Since xerosis of the skin is a salient feature of AD, the liberal use of emollients is recommended as first-line therapy. These need to be applied frequently during the day to relieve symptoms and signs of dryness, as they usually last only 6 hours on the skin. Different preparations are often required for different areas of the body and at different times of the year. Large quantities of emollient are usually required per week to maintain moisture and barrier function of the skin (Catherine Mack Correa and Nebus, 2012).
- Antihistamines are often used for its effect on pruritis. However, because many mediators, other than histamine, are implicated in AD-induced pruritis, antihistamines may not be beneficial in all patients (Mollanazar et al., 2015).

(iii) *Anti-inflammatory therapies*

Topical corticosteroids:

Intermittent topical corticosteroid usage to manage the disease is well documented (Abeck and Strom, 2000, Ellis et al., 2003). Mild to moderate potency preparations are usually used and applied once to twice daily until control is achieved followed by twice weekly applications thereafter to maintain the remission. The mildest agent

that can control the disease should be chosen. Potent and super potent topical steroids are sometimes required, but these should only be used for short periods of time (Thomas et al., 2002).

Topical calcineurin inhibitors**:**

Calcineurin inhibitors are immunomodulating, anti-inflammatory medications that have a rapid and sustained effect in treating both signs and symptoms of atopic dermatitis (Sunderkotter et al., 2006). In particular, it has been shown to relieve pruritis associated with diseases. It can be used alone or as an adjunctive measure together with topical steroids or systemic treatment in the management of acute or chronic AD. It has steroid sparing activity with very few adverse effects. It has been shown not only to prevent atrophy caused by steroids, but also to some extent to reverse mild steroid side effects (Kyllonen et al., 2004). It can be used for a longer period than topical steroids and on sensitive areas like the face and neck. Studies show that it can even be used safely on children as young as 3 years of age (Sunderkotter et al., 2006). Drawbacks to the treatment include the cost of the product and potential for cutaneous malignancy, albeit a rare event. Available agents in South Africa include Protopic and Elidel.

Phototherapy:

Both UVA and UVB either as monotherapy or as an adjunctive treatment has been shown to clinically improve AD (Patrizi et al., 2015).

Systemic Rx:

Oral anti-inflammatory immunomodulators are reserved for patients with severe

atopic dermatitis or recurrent or recalcitrant disease.

Systemic corticosteroids: Long term side effects limit the continuous use of systemic corticosteroids. They have been shown to be effective in the short-term management of severe acute disease (Abeck and Strom, 2000), as well as for acute on chronic disease exacerbations.

Azathioprine: Azathioprine is an immunosuppressive treatment that has been shown to be effective in the management of chronic atopic dermatitis in both adults and children**.** It presents a cheaper option to treatment than cyclosporine. Azathioprine is used more frequently in certain academic departments nationally. A randomised controlled trial in 2002 (Berth-Jones et al.) showed it to be effective in severe AD. Potential side effects include nausea, vomiting, diarrhoea, pancreatitis, granulocytopaenia and rarely lymphoma to name a few (Wolverton, 2007).

Methotrexate: Methotrexate has been used with some success in adults with severe AD (Hanifin et al., 2004).

Cyclosporine: Cyclosporine affords rapid relief from severe disease, but it has many adverse effects and a high relapse rate following cessation of treatment. Schmitt et al found it to be an effective agent for severe disease in both adults and children (2007b). The tolerability of the drug was much better in children. Inaffordability of this very expensive drug is a worrying problem.

Mycophenolate mofetil, intravenous immunoglobulin, alpha-interferon: Mycophenolate mofetil is an immunosuppressive agent that exerts its mechanism of action by blocking the proliferation of T and B lymphocytes (Wolverton, 2007). It has therefore been studied for its use in AD. It has been shown to be effective and well tolerated with a good safety profile at an oral dose of 1g twice daily in adults with severe, recalcitrant disease (Neuber et al., 2000).

Biologic agents: The advent of the biologic agent has issued in a new era not just in the treatment of dermatological disorders but medicine as a whole. Dupilumab is a monoclonal antibody that inhibits cytokines involved in the AD inflammatory pathway. While dupilumab is not yet available commercially, clinical trials show promising results (Beck et al., 2014). Investigation into other biologic agents is also currently being conducted.

TREATMENT MODALITIES IN ATOPIC DERMATITIS		
	Therapy	**Level of evidence**
Topical	• Emollients • Topical Corticosteroids • Topical calcineurin inhibitors	2 1 1
Local	• UVB or UVA-UVB • Narrowband UVB • Oral PUVA • UVA	1 2 1 1
Systemic	• Systemic corticosteroids • Cyclosporine • Azathioprine • Mycophenolate mofetil • Methotrexate • Interferon • Immunoglobulin • Biologic agents	2 1 1 2 2 1 2 2-3

Table 1.1 Summary of treatments available for Atopic Dermatitis

2.7 Quality of Life

Advances in research in AD have changed our understanding of the disease at a molecular and genetic level (Barnes, 2010, Tang et al., 2012, Chen and Zhao, 2013). This affords opportunities to translate these advances into the formulation of newer and better treatments. In the meantime, however, patients still experience a wide range of symptoms that affect their daily lives and the lives of their families. These symptoms range from mild to disabling. Some of them can be measured clinically, but others are more subtle occurring at a psychological level. Understanding the exact impact of the disorder is imperative in the management of these patients.

The WHO defines Quality of Life as “the individual’s perception of their position in life in the context of culture and value systems in which they live and in relation to their goals, expectations, standards and concerns.” Many factors affect patients’ assessment of their quality of life. These include their personal and religious beliefs, physical health, psychological well-being, personal relationships, their home and work environment and independence level (The Whoqol, 1998). Q.O.L defines all aspects of a patient’s welfare and is not just limited to the effects on their medical health (Berzon et al., 1993).

2.7.1 Quality of life in children with chronic disease

Quantification of the impact of Quality of Life in patients with chronic diseases has become an important topic in both the developed and developing worlds. Much research has been conducted in children with various chronic disorders and this has shown the negative effects that the disease has on Health-Related Quality Of Life

(HRQOL) (Grootenhuis et al., 2007). Children with chronic diseases have been shown to have delayed developmental milestones when compared to other children (Suris et al., 2004). All aspects of the affected child's life has been shown to be affected by a chronic condition. Besides physical and emotional effects, other areas of functioning that have been shown to be affected are cognitive and social aspects of a child's life (Grootenhuis et al., 2007). These children have been shown to have higher levels of negative affect, school related problems, social withdrawal and poor peer relationships (Cheng et al., 2015).

Research shows that children with chronic illnesses have a higher risk of developing anxiety-related disorders and learning difficulties compared to their healthier peers (Case et al., 2015, Cheng et al., 2015). A study of 152 children with chronic diseases in New Zealand showed that these children had an increased susceptibility towards developing depression and anxiety, hyperactivity, behavioural abnormalities and social problems (Case et al., 2015).

2.7.2 Quality of life in children with chronic atopic dermatitis

Many Q.O.L studies on patients with AD have been done (Aziah et al., 2002, Ben-Gashir et al., 2002, Balkrishnan et al., 2003, Ben-Gashir, 2003, Ben-Gashir et al., 2004, Chamlin et al., 2004, Beattie and Lewis-Jones, 2006a, McKenna and Doward, 2008) , but to our knowledge, none have been conducted in South Africa. Most of the studies took place in the United Kingdom, the United States of America and Europe.

A Q.O.L study conducted in the UK compared the Q.O.L of children with chronic skin diseases and general medical conditions. It showed that AD was the leading dermatological cause of a decline in quality of life. When compared with chronic medical illnesses, atopic dermatitis had a decline in Q.O.L that equalled that seen in chronic renal disease, ranking second only to cerebral palsy. Asthma, cystic fibrosis, psoriasis, enuresis and epilepsy all had a lower decline in Q.O.L than AD (Beattie and Lewis-Jones, 2006b).

Atopic dermatitis, together with psoriasis and generalised pruritis have been shown to have a greater impact on Q.O.L than skin disorders such as acne, viral warts and basal cell carcinoma (Finlay and Khan, 1994). A 2002 South African study showed that most admissions to a tertiary dermatology centre in Cape Town were for extensive atopic dermatitis or psoriasis (Jessop et al.).

AD in adolescence and in adulthood is associated with a predisposition towards the development of depression and anxiety later in life (Cheng et al., 2015). Pruritis and the feeling of being disfigured impart a psychological burden on patients leading to a major impact on their Q.O.L (Buske-Kirschbaum et al., 2001). Cosmetic consequences of AD can affect self-esteem, personal relationships and social acceptance (Humphreys and Humphreys, 1998). Chronic pruritis may play an important role in the development of sleep disturbances, anxiety, irritability and depression (Yang et al., 2010, Cheng et al., 2015).

2.7.3 Quality of life in patient's families

A large quality of life study in the UK showed that AD had a profound impact on Q.O.L on patients and their families. Two hundred and three infants and their families were studied. The most reported family symptoms included sleep loss, exhaustion and emotional distress (Beattie and Lewis-Jones, 2006a).

Parents of affected children report social difficulties and feelings of worry, guilt, blame, and frustration due to their child's skin disorder (Chamlin et al., 2004).
There are no reported differences in the literature between the Q.O.L in boys and girls with AD. Younger atopic children had a more profound impact on their families Q.O.L (Ganemo et al., 2007). Caring for a child with AD is associated with greater sleep disturbance in parents than asthma (Moore et al., 2006). This correlated with increased anxiety and depression in mothers.

The financial impact of atopic dermatitis was a major cause of a decrease in family Q.O.L. A study conducted in Italy showed that the average cost of a child's AD was $1540 annually. Main expenses were due to special cleansing products, moisturizers and doctor visits (Ricci et al., 2006). The unmeasured expenses on the family unit will undoubtedly be related to the impact that the disease has on parents` work. Time taken off from work due to doctor visits, poor sleep, depression and anxiety affect work productivity, salary, bonuses and may prevent sufficient progress at work. Poor parent focus on personal ambitions and drive lead to parents of affected children stagnating in their careers. The financial impact to society is also significant with a US study estimating a cost of AD to the state to be $1 billion annually (Carroll et al., 2005).

Many studies conducted in Western, European and Asian countries confirmed that disease severity was correlated with family impact and Q.O.L of the affected child (Aziah et al., 2002, Ben-Gashir, 2003, Ben-Gashir et al., 2004, Chamlin et al., 2004, McKenna and Doward, 2008). Most studies also demonstrated the ability of caregivers to accurately assess the severity of their child's AD with parental assessment strongly correlating with impact on Q.O.L of patients and their families (Ben-Gashir et al., 2002, Balkrishnan et al., 2003).

2.7.4 Quality of Life Assessment in atopic dermatitis

Multiple Q.O.L outcome measures are available to assess children with cutaneous disease (Lewis-Jones, 2006). For AD specifically, the dermatitis family impact (DFI) questionnaire (Lawson et al., 1998), the infants dermatitis Q.O.L index (IDQOL) (Lewis-Jones et al., 2001) and the parent's index of Q.O.L in AD (DIQoL-AD) (McKenna et al., 2005) are tools which have been tested. These, however mostly focus on symptoms and functioning, with very few items dedicated to assess the emotional effects and broader impact of AD on the child and the family.

2.8 The Childhood Atopic Dermatitis Impact Scale (CADIS)

The Childhood Atopic Dermatitis Impact Scale (CADIS) is a validated QOL tool designed for children less than 6 years of age. It consists of 45 questions covering 5 domains i.e. child's symptoms, child's limitation on behaviour and activity, family and social function, parent sleep and parent emotion. Evidence of its content and construct validity has been published (Chamlin et al., 2005) and test–retest reliability has been demonstrated (Chamlin et al., 2007).

2.9 Severity scoring systems for Atopic Dermatitis

Approximately 20 different clinical scoring systems exist that measure the severity of AD. A systematic review published by Schmitt et al showed that only 3 of these measures showed adequate reliability and validity (2007a). These were the Patient-Oriented Eczema Measure (POEM), the Eczema Area and Severity Index (EASI) and the Severity Scoring system of AD (SCORAD). A variant of the SCORAD ie the objective SCORAD, which takes into consideration observer (clinician) based severity only, has also been validated and showed internal consistency (Angelova-Fischer et al., 2005).

For the purpose of the current study, two of the above scoring systems were chosen viz an objective scoring system in the form of the objective SCORAD and a subjective assessment of severity represented by the POEM. The inclusion of 2 different outcome measures provides a more accurate measure of eczema severity.

2.9.1 SCORAD

The European Task force on Atopic dermatitis (ETFAD) developed the SCORAD index. It initially consisted of scores for extent of involvement, intensity and subjective symptoms (Pucci et al., 2005). The SCORAD index was later modified to exclude the subjective symptoms (Oranje et al., 2007).

It measures the extent and severity of lesions of eczema. It has been shown to be one of the best instruments available to measure clinical signs of AD. It is valid, internally consistent and easily interpretable (Schram et al., 2012).

2.9.2 POEM

Of the above 3 outcome measures, the POEM is the only one that is completely derived and assessed by the patient themselves. The POEM is a simple, easily understandable and validated tool to monitor disease severity in both children and adults with AD (Charman et al., 2004). It was initially developed to address the imbalance between patient and physician-based severity indices in AD research. It has been recommended in many reviews and national guidelines and has been used in outpatient departments, clinical trials and various studies.

2.10 Conclusion of literature review

Atopic Dermatitis is a chronic medical condition of childhood that has an immense impact on health-related Q.O.L in patients and their families, not only with regards to physical health, but emotional and mental health as well. Assessment of effect on Q.O.L can identify specific areas where intervention can be directed to improve Q.O.L of patients and their families, as well as to provide concrete data with which to motivate for funding of these interventions.

Many studies have been done on the Q.O.L in patients with atopic dermatitis but, to our knowledge, there have been none conducted in South Africa. Most of these studies were conducted in the United States, Europe and Asia. The social, economic and environmental characteristics of South Africa greatly differ with these countries, rendering the need for a further study in our context. Furthermore, none of the studies encountered in the literature used the combination of SCORAD, POEM and CADIS to compare the severity of atopic dermatitis with Q.O.L.

Chapter 3 – METHODOLOGY

In this chapter the methodology used in this research report will be presented.

3.1 Study design

This is a cross-sectional study.

3.2 Location of the study

This study was conducted at Chris Hani Baragwanath Academic Hospital in Soweto, Johannesburg. This hospital is the largest governmental medical institution in Africa. The study group was obtained from the Paediatric Dermatology Outpatient Clinic.

3.3 Ethical clearance

Ethical clearance for the proposed research was obtained from the University of Witwatersrand Human Research Ethics Committee (Clearance number M090305) (Appendix). Further permission was obtained from the hospital manager of CHBAH, the head of the Department of Dermatology and the managing specialist dermatologist at the Paediatric Dermatology Outpatient Clinic.

Written informed consent was obtained from all caregivers for themselves as well as for each child participating in the research.

3.4 Study population

Data from 381 children and their respective primary caregivers, who fulfilled the inclusion and exclusion criteria, was analysed.

3.5 Sample selection

Data was collected from 381 consecutive children aged < 6 years of age and their caregivers, who consented to participate in the study (within a 3 month period). They were all attendees at the dermatology paediatric outpatient department, receiving treatment there for AD.

Inclusion criteria:

- Children < 6 years old with a diagnosis of AD
- Primary caregivers > 18 years of age

Exclusion criteria:

- Children in the study group who had any other chronic diseases that may impact on Q.O.L eg., chronic infections, autoimmune disorders
- Children older than 6 years of age or
- Primary caregiver < 18 years of age
- Children who attended the clinic not accompanied by their primary caregiver, eg. friend, distant relative, sibling

3.6 Timing of study

The data collection was performed over a 3 month period. It commenced on Monday, 2 August 2010 and concluded on Thursday, 28 October 2010.

3.7 Sample size

For the use of parametric statistical techniques, a minimum of 30 participants was necessary to achieve a statistical significance. Due to the central limit theorem, the larger the sample, the more normal the data will be. A sample size of 385 participants would have yielded a power of 90 at 5% level of significance. Therefore to achieve statistically significant data with high power, the sample size aimed at was 385. However, over the 3 month period, data from only 381 patients were collected.

3.8 Assessment tools

Objective SCORAD

Patients were assessed for disease severity using the modified objective SCORAD index. The site of involvement was also recorded. This objective severity assessment was conducted by a single-clinician, ie. the investigator, to prevent inter-observer bias.

Regarding SCORAD:

SCORAD (SCORingAD) index was developed by the European Task force on Atopic dermatitis (ETFAD). It initially consisted of scores for extent of involvement, intensity and subjective symptoms. The SCORAD index was later modified to exclude the subjective symptoms. It was thus then termed the objective SCORAD. Points are awarded as follows:

1. Extent

   -Scored 0 to 100 depending on the percentage body surface area involved

2. Intensity

   Each of 6 symptoms are graded 0 to 3 depending on intensity

   -erythema

   -oedema/papules

   -excoriations

   -lichenification

   -oozing/crusting

   -dryness

All items were filled out on a SCORAD evaluation form (Appendix VII). The objective SCORAD index formula is Extent/5 + 7xIntensity/2. The maximum objective SCORAD score is thus 82 (plus an additional 10 bonus points for severe dermatitis of the face or hands).

POEM

Primary caregivers assess their child's disease over the last week using the Patient-Oriented Eczema Measure (POEM). Seven signs/symptoms ie. dryness, flaking, itching, oozing, bleeding, cracking and disturbed sleep are rated according to a 5-point scale, depending on the number of days in the week that the child was affected by these. A maximum score of 28 can be assigned with a minimum score of 0.

CADIS

The CADIS is a Q.O.L questionnaire comprising 45 questions in 5 domains (Appendix IX). It is administered by the primary caregiver themselves and consists of statements regarding the child's eczema and effect on child and family life over

the last four weeks. The primary caregiver notes how strongly they agree with each of the given statements by giving each statement a score of 0, 1, 2, 3 or 4 where 0 means never, 1 denotes almost never, 2 sometimes, 3 correlating with an answer of often and 4 meaning always.

3.9 Procedure

3.9.1 Translation of questionnaires

To ensure that our study sample was representative of the population attending Chris Hani Baragwanath Academic Hospital, it was important that the questionnaire was made available in isiZulu, which was the most commonly spoken language in the study population. The English questionnaire was thus translated into isiZulu and Sotho. English literate patients completed the English questionnaire and the isiZulu and Sotho speaking patients completed the translated questionnaire.

3.9.2 Data collection

Data was collected at the paediatric outpatient dermatology clinic that takes place every Monday and Thursday mornings. All attendees at the clinic, who fulfilled the inclusion and exclusion criteria during the three-month period, were invited to participate in the study.

Before the study commenced, a research assistant was trained to administer and explain the measurement tools ie. POEM and CADIS, as well as to explain aspects regarding the nature of the research to the patients. She was able to communicate in English, isiZulu and Sotho. Consenting primary caregivers were provided with

patient information leaflets regarding the study in a language of their choice (English, isiZulu, Sotho) and consent was obtained in writing from the participating caregiver for themselves and their child/ward taking part in the study. Two separate consent forms were signed. (One for the primary caregiver and one for participating child). Thereafter they were provided with 2 self-administered questionnaires, that is the CADIS and the POEM (in a language of their choice). This was conducted in the clinic waiting room.

Each primary caregiver was then interviewed in a private examination room by the researcher to obtain the required socioeconomic information including caregiver age, marital status, religion, highest educational level achieved, employment, residence and household income. The child was then examined and assessed by the researcher to determine severity of atopic dermatitis using the objective SCORAD index.

3.10 Bias and limitation

No bias existed in patient selection as the option of participation was given to all patients and caregivers attending the clinic during the 3 month period, who complied with the inclusion and exclusion criteria.

Inter-observer bias was eliminated by a single-clinician (i.e. the researcher) performing the clinician assessment of disease severity using the objective SCORAD index.

All patients were recruited from the Paediatric Dermatology Outpatient Clinic at Chris Hani Baragwanath Academic Hospital (CHBAH). This is a large referral

hospital and may therefore imply a referral bias towards increased disease severity. Mild cases were well represented in the study population, though.

3.11 Statistical analysis

The questionnaires were scored and all scores and demographic details were recorded in a database in excel format. It was then analysed statistically using SPPS (Statistical Packages for Social Sciences) version 13.

Data description

Continuous data was described by means and standard deviations as well as by the use of tables.

Categorical data was described using frequency distribution, pie charts and bar graphs.

Data analysis

Bivariate analysis of categorical variables was done using Pearson's Chi-Square Test (Fisher exact test where appropriate).

To compare 2 continuous variables, the two independent T test was used.

To correlate 2 continuous variables, the use of Pearson's correlation and regression was used.

To correlate more than 2 categories over a continuous variable, ANOVA (analysis of variables) was used.

3.12 Funding

Partial funding of the research was obtained from the Dermatology Society of South Africa and Galderma.

All other costs were born by the researcher.

Chapter 4: RESULTS

4.1 Introduction

This chapter deals with the results of the statistical analyses of the data of quality of life in children less than 6 years old with atopic eczema and their families. The first section presents the descriptive statistics of demographic profiles of patients in pie charts and bar graphs, and information related to Atopic Dermatitis in table format.

The second section deals with the tests of significance for different indices used to assess the quality of life in children with atopic eczema and their families. SCORAD, CADIS and POEM are compared to each other using the Pearson Correlation Coefficient. CADIS and POEM scores are compared across the different categories of demographic details of patients. For two-category demographic details, two independent T-test is used and for more than two categories, Analysis of Variance (ANOVA) is used instead. To determine which of the domains of CADIS is mostly correlated to SCORAD or POEM, Pearson correlation coefficient is used.

Prior to the two independent T-test or ANOVA, the test of normality is carried out to determine whether a parametric version or a non-parametric version will be used. If variables are normally distributed, the parametric tests (two independent T-test and ANOVA) are used; otherwise non-parametric tests (Mann-Whitney and Kruskal-Wallis) are used.

Histograms of scores in Appendix 1, serve to test normality. It can be seen that only the SCORAD score is highly skewed, compared to other scores. So, due to the

Central Limit Theorem, with the sample size of 381 far more than 30 as recommended, scores are considered as normally distributed. Therefore, parametric tests will be used for all of the scores except SCORAD, where non-parametric tests will be used.

All the analyses are carried out using the SPSS (Statistical Packages for Social Sciences) version 13.

4.2 Descriptive Statistics

4.2.1 Demographics

4.2.1.1 Age Distribution of children

The age distribution of the patients participating in this study is shown in the graph below.

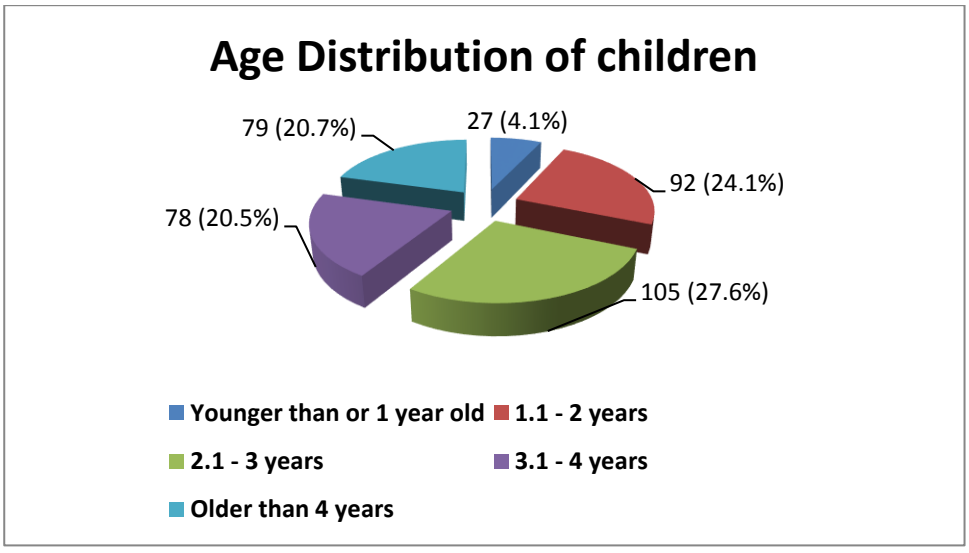


Figure 4.1 Age distribution of children

Only a small number of children participating in the study were younger than one year of age (4.1%). Ninety-two patients (24.1%) were between the ages of 1 and 2

years old; 105 (27.6%) were in the 2-3 year age group; 78 (20.5%) were between the ages of 3-4 years and 79 (20.7%) patients were older than 4 years of age. The majority of patients, almost 52% (51.7%) were 1-3 years of age.

4.2.1.2 Gender Distribution of children

The gender distribution of patients participating in this study is shown in the following graph (Figure 4.2). The majority (54.9%) of patients in the study were male and 45.1% of study participants were female.

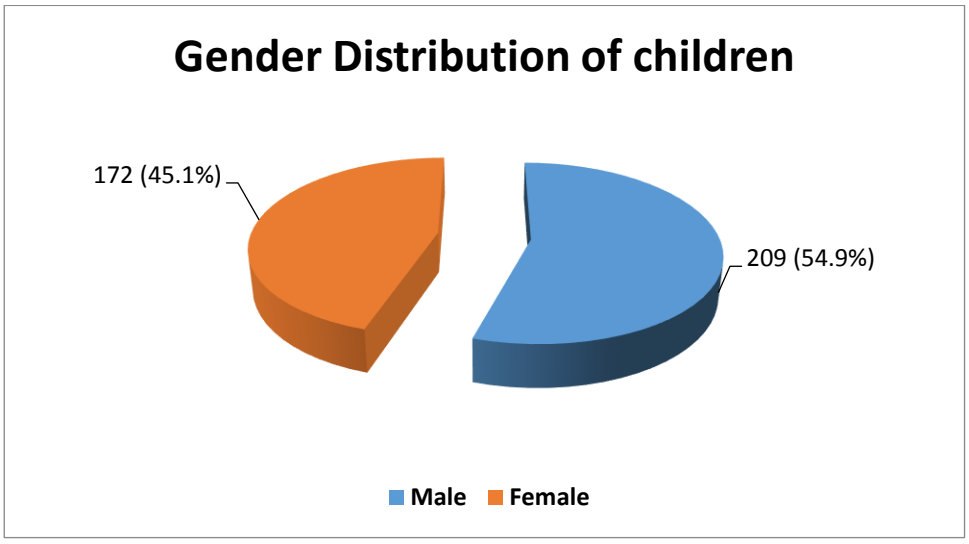


Figure 4.2 Gender distribution of children

4.2.1.3 Caregiver Relationship and Distribution

Figure 4.3 shows the distribution of caregivers of patients.

In the study group 356 children (93.4%) had their mother as the primary caregiver. Twenty-one (5.5%) of the children's primary caregiver was the father and only 1% (4 children) were cared for by a guardian.

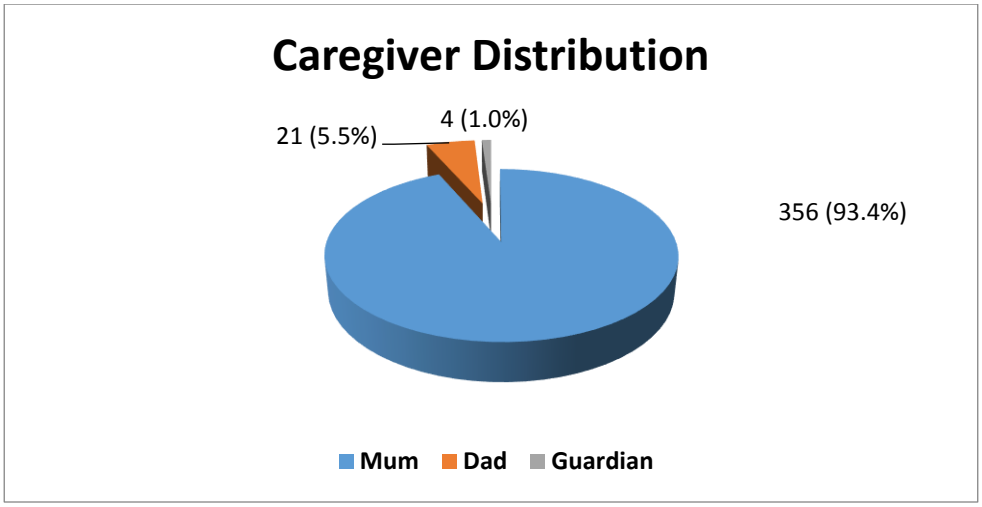


Figure 4.3 Frequency distributions of caregivers

Ninety-nine per cent of patients (377) in the study were black, one per cent (4) of them were coloured. This correlated with the race of the primary caregivers.

4.2.1.4 Distribution of age of Caregivers

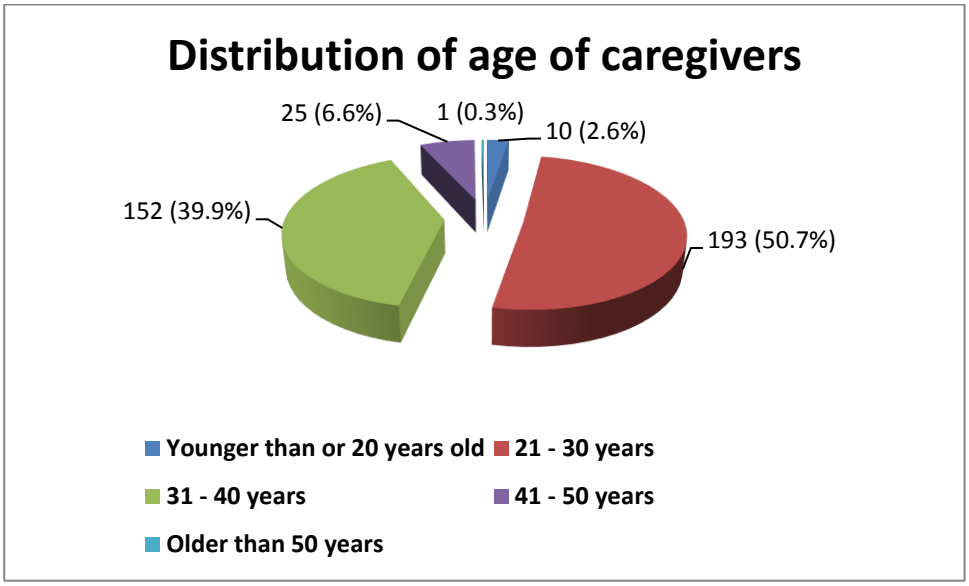


Figure 4.4. Distribution of the age groups of caregivers

The pie chart (Figure 4.4) above shows the age distribution of the primary caregivers of children participating in the study.

The majority of caregivers (50.7%) were 20-30 years of age. One hundred and fifty-two caregivers (39.9%) were 31-40 years of age, 25 (6.6%) were in the 41-50 year age group. Only 0.3% of caregivers fell in the older than 50 year age group and 2.6% were younger than 20 years of age.

4.2.1.5 Distribution of Caregiver Education Level

The pie chart below (Figure 4.5) illustrates the distribution of the education levels of the primary caregivers in the sample.

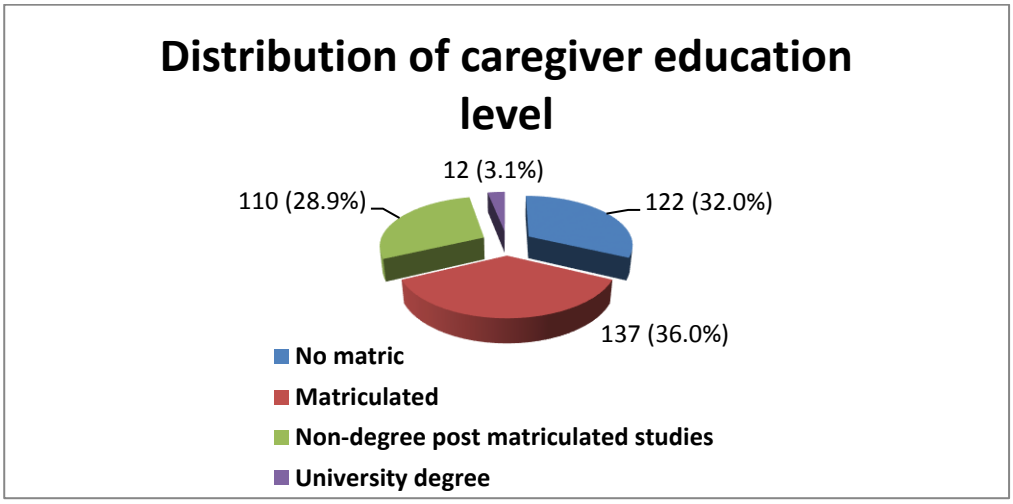


Figure 4.5 Distribution of level of education of caregivers

Only 3.1% of the caregivers in the sample had attained a university degree.110 caregivers (28.9%) completed post matric studies. This included diploma and certificate training courses. 36% of caregivers matriculated with no further tertiary education and 122 caregivers (32%) did not matriculate.

4.2.1.6 Caregiver Work Distribution

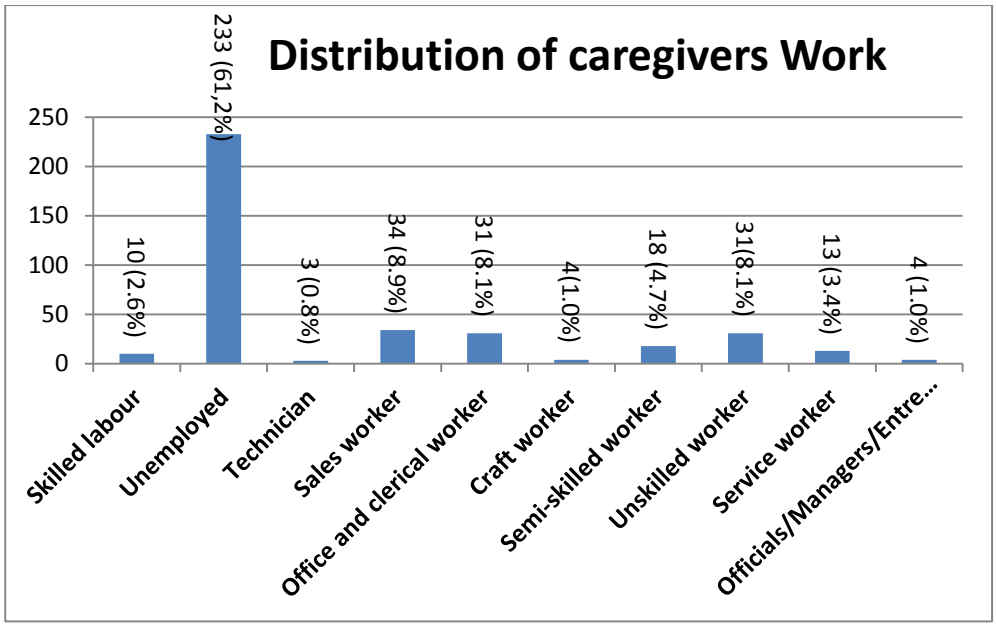


Figure 4.6 Distribution of work of caregivers

Figure 5.6 depicts the distribution of the types of work performed by the caregivers in the sample. 61.2% of the sample was unemployed. Skilled labour comprised only 2.6% of the sample.

4.2.1.7 Distribution of Religion

Figure 5.7 shows the religious distribution of participants within the study.

The vast majority (92%) of participants in the study were Christian. Twenty-five participants (6.6%) had no practising religion and only one patient (0.3%) was of the Islamic faith.

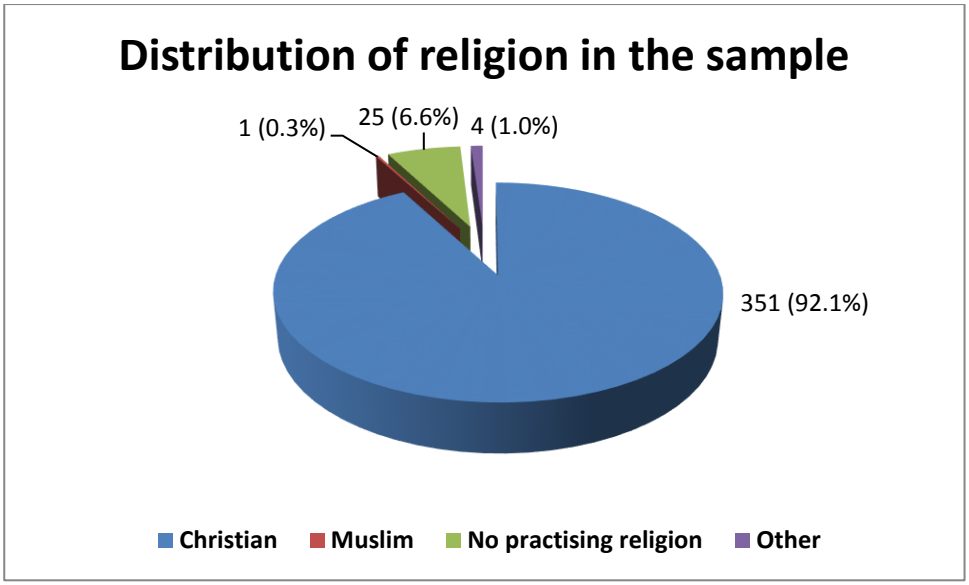


Figure 4.7 Frequency distribution of religion within the sample

4.2.1.8 Distribution of Marital Status

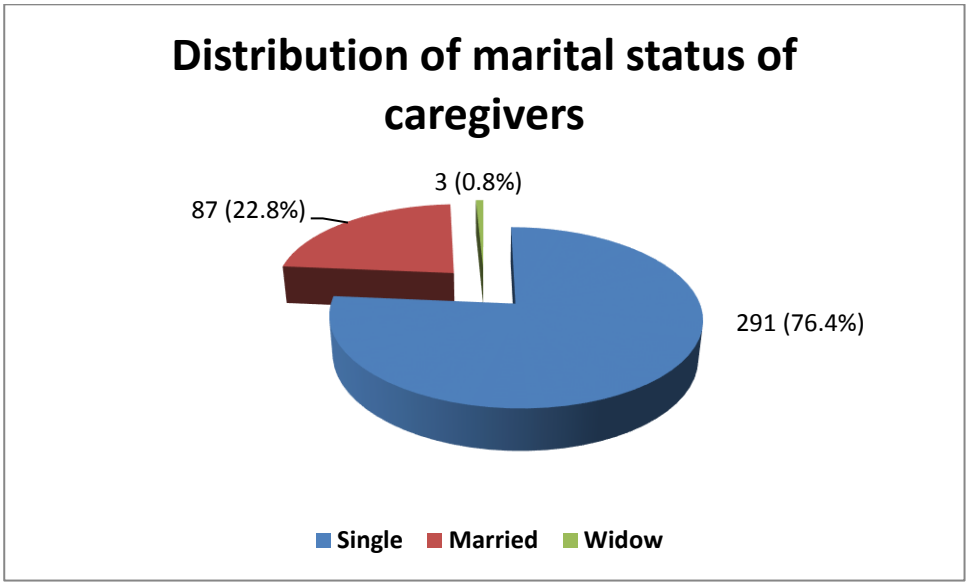


Figure 4.8 Frequency distribution of marital status of caregivers

The graph above (Figure 4.8) indicates the marital status of caregivers of the children in the study. It clearly shows that the majority (76%) of caregivers of children with AD were single. Only eighty-seven (22.8%) caregivers were married. But Figure 5.9 below indicates that fifty percent cohabited with a partner.

4.2.1.9 Distribution of Cohabitation

The graph below shows the cohabitation distribution of caregivers.

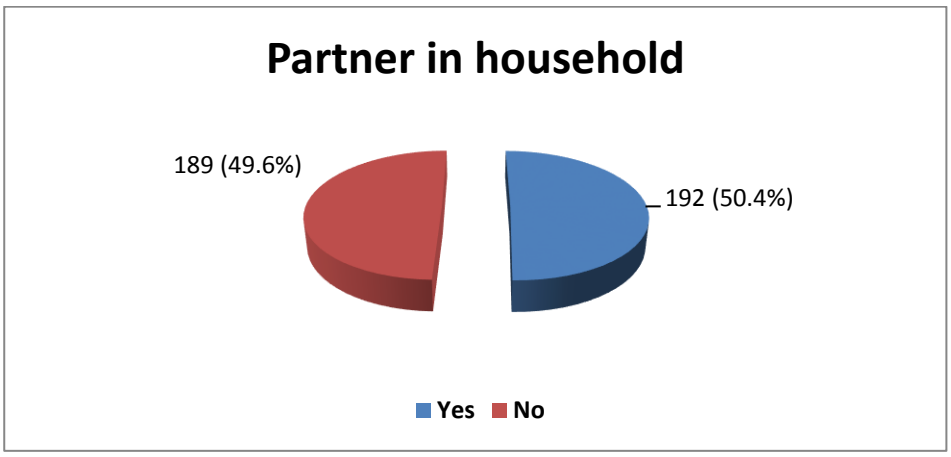


Figure 4.9 Frequency distribution of cohabitation

4.2.1.10 Areas of Residence

The pie chart below shows the residence distribution of participants.

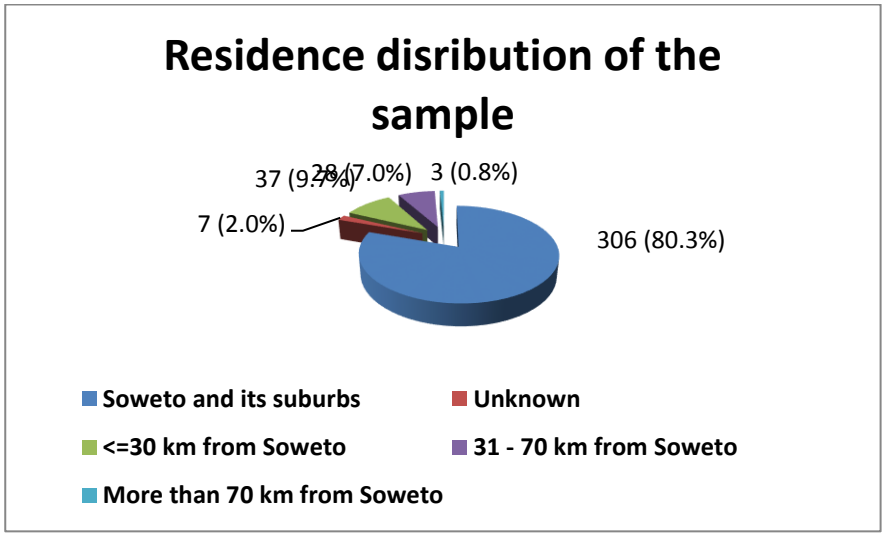


Figure 4.10. Distributions of areas of residence

A big majority (80.3%) of patients and their families in the study lived in Soweto and its surrounding suburbs, as seen in Figure 4.10. Thirty-seven (9.7%) lived less than 30 kilometres from Soweto, 28 (7.0%) lived 31-70 kilometres from Soweto, 7 (2.0%)

lived in unknown areas and 3 (0.8%) lived more than 70 kilometres away from Soweto.

4.2.1.11 Income of Households

The income of the participating children's household is indicated in Figure 4.11. The majority of households, 210 (55.1%), earned less than or equal to R3000 a month. One hundred and eight (28.3%) made between R3000 and R6000 whilst 23 (6.0%) earned between R6000 and R9000. Twenty (5.2%) households had a monthly income of between R9000 and R12 000 and 17 (4.5%) earned more than R12 000 a month.

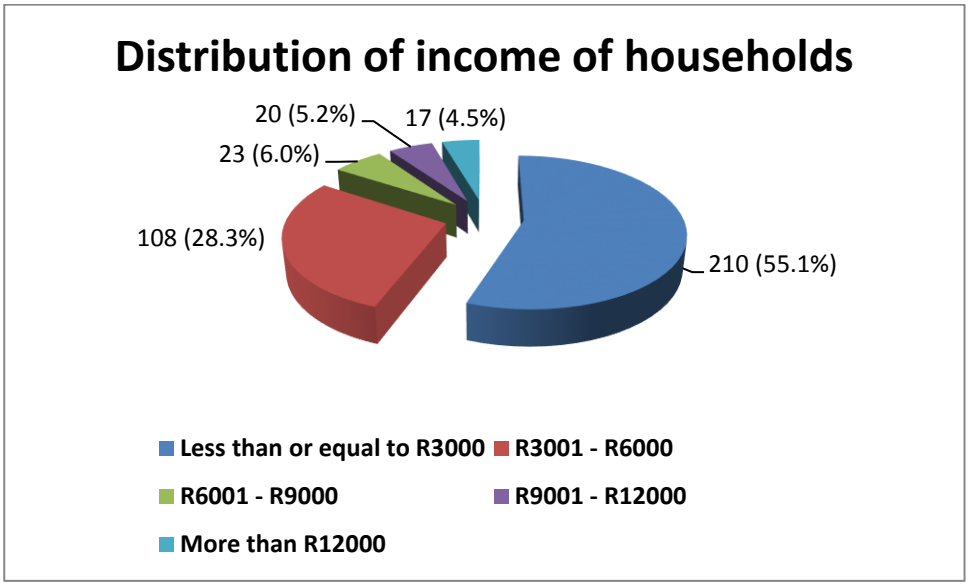


Figure 4.11 Distributions of income of households

4.2.2 Atopic Dermatitis Parameters

Table 4.1 Descriptive statistics of children AD parameters						
	n	Minimum	Maximum	Mean (SD)	Median	Corresponding items in CADIS
SCORAD score	381	0	73	13.49 (14.92)	8	
Total CADIS	381	0	174	70.29 (41.60)	72	
Average Domain 1 - Child Symptoms	381	0	4	2.05 (1.19)	2	1, 6, 9, 10, 12, 14, 17
Average Domain 2 - Child Limitations and Behaviour	381	0	4	1.34 (0.94)	1	2, 21, 22, 24, 27, 29, 34, 41, 43
Average Domain 3 - Family and Social function	381	0	4	1.31 (1.03)	1.11	4, 5, 7, 8, 11, 20, 30, 4, 45
Average Domain 4 - Parent Emotion	381	0	4	1.71 (1.02)	1.71	3, 31, 36
Average Domain 5 - Parent Sleep	381	0	4	1.04 (1.12)	1	13, 15, 16, 18, 19, 23, 25, 26, 28, 32, 33, 35, 37, 38, 39, 42, 44
POEM	381	0	28	10.60 (6.90)	8	

SD stands for Standard Deviation

Table 4.1 shows descriptive statistics of the indices used to assess the impact and effects of severity of Atopic Dermatitis. It can be seen that all the five domains of Childhood Atopic Dermatitis Impact Scale (CADIS) have means ranging from 1 to 2, with standard deviation of almost 1. This is an indication that the quality of life is assessed in a similar way in all the five domains.

4.2.2.1 Atopic dermatitis severity

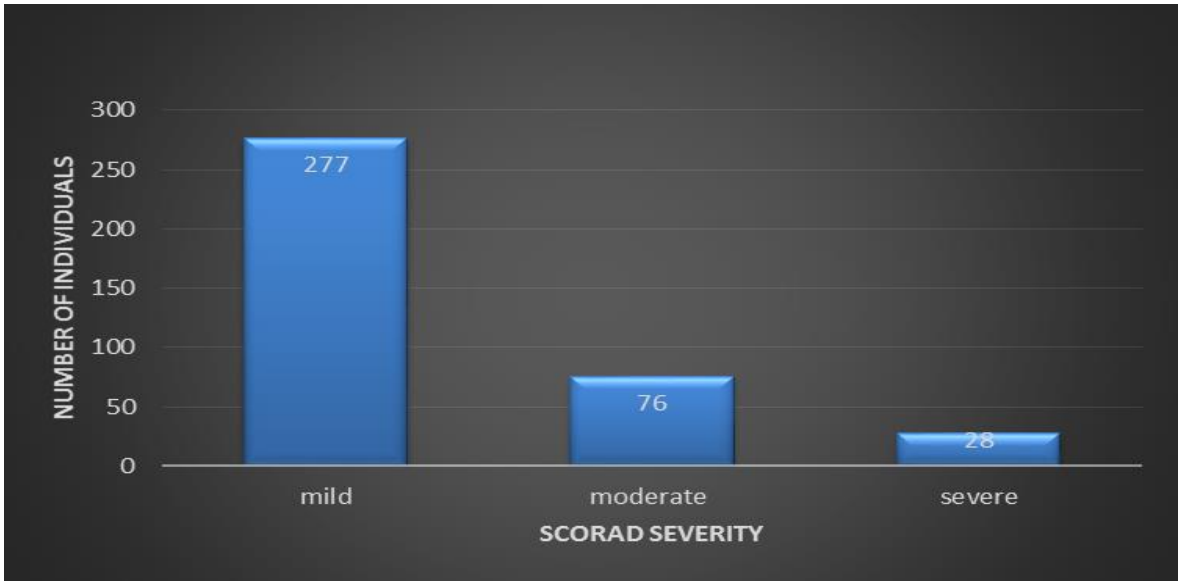


Figure 4.12 Severity distribution of Atopic Dermatitis in the sample using SCORAD

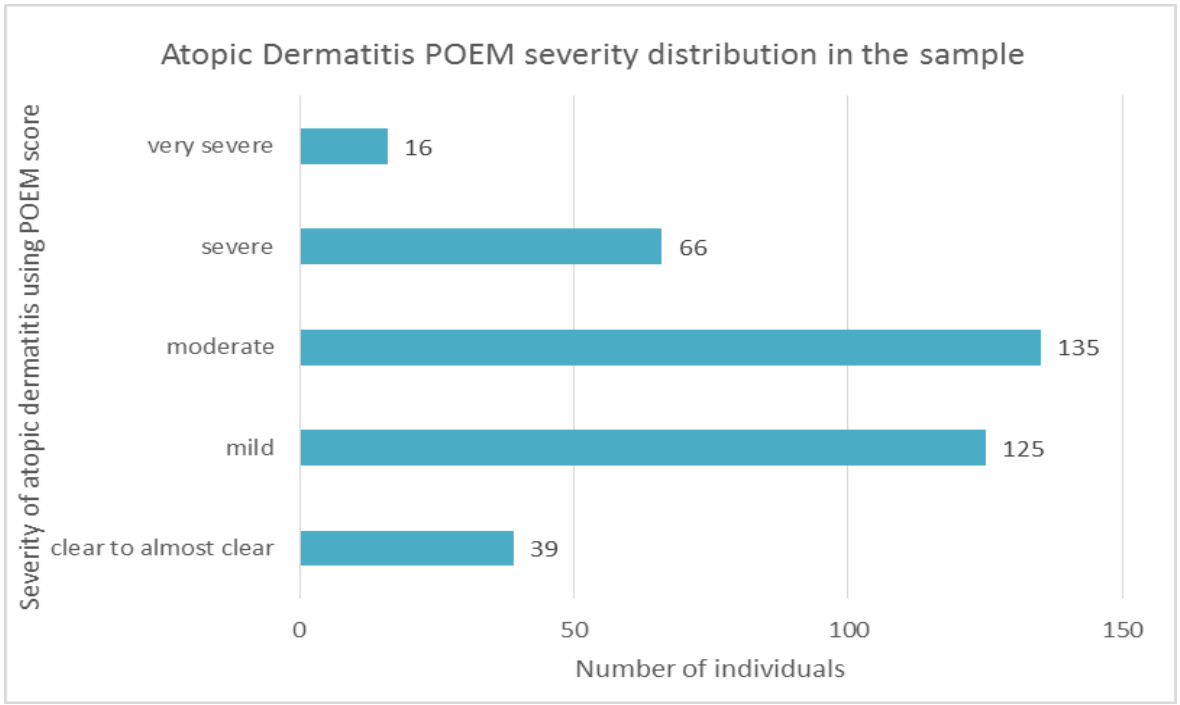


Figure 4.13 Severity distribution of Atopic Dermatitis in the sample using POEM

Figure 4.12 depicts the distribution of severity within the sample population using the SCORAD index. 277 patients (72.7%) had mild disease (corresponding to a SCORAD score of <20), 76 patients (19.9%) had moderate disease (SCORAD score of 20-40) and 28 patients (7.3%) were severe (SCORAD score of >40).

Figure 4.13 shows the severity distribution of the sample using the POEM. Using this index 39 patients (10.2%) were clear to almost clear of eczema (corresponding to a POEM score of 0-2), 125 patients (32.8%) were designated as mild disease (POEM score of 3-7), 135 patients (35.4%) had moderate disease (POEM score of 8-16), 66 patients (17.3%) had severe disease (POEM score of 17-24) and 16 patients (4.2%) scored as having very severe eczema (POEM score of 25-28).

4.3. Comparisons

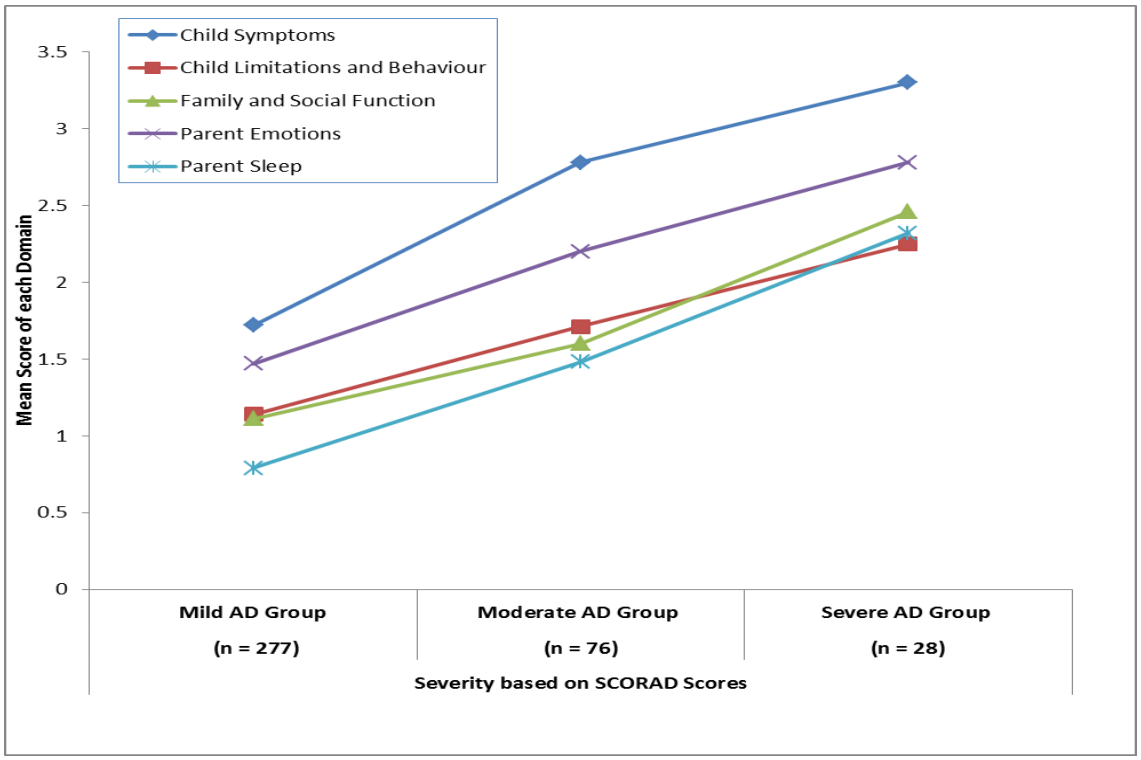


Figure 4.14 Mean Severity Scoring of Atopic Dermatitis (SCORAD) index scores for each Childhood Atopic Dermatitis Impact Scale domain.

Figure 4.14 indicates that 277 patients (73%) are classified as having mild AD, 76 (20%) with moderate AD, and 28 (7%) with severe AD. On average, the Child Symptom domain has the highest score in all the three groups of SCORAD severity. Parent Sleep domain has the lowest score in mild and moderate eczema, and Child Limitations and Behavior domain has the lowest score in the severe group. Score differences between mild and moderate groups are less than those between moderate and severe groups.

Analysis of Variance (ANOVA) is used to determine whether the differences observed in all five CADIS domains, across the three groups of SCORAD severity index, are statistically significant. Results of the ANOVA are shown in Table 2 below.

ANOVA is a statistical technique used to test whether scores of a numerical variable differ significantly across a categorical variable with more than two levels. The null hypothesis (H_0) is that there is no difference and the alternative hypothesis (H_a) is the scores differ for at least two levels of the categorical variable. H_0 is rejected, at 5% significance level, if the p-value is less than 0.05, otherwise H_a is rejected instead.

The p-values of 0.000<0.05 in Table 2 show that all the five domains significantly differ across the three groups. Bonferroni Post Hoc tests, Appendix 1, show that all pairwise comparisons are significant (P-value < 0.05), except child symptoms between moderate and severe groups.

Total CADIS also differs significantly across the three groups of SCORAD.

Table 4.2 Comparison of CADIS domains and Total scores in children with mild, moderate and severe AD

Domain	Mild (n=277)	Moderate (n=76)	Severe (n=28)	Number of items	Range	Test statistic	P-value
Child Symptoms	1.72 (1.13)	2.74 (0.90)	3.30 (0.80)	7	0-4	$F_{378, 2} = 50.3$	0.000
Child Limitations and Behavior	1.14 (0.89)	1.71 (0.83)	2.25 (0.90)	9	0-4	$F_{378, 2} = 28.8$	0.000
Family and Social function	1.11 (0.89)	1.60 (0.93)	2.46 (0.89)	9	0-4	$F_{378, 2} = 29.1$	0.000
Parent Emotion	1.47 (0.96)	2.20 (0.82)	2.78 (0.86)	3	0-4	$F_{378, 2} = 38.7$	0.000
Parent Sleep	0.79 (1.00)	1.48 (1.15)	2.32 (0.96)	17	0-4	$F_{378, 2} = 36.7$	0.000
Total CADIS	**59.62** (38.81)	**91.03** (32.29)	**119.64** (33.96)	**45**	0-180	$F_{378, 2} = 47.7$	0.000

Data are given as Mean (SD)

To compare scores of CADIS and POEM across the different categories of demographic profiles of patients, independent samples T-test or ANOVA is carried out according to whether the demographic variable has two, or more than two categories. POEM is the only one that is significantly (p-value = 0.001) different across the five levels of child age, Table 4.3. The results of other demographic profiles are presented in Appendix 1.

From the results of POEM in Table 4.3, we know that there are significant differences between the groups as a whole. Appendix 1 shows which groups differed from each other. It can be seen that the significant differences observed in

POEM across the different levels of child age, lie only between children younger than or 1 year old and each of the other groups (p-value < 0.05).

Table 4.3 Comparison of CADIS and POEM across children's age levels

		n	Range	Mean	Median	Test Statistic & P-value
CADIS	Younger than or 1 year old	27	13-144	80,74 (34.73)	90	$F_{376, 4} = 0.854$ & 0.492
	1.1 - 2 years	92	7-159	72,02 (40.07)	74	
	2.1 - 3 years	105	0-162	71,86 (42.55)	74	
	3.1 - 4 years	78	0-155	67,28 (42.19)	69	
	Older than 4 years	79	5-174	65,61 (43.69)	57	
POEM	Younger than or 1 year old	27	1-28	15,67 (7.87)	16	$F_{376, 4} = 4.894$ & 0.001
	1.1 - 2 years	92	0-27	11,10 (6.46)	9	
	2.1 - 3 years	105	0-28	10,34 (7.30)	8	
	3.1 - 4 years	78	0-27	9,90 (6.48)	8	
	Older than 4 years	79	0-28	9,30 (6.20)	8	

Table 4.4 Comparison of CADIS across levels of education

		n	Range	Mean	Median	Test Statistic & P-value
CADIS	No matric	122	0-174	72,29 (43.34)	83	$F_{377, 3} = 2.767$ & 0.042
	Matriculated	137	0-159	63,97 (38.63)	64	
	Non-degree post matriculated studies	110	0-162	70,25 (42.79)	68	
	University degree	12	19-132	61,67 (35.20)	55	

Table 4.4 shows CADIS scores differed significantly across the caregivers level of education (P-value: 0042<0.05). A lower education was associated with a higher CADIS score.

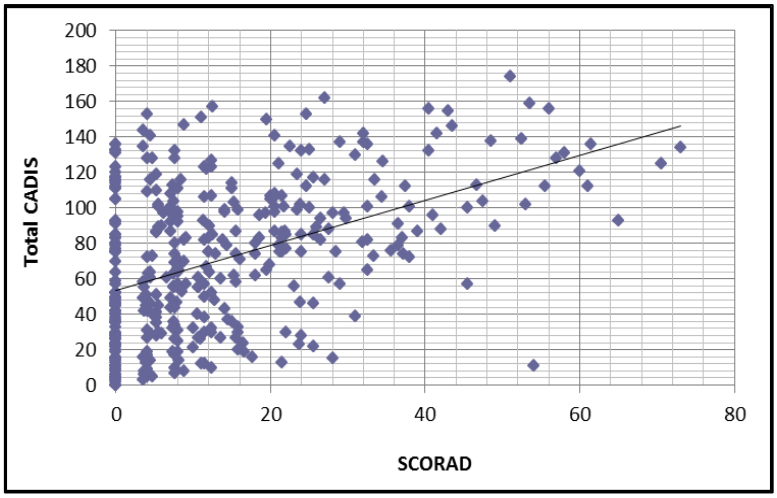
To compare two continuous variables, correlation coefficient is used. Correlation coefficient measures the strength and direction of a linear relationship between two variables on a scatterplot. If the scatterplot does not indicate there is at least somewhat of a linear relationship, the correlation does not mean much. As all our variables, except SCORAD are assumed to be normally distributed, Pearson's correlation coefficient r is used. Spearman's correlation coefficient r_s is used for all correlations involving SCORAD.

Rule of Thumb for interpreting the size of a correlation coefficient:

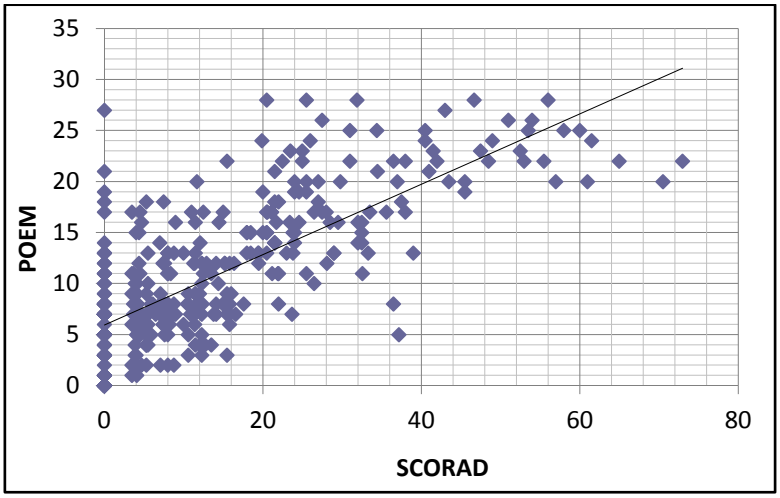
Size of Correlation	Interpretation
0.90 to 1.00 (-0.90 to -1.00)	Very strong positive (negative) correlation
0.70 to 0.90 (-0.70 to -0.90)	Strong positive (negative) correlation
0.50 to 0.70 (-0.50 to -0.70)	Moderate positive (negative) correlation
0.30 to 0.50 (-0.30 to -0.50)	Weak positive (negative) correlation
0.00 to 0.30 (0.00 to -0.30)	Negligible correlation

Figure 4.15 comprises three plot charts and depicts the correlations between SCORAD, CADIS and POEM. There is a weak positive correlation (0.423) between CADIS and SCORAD, while the correlations of POEM with SCORAD and CADIS are moderate positive (0.700 and 0.672). Among the CADIS domains, Child Symptoms is mostly correlated to POEM (r = 0.67), Figure 4.16, and to SCORAD (r = 0.46), Figure 4.17.

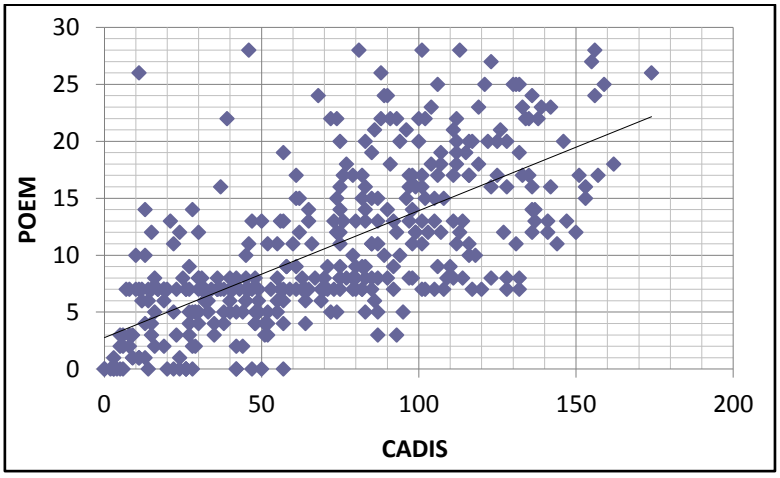
All correlation coefficients are highly significant (p-value 0.000 < 0.05).



r_s = 0.423 (p-value = 0.000)



r_s = 0.700 (p-value = 0.000)

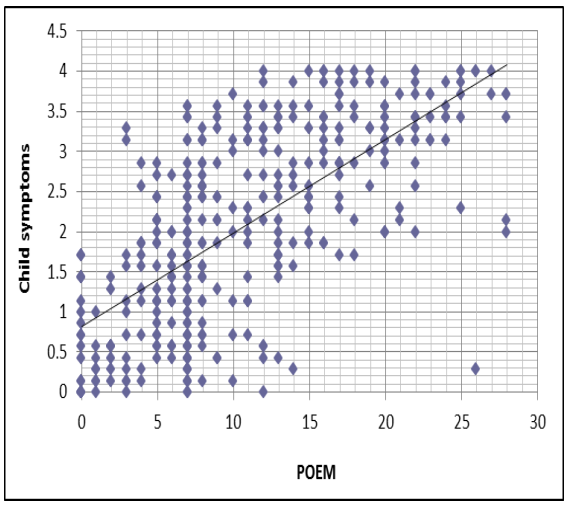


r_s = 0.672 (p-value = 0.000)

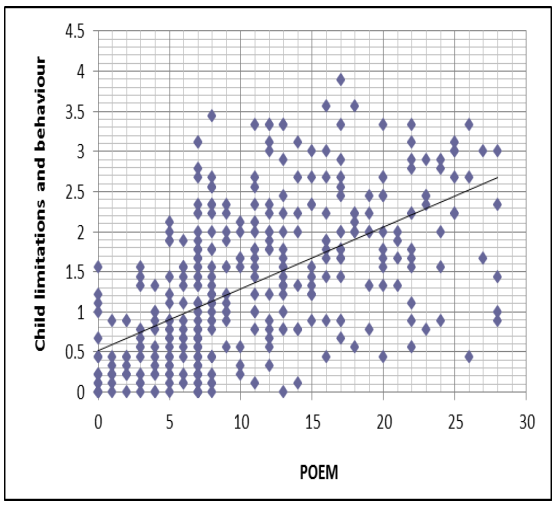
Figure 4.15 Correlations between SCORAD, POEM and CADIS

Figure 4.16 Correlations between CADIS domains and POEM

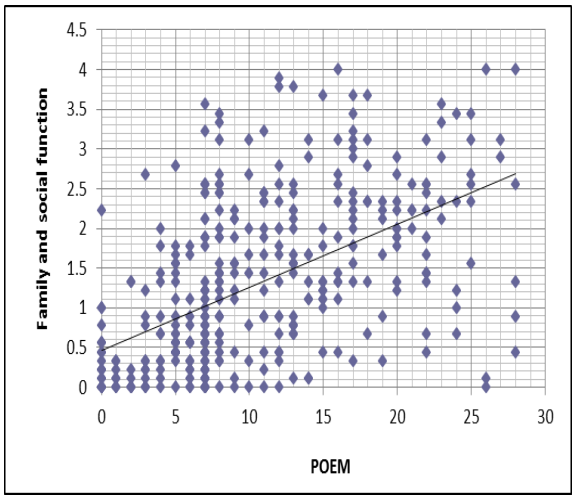
r = 0.673 (p-value = 0.000)



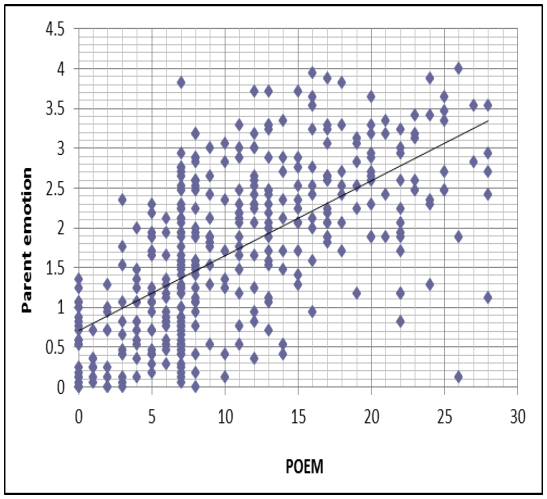
r = 0.567 (p-value = 0.000)



r = 0.529 (p-value = 0.000)



r = 0.636 (p-value = 0.000)



r = 0.484 (p-value = 0.000)

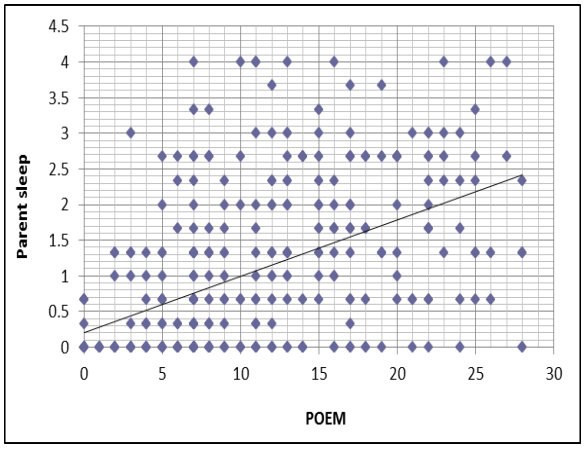
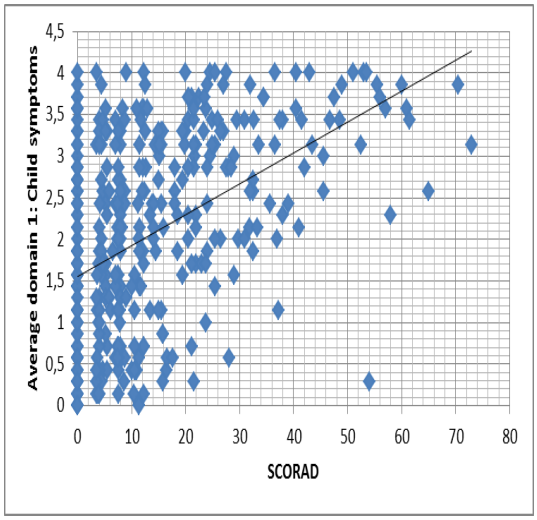
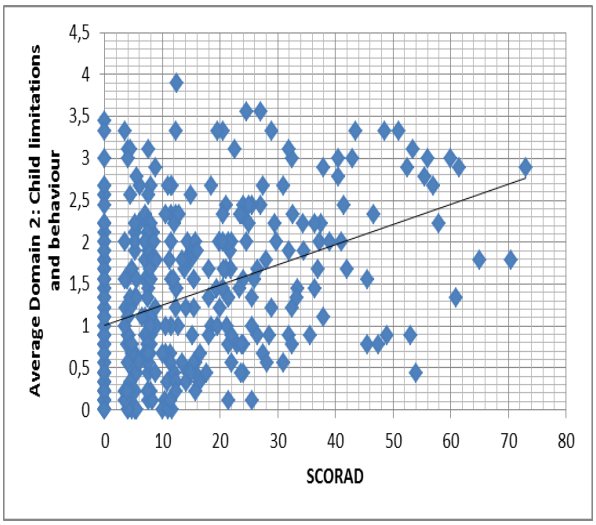


Figure 4.17 Correlations between SCORAD and CADIS domains

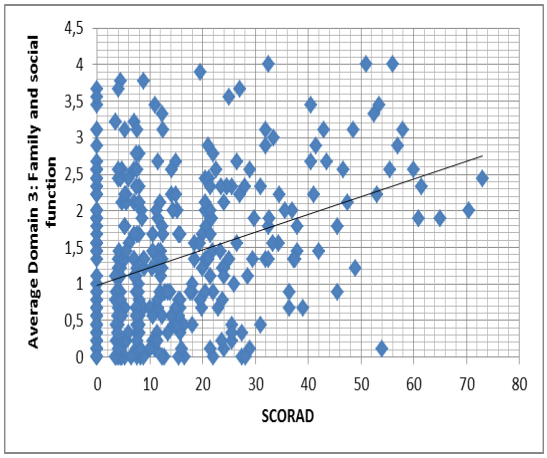
r = 0.464 (p-value = 0.000)



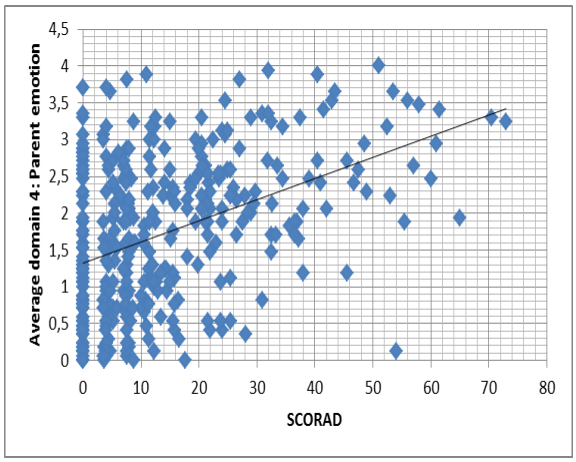
r = 0.383 (p-value = 0.000)



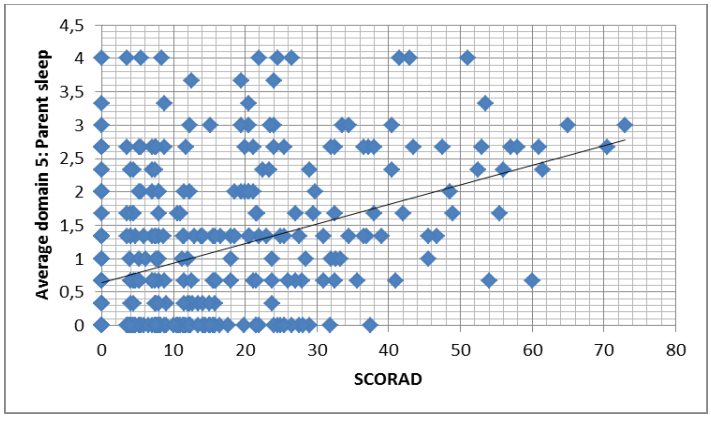
r = 0.349 (p-value = 0.000)



r = 0.423 (p-value = 0.000)



r= 0.388 (p-value = 0.000)



Chapter 5: DISCUSSION

In chapter 5, the results obtained from the study will be discussed. The limitations of the study and recommendations for future studies will also be discussed.

5.1 Demographics

In this study, the Q.O.L of 381 children were evaluated using the CADIS. To our knowledge, no other study using this tool has been conducted in South Africa. Previous studies using this assessment tool sampled a smaller number of patients (Chamlin et al., 2007).

Fifty four point nine percent of patients were male. Most studies on atopic dermatitis show that it affects males and females equally with a slight female predominance. This was not the case in the present study.

Only children less than or equal to 6 years of age were invited to participate in the study. This age group was chosen as younger children are more dependent on their parents and family members for their primary care and as such, health related problems in these children will impact greatly on the quality of life of the family unit as a whole. The mean age of the children participating in the present study was 3.07 years with 51.7% of the sample being between the ages of 1 and 3 years. Only 4.1 % of the study population was less than or equal to 1 year of age. Age was a significant contributing demographic factor in the study. A significant difference in AD severity and QOL scores existed for children 1 year and younger ($p<0.05$). This group had proportionately higher POEM scores denoting higher perceived severity

of their disease and had higher CADIS scores showing a worse quality of life than their older counterparts. The mean and median CADIS scores showed a decline with increasing age illustrating the improvement of quality of life in the patient and their families as the children grew older. This finding was in keeping with other research that demonstrates AD to have a more profound effect on the QOL in younger patients (Ganemo et al., 2007).

Of the primary caregivers, 93.4% were the mothers of the patients and the majority of the sample was black (99%). Ninety two per cent of patients followed the Christian faith. None of these demographic factors showed to affect the QOL scores.

The mean age of the primary caregiver was 30.4 years with most caregivers (50.7%) being between the ages of 20 and 30 years. The low education level of the sample was evidenced in the data which showed that only 3.1% of the primary caregivers in the study group attained a tertiary degree. Thirty six per cent of participants attained matric qualification only with no further studies and 32% of caregivers did not complete their secondary school education at all. This translated into a staggering 61.2% unemployment rate amongst the primary caregivers. A majority of 55.1% of the sample reported a household income of less than R 3000 per month. This younger age of most caregivers, low income and education levels and high rate of unemployment brings to the fore the burden that families affected with AD will face in South Africa. The financial impact of atopic dermatitis has been shown previously to be a major cause of decrease in family Q.O.L. A study conducted in Italy showed that the average cost of a child's AD was $1540 annually (Ricci et al., 2006) . Similar studies have not been conducted in South Africa, so an exact rand

value cannot be placed on this cost. Main expenses in the Italian study were due to moisturisers, special cleaning products and doctor visits (Ricci et al., 2006). In the current sample, as all patients were being cared for at a state facility, these costs were not the burden of the family to bare. However, parents still require to take time off from work for various reasons. This may be due to doctor visits, lack of sleep during periods of disease flares and psychological problems such as stress and anxiety. This has a negative impact on parent earnings.

Caregiver education level was a significant factor predicting QOL in the present study, with a lower education level being associated with a greater decline in QOL scores ($p\ 0042<0.05$). All other demographic factors were shown not to be a significant factor affecting QOL in the present study.

Poor socioeconomic circumstances have been shown to affect psychosocial development of children (Chandan and Richter, 2009; Earls et al, 2008). It is therefore very important to determine socioeconomic status when assessing quality of life. All children and primary caregivers were chosen from the Paediatric Dermatology Outpatient Clinic at Chris Hani Baragwanath Academic Hospital, which is traditionally renowned for servicing a highly underprivileged community with a poor socioeconomic background. 80.3% of the sample resided within Soweto and its suburbs.

Seventy six per cent of caregivers were single and only 50% of caregivers cohabitated with their partner.

5.2 Atopic Dermatitis severity

The objective SCORAD was used as the physician's measure of severity of AD. 72.7% of patients had mild disease, 19.9% had moderate disease and 7.3% were designated as having severe disease. The POEM is a self-administered tool and accounts only for subjective symptoms of AD from the point of view of the patient/caregiver. Using this index 10.2% of patients were clear to almost clear of eczema, 32.8% were designated as having mild disease, 35.4% as moderate disease, 17.3% as severe disease and 4.2% of patients had very severe eczema. The mean SCORAD was 13.49 (falling within the mild category) and the mean POEM was 10.60 (falling within the moderate category). These figures clearly show the disparity between the objective and subjective severity scoring systems in atopic eczema. The patient's perceptions of severity was demonstrably higher than the physician`s objective severity assessment.

5.3 Quality of life

The degree of impairment in QOL was proportional to the severity of AD as measured by SCORAD and POEM ie. the CADIS scores were higher in moderate AD than in mild AD and higher in severe AD than in moderate AD. Many previous studies corroborate this finding of the increased effect on QOL with increasing severity of the atopic eczema (Ben-Gashir et al., 2004, Kim et al., 2012). A greater correlation existed between POEM and CADIS than with the objective SCORAD and CADIS, meaning that patients perceived disease severity was more in tune with the impairment in quality of life than the physician's assessment of disease severity. No precedent exists for this finding as these scores were never previously compared to QOL in a single study.

The individual domain scores and the total CADIS scores showed a greater difference between moderate and severe disease than it did between mild and moderate disease, demonstrating a much greater impairment in quality of life in children with severe atopic dermatitis. The domain of child symptoms showed less of a disparity between the moderate and severe groups. Even though the scores for child symptoms did increase from the moderate to severe AD group, the difference was much less than was present in the other domains. This shows that the impairment in QOL imparted by the child's symptoms, while more in severe than moderate disease, does not show as much disparity between the severity groups than the other domains. As the disease increases in severity the other domains particularly those that impact the family seem to be affected more dramatically, demonstrating the severe decline in QOL within the family as whole in severe disease.

Child's Symptoms was still the QOL measure most affected in all 3 severity groups. Parent sleep was the least affected domain in mild and moderate AD but increased significantly in severe disease. Parent emotion and child symptoms domains were the most affected in severe disease.

5.4 Limitations of the research

- All patients were recruited from the Paediatric Outpatient Department at Chris Hani Baragwanath Academic hospital. This may impart some referral bias with patient's caregivers perceiving a greater severity of their child's disease based on the fact that they attend a tertiary referral centre.
- The study was a cross-sectional one with a once off QOL and severity assessment being performed for each child. Comparison data was not

attained to assess QOL in the same patients over a period of time, which could add an important dimension to the study.

- The 45-item CADIS proved to be time consuming and difficult to perform in a busy clinic such as is the case at Chris Hani Baragwanath Academic Hospital.
- The results of this study may not be used to draw generalized conclusions to children in all age groups, as the current research included children in only a very narrow age range.

5.5 Relevance to clinical practice and recommendations based on results

Quality of life assessment is an important tool in fully understanding the impact of atopic dermatitis. The current study showed that the physician's severity assessment of AD did not correlate as well as caregiver assessment to adequately predict the impairment in QOL in affected children. And neither severity assessment accounts for the decrease in quality of life experienced by the patient's family. QOL measurement tools are unfortunately not routinely performed at a dermatology clinic level due to high patient numbers and due to the fact that these assessments are time consuming. The importance of QOL, as demonstrated by the current study, obviates a need for a standard, simple, routine QOL tool to be introduced into the paediatric dermatology clinics. This will provide invaluable information and insight into patient disease severity and family impact of the disease.

Atopic Dermatitis has been shown to have a negative impact on QOL of children suffering with from disease with increased severity correlating with a worse impact on physical and psychosocial functioning. It is, therefore, evident that services

offered at the paediatric dermatology clinics should not only concentrate on the medical management of the disease. There is a need for a multi-disciplinary approach that meets medical, social and psychological needs of the patient. This may decrease stress and anxiety experienced by the patients, which in turn will support a more favourable therapeutic outcome. Intervention aimed at all aspects of functioning may be essential to ensure children attain a smooth transition into adolescence and adulthood. These interventions should not be based only at large referral clinics but need to be extended to local clinics, communities and the school environment.

In addition, programmes should be extended to meet the needs of caregivers and families of affected children. Better education needs to be provided to family members about the affected child's condition and in-depth counselling should be performed regarding topical steroid and emollient usage, prevention of infection, compliance to treatment, avoidance of trigger factors and grooming practices.

The financial burden on families and effect on psychosocial functioning of the primary caregiver has been well documented and has also been demonstrated in the current research. A need therefore exists for the establishment of Atopic Dermatitis support groups, care dependency grants for AD and psychologist and social worker assessment of severely affected families.

Parent workplace intervention by means of employer education and counselling may foster greater understanding of family needs. Allowing for special family responsibility leave and flexible work hours are some changes that can be

negotiated for parents at their workplace to assist parents with the care of their atopic children. This will help to alleviate stress and anxiety for parents at the workplace, resulting in a more productive working environment.

Improving community awareness of AD needs to be pioneered to decrease stigmata associated with the disease. This can be achieved by performing school outreach programmes, awareness days at school, as well as consultation with educators and community leaders.

5.6 Recommendations for future research

Research has shown that children suffering from AD have a lower quality of life.

- Further studies using the same tools should be performed on the same sample at different times during the disease course to demonstrate the change in QOL in children as the severity of their disease changes and as symptoms and signs evolve over time.
- Studies that include children within a broader age range would be useful to assess the impact of AD at all stages of development.
- A prospective study of QOL would be interesting to demonstrate the changes in disease severity and QOL as children graduate to adolescence and then adulthood.
- The creation and validation of a reliable, simple QOL questionnaire for a South African setting needs to be developed. This tool should be quick and easy to perform routinely in busy outpatient clinics.

This study is important for further research that would be of benefit to developing countries such as South Africa. Limited research using validated QOL measures have been done in the field of atopic dermatitis worldwide and, to our knowledge, none have been performed in South Africa, leading to a large gap in the literature on this topic. The results of this study will contribute to the development of a more comprehensive management programme for children with atopic dermatitis.

Chapter 6: CONCLUSION

Recent studies show that the prevalence of atopic dermatitis in the developing world is increasing (Odhiambo et al., 2009). It has become a major cause of chronic illness in childhood (Madhok et al., 2015). Quality of Life measures has therefore become an important medical outcome to consider in affected children and their families. The aim of the research was to evaluate the Q.O.L of children < 6 with atopic eczema and their families in a South African setting. The Childhood Atopic Dermatitis Impact Scale was the measurement tool used. Three hundred and eighty one subjects and their caregivers were assessed.

The CADIS has been shown to be valid and reliable and has been used in previous research in children < 6 with AD. For this study, the questionnaires were translated into isiZulu and Sotho.

The results indicated that atopic dermatitis has a negative impact on the quality of life of affected children and their families. The degree of impairment of quality of life increased with increasing disease severity. This finding supports previous studies that demonstrated similar findings (Ben-Gashir et al., 2004, Kim et al., 2012). The greatest impact on QOL in all severity groups was in the area of the affected child's symptoms. The family QOL was affected more as the disease severity increased. A relationship was established between QOL and patient age, where a higher impairment in child and family QOL existed for children less than 1 year of age. It was also associated with lower caregiver education level. The QOL measure showed a higher correlation to the caregiver assessment of severity than to the

physician's assessment, suggesting that patient derived outcome measures should be the most essential measure in adequately assessing disease severity. As shown in the current research, the POEM is simple, quick and easy to perform, making it ideal to use in a clinic setting as a marker of both severity of disease and QOL.

There is a need for further research of children in South Africa with AD. This is essential to identify effective interventions to improve disease severity and Q.O.L in patients and their families. Some interventions that may help to alleviate the burden of disease include parent education, psychological counselling of patients and families, the formulation of AD support groups, financial assistance to affected families in the form of care dependency grants and outreach programmes to schools, workplaces and the community to improve awareness of AD to foster better understanding of elements of the disease and the effects it has on patients and their families. These interventions could help in the development of atopic children into healthy adults capable of effective family, community and social interaction.

Chapter 7: REFERENCES

ABECK, D. & STROM, K. 2000. Optimal management of atopic dermatitis. *Am J Clin Dermatol,* 1**,** 41-6.

ANGELOVA-FISCHER, I., BAUER, A., HIPLER, U. C., PETROV, I., KAZANDJIEVA, J., BRUCKNER, T., DIEPGEN, T., TSANKOV, N., WILLIAMS, M., FISCHER, T. W., ELSNER, P. & FLUHR, J. W. 2005. The objective severity assessment of atopic dermatitis (OSAAD) score: validity, reliability and sensitivity in adult patients with atopic dermatitis. *Br J Dermatol,* 153**,** 767-73.

AZIAH, M. S., ROSNAH, T., MARDZIAH, A. & NORZILA, M. Z. 2002. Childhood atopic dermatitis: a measurement of quality of life and family impact. *Med J Malaysia,* 57**,** 329-39.

BALKRISHNAN, R., HOUSMAN, T. S., CARROLL, C., FELDMAN, S. R. & FLEISCHER, A. B. 2003. Disease severity and associated family impact in childhood atopic dermatitis. *Arch Dis Child,* 88**,** 423-7.

BARNES, K. C. 2010. An update on the genetics of atopic dermatitis: scratching the surface in 2009. *J Allergy Clin Immunol,* 125**,** 16-29.e1-11; quiz 30-1.

BEATTIE, P. E. & LEWIS-JONES, M. S. 2006a. An audit of the impact of a consultation with a paediatric dermatology team on quality of life in infants with atopic eczema and their families: further validation of the Infants' Dermatitis Quality of Life Index and Dermatitis Family Impact score. *Br J Dermatol,* 155**,** 1249-55.

BEATTIE, P. E. & LEWIS-JONES, M. S. 2006b. A comparative study of impairment of quality of life in children with skin disease and children with other chronic childhood diseases. *Br J Dermatol,* 155**,** 145-51.

BECK, L. A., THACI, D., HAMILTON, J. D., GRAHAM, N. M., BIEBER, T., ROCKLIN, R., MING, J. E., REN, H., KAO, R., SIMPSON, E., ARDELEANU, M., WEINSTEIN, S. P., PIROZZI, G., GUTTMAN-YASSKY, E., SUAREZ-FARINAS, M., HAGER, M. D., STAHL, N., YANCOPOULOS, G. D. & RADIN, A. R. 2014. Dupilumab treatment in adults with moderate-to-severe atopic dermatitis. *N Engl J Med,* 371**,** 130-9.

BEN-GASHIR, M. A. 2003. Relationship between quality of life and disease severity in atopic dermatitis/eczema syndrome during childhood. *Curr Opin Allergy Clin Immunol,* 3**,** 369-73.

BEN-GASHIR, M. A., SEED, P. T. & HAY, R. J. 2002. Are quality of family life and disease severity related in childhood atopic dermatitis? *J Eur Acad Dermatol Venereol,* 16**,** 455-62.

BEN-GASHIR, M. A., SEED, P. T. & HAY, R. J. 2004. Quality of life and disease severity are correlated in children with atopic dermatitis. *Br J Dermatol,* 150**,** 284-90.

BERTH-JONES, J., TAKWALE, A., TAN, E., BARCLAY, G., AGARWAL, S., AHMED, I., HOTCHKISS, K. & GRAHAM-BROWN, R. A. 2002. Azathioprine in severe adult atopic dermatitis: a double-blind, placebo-controlled, crossover trial. *Br J Dermatol,* 147**,** 324-30.

BERZON, R., HAYS, R. D. & SHUMAKER, S. A. 1993. International use, application and performance of health-related quality of life instruments. *Quality of Life Research,* 2**,** 367-368.

BOLOGNIA, J., JORIZZO, J. L. & RAPINI, R. P. 2008. *Dermatology,* St. Louis, Mo. ; London, Mosby Elsevier.

BUSKE-KIRSCHBAUM, A., GEIBEN, A. & HELLHAMMER, D. 2001. Psychobiological aspects of atopic dermatitis: an overview. *Psychother Psychosom,* 70**,** 6-16.

CARROLL, C. L., BALKRISHNAN, R., FELDMAN, S. R., FLEISCHER, A. B., JR. & MANUEL, J. C. 2005. The burden of atopic dermatitis: impact on the patient, family, and society. *Pediatr Dermatol,* 22**,** 192-9.

CASE, R. J., BARBER, C. C. & STARKEY, N. J. 2015. Psychosocial needs of parents and children accessing hospital outpatient paediatric services in New Zealand. *J Paediatr Child Health,* 51**,** 1097-102.

CATHERINE MACK CORREA, M. & NEBUS, J. 2012. Management of patients with atopic dermatitis: the role of emollient therapy. *Dermatol Res Pract,* 2012**,** 836931.

CHAMLIN, S. L., CELLA, D., FRIEDEN, I. J., WILLIAMS, M. L., MANCINI, A. J., LAI, J. S. & CHREN, M. M. 2005. Development of the Childhood Atopic Dermatitis Impact Scale: initial validation of a quality-of-life measure for young children with atopic dermatitis and their families. *J Invest Dermatol,* 125**,** 1106-11.

CHAMLIN, S. L., FRIEDEN, I. J., WILLIAMS, M. L. & CHREN, M. M. 2004. Effects of atopic dermatitis on young American children and their families. *Pediatrics,* 114**,** 607-11.

CHAMLIN, S. L., LAI, J. S., CELLA, D., FRIEDEN, I. J., WILLIAMS, M. L., MANCINI, A. J. & CHREN, M. M. 2007. Childhood Atopic Dermatitis Impact Scale:

reliability, discriminative and concurrent validity, and responsiveness. *Arch Dermatol,* 143**,** 768-72.

CHARMAN, C. R., VENN, A. J. & WILLIAMS, H. C. 2004. The patient-oriented eczema measure: development and initial validation of a new tool for measuring atopic eczema severity from the patients' perspective. *Arch Dermatol,* 140**,** 1513-9.

CHEN, S. & ZHAO, L. 2013. Association between the IL10 -1082A>G (rs1800896) single-nucleotide polymorphism and atopic dermatitis: a systematic review and meta-analysis. *Dermatitis,* 24**,** 161-5.

CHENG, C. M., HSU, J. W., HUANG, K. L., BAI, Y. M., SU, T. P., LI, C. T., YANG, A. C., CHANG, W. H., CHEN, T. J., TSAI, S. J. & CHEN, M. H. 2015. Risk of developing major depressive disorder and anxiety disorders among adolescents and adults with atopic dermatitis: a nationwide longitudinal study. *J Affect Disord,* 178**,** 60-5.

DAUD, L. R., GARRALDA, M. E. & DAVID, T. J. 1993. Psychosocial adjustment in preschool children with atopic eczema. *Arch Dis Child,* 69**,** 670-6.

ELLIS, C., LUGER, T., ABECK, D., ALLEN, R., GRAHAM-BROWN, R. A., DE PROST, Y., EICHENFIELD, L. F., FERRANDIZ, C., GIANNETTI, A., HANIFIN, J., KOO, J. Y., LEUNG, D., LYNDE, C., RING, J., RUIZ-MALDONADO, R. & SAURAT, J. H. 2003. International Consensus Conference on Atopic Dermatitis II (ICCAD II): clinical update and current treatment strategies. *Br J Dermatol,* 148 Suppl 63**,** 3-10.

FINLAY, A. Y. & KHAN, G. K. 1994. Dermatology Life Quality Index (DLQI)--a simple practical measure for routine clinical use. *Clin Exp Dermatol,* 19**,** 210-6.

GANEMO, A., SVENSSON, A., LINDBERG, M. & WAHLGREN, C. F. 2007. Quality of life in Swedish children with eczema. *Acta Derm Venereol,* 87**,** 345-9.

GROOTENHUIS, M. A., KOOPMAN, H. M., VERRIPS, E. G., VOGELS, A. G. & LAST, B. F. 2007. Health-related quality of life problems of children aged 8-11 years with a chronic disease. *Dev Neurorehabil,* 10**,** 27-33.

HANIFIN, J. M., COOPER, K. D., HO, V. C., KANG, S., KRAFCHIK, B. R., MARGOLIS, D. J., SCHACHNER, L. A., SIDBURY, R., WHITMORE, S. E., SIECK, C. K. & VAN VOORHEES, A. S. 2004. Guidelines of care for atopic dermatitis, developed in accordance with the American Academy of Dermatology (AAD)/American Academy of Dermatology Association "Administrative Regulations for Evidence-Based Clinical Practice Guidelines". *J Am Acad Dermatol,* 50**,** 391-404.

HUMPHREYS, F. & HUMPHREYS, M. S. 1998. Psychiatric morbidity and skin disease: what dermatologists think they see. *Br J Dermatol,* 139**,** 679-81.

HUNTER, J. A. A., SAVIN, J. & DAHL, M. V. 2002. *Clinical dermatology,* Malden, Mass. ; Oxford, Blackwell Science.

JESSOP, S., MCKENZIE, R., MILNE, J., RAPP, S. & SOBEY, G. 2002. Pattern of admissions to a tertiary dermatology unit in South Africa. *Int J Dermatol,* 41**,** 568-70.

KIM, D. H., LI, K., SEO, S. J., JO, S. J., YIM, H. W., KIM, C. M., KIM, K. H., KIM, D. W., KIM, M. B., KIM, J. W., RO, Y. S., PARK, Y. L., PARK, C. W., LEE, S. C. & CHO, S. H. 2012. Quality of life and disease severity are correlated in patients with atopic dermatitis. *J Korean Med Sci,* 27**,** 1327-32.

KYLLONEN, H., REMITZ, A., MANDELIN, J. M., ELG, P. & REITAMO, S. 2004. Effects of 1-year intermittent treatment with topical tacrolimus monotherapy

on skin collagen synthesis in patients with atopic dermatitis. *Br J Dermatol,* 150**,** 1174-81.

LAWSON, V., LEWIS-JONES, M. S., FINLAY, A. Y., REID, P. & OWENS, R. G. 1998. The family impact of childhood atopic dermatitis: the Dermatitis Family Impact Questionnaire. *Br J Dermatol,* 138**,** 107-13.

LEWIS-JONES, M. S. & FINLAY, A. Y. 1995. The Children's Dermatology Life Quality Index (CDLQI): initial validation and practical use. *Br J Dermatol,* 132**,** 942-9.

LEWIS-JONES, M. S., FINLAY, A. Y. & DYKES, P. J. 2001. The Infants' Dermatitis Quality of Life Index. *Br J Dermatol,* 144**,** 104-10.

LEWIS-JONES, S. 2006. Quality of life and childhood atopic dermatitis: the misery of living with childhood eczema. *Int J Clin Pract,* 60**,** 984-92.

MADHOK, V., FUTAMURA, M., THOMAS, K. S. & BARBAROT, S. 2015. What's new in atopic eczema? An analysis of systematic reviews published in 2012 and 2013. Part 1. Epidemiology, mechanisms of disease and methodological issues. *Clin Exp Dermatol,* 40**,** 238-42.

MANJRA, A. I., DU PLESSIS, P., WEISS, R., MOTALA, C. M., POTTER, P. C., RABOOBEE, N., NDLOVA, N., DAVIS, M. & WEINBERG, E. G. 2005. Childhood atopic eczema consensus document. *S Afr Med J,* 95**,** 435-40.

MCKENNA, S. P. & DOWARD, L. C. 2008. Quality of life of children with atopic dermatitis and their families. *Curr Opin Allergy Clin Immunol,* 8**,** 228-31.

MCKENNA, S. P., WHALLEY, D., DEWAR, A. L., ERDMAN, R. A., KOHLMANN, T., NIERO, M., BARO, E., COOK, S. A., CRICKX, B., FRECH, F. & VAN ASSCHE, D. 2005. International development of the Parents' Index of Quality of Life in Atopic Dermatitis (PIQoL-AD). *Qual Life Res,* 14**,** 231-41.

MCNALLY, N. J., PHILLIPS, D. R. & WILLIAMS, H. C. 1998. The problem of atopic eczema: aetiological clues from the environment and lifestyles. *Soc Sci Med,* 46**,** 729-41.

MOKKINK, L. B., VAN DER LEE, J. H., GROOTENHUIS, M. A., OFFRINGA, M. & HEYMANS, H. S. 2008. Defining chronic diseases and health conditions in childhood (0-18 years of age): national consensus in the Netherlands. *Eur J Pediatr,* 167**,** 1441-7.

MOLLANAZAR, N. K., SMITH, P. K. & YOSIPOVITCH, G. 2015. Mediators of Chronic Pruritus in Atopic Dermatitis: Getting the Itch Out? *Clin Rev Allergy Immunol*.

MOORE, K., DAVID, T. J., MURRAY, C. S., CHILD, F. & ARKWRIGHT, P. D. 2006. Effect of childhood eczema and asthma on parental sleep and well-being: a prospective comparative study. *Br J Dermatol,* 154**,** 514-8.

NEUBER, K., SCHWARTZ, I., ITSCHERT, G. & DIECK, A. T. 2000. Treatment of atopic eczema with oral mycophenolate mofetil. *Br J Dermatol,* 143**,** 385-91.

NICOLAOU, N., SIDDIQUE, N. & CUSTOVIC, A. 2005. Allergic disease in urban and rural populations: increasing prevalence with increasing urbanization. *Allergy,* 60**,** 1357-60.

NUTTEN, S. 2015. Atopic dermatitis: global epidemiology and risk factors. *Ann Nutr Metab,* 66 Suppl 1**,** 8-16.

ODHIAMBO, J. A., WILLIAMS, H. C., CLAYTON, T. O., ROBERTSON, C. F. & ASHER, M. I. 2009. Global variations in prevalence of eczema symptoms in children from ISAAC Phase Three. *J Allergy Clin Immunol,* 124**,** 1251-8.e23.

ORANJE, A. P., GLAZENBURG, E. J., WOLKERSTORFER, A. & DE WAARD-VAN DER SPEK, F. B. 2007. Practical issues on interpretation of scoring atopic

dermatitis: the SCORAD index, objective SCORAD and the three-item severity score. *Br J Dermatol,* 157**,** 645-8.

PATRIZI, A., RAONE, B. & RAVAIOLI, G. M. 2015. Management of atopic dermatitis: safety and efficacy of phototherapy. *Clin Cosmet Investig Dermatol,* 8**,** 511-20.

PERRIN, E. C., NEWACHECK, P., PLESS, I. B., DROTAR, D., GORTMAKER, S. L., LEVENTHAL, J., PERRIN, J. M., STEIN, R. E., WALKER, D. K. & WEITZMAN, M. 1993. Issues involved in the definition and classification of chronic health conditions. *Pediatrics,* 91**,** 787-93.

PUCCI, N., NOVEMBRE, E., CAMMARATA, M. G., BERNARDINI, R., MONACO, M. G., CALOGERO, C., VIERUCCI, A. 2005. Scoring atopic dermatitis in infants and young children: distinctive features of the SCORAD index. *Allergy*, 60, 113-116

RICCI, G., BENDANDI, B., PAGLIARA, L., PATRIZI, A. & MASI, M. 2006. Atopic dermatitis in Italian children: evaluation of its economic impact. *J Pediatr Health Care,* 20**,** 311-5.

RING, J., PRZYBILLA, B. & RUZICKA, T. 2006. *Handbook of atopic eczema*, Springer-Verlag Berlin Heidelberg.

SAMOCHOCKI, Z. & DEJEWSKA, J. 2012. A comparison of criteria for diagnosis of atopic dermatitis in children. *World J Pediatr,* 8**,** 355-8.

SAMPSON, H. A. 1997a. Food allergy. *Jama,* 278**,** 1888-94.

SAMPSON, H. A. 1997b. Food sensitivity and the pathogenesis of atopic dermatitis. *J R Soc Med,* 90 Suppl 30**,** 2-8.

SAMPSON, H. A. & HO, D. G. 1997. Relationship between food-specific IgE concentrations and the risk of positive food challenges in children and adolescents. *J Allergy Clin Immunol,* 100**,** 444-51.

SCHMITT, J., LANGAN, S. & WILLIAMS, H. C. 2007a. What are the best outcome measurements for atopic eczema? A systematic review. *J Allergy Clin Immunol,* 120**,** 1389-98.

SCHMITT, J., SCHMITT, N. & MEURER, M. 2007b. Cyclosporin in the treatment of patients with atopic eczema - a systematic review and meta-analysis. *J Eur Acad Dermatol Venereol,* 21**,** 606-19.

SCHRAM, M. E., SPULS, P. I., LEEFLANG, M. M., LINDEBOOM, R., BOS, J. D. & SCHMITT, J. 2012. EASI, (objective) SCORAD and POEM for atopic eczema: responsiveness and minimal clinically important difference. *Allergy,* 67**,** 99-106.

SINCLAIR, W., ABOOBAKER, J., JORDAAN, F., MODI, D. & TODD, G. 2008. Management of atopic dermatitis in adolescents and adults in South Africa. *S Afr Med J,* 98**,** 303-19.

SU, J. C., KEMP, A. S., VARIGOS, G. A. & NOLAN, T. M. 1997. Atopic eczema: its impact on the family and financial cost. *Arch Dis Child,* 76**,** 159-62.

SUNDERKOTTER, C., WEISS, J. M., BEXTERMOLLER, R., LOFFLER, H. & SCHNEIDER, D. 2006. [Post-marketing surveillance on treatment of 5,665 patients with atopic dermatitis using the calcineurin inhibitor pimecrolimus: positive effects on major symptoms of atopic dermatitis and on quality of life]. *J Dtsch Dermatol Ges,* 4**,** 301-6.

SURIS, J. C., MICHAUD, P. A. & VINER, R. 2004. The adolescent with a chronic condition. Part I: developmental issues. *Arch Dis Child,* 89**,** 938-42.

TANG, T. S., BIEBER, T. & WILLIAMS, H. C. 2012. Does "autoreactivity" play a role in atopic dermatitis? *J Allergy Clin Immunol,* 129**,** 1209-1215.e2.

THE WHOQOL, G. 1998. The World Health Organization quality of life assessment (WHOQOL): Development and general psychometric properties1. *Social Science & Medicine,* 46**,** 1569-1585.

THOMAS, K. S., ARMSTRONG, S., AVERY, A., PO, A. L., O'NEILL, C., YOUNG, S. & WILLIAMS, H. C. 2002. Randomised controlled trial of short bursts of a potent topical corticosteroid versus prolonged use of a mild preparation for children with mild or moderate atopic eczema. *Bmj,* 324**,** 768.

VAN DEN OORD, R. A. & SHEIKH, A. 2009. Filaggrin gene defects and risk of developing allergic sensitisation and allergic disorders: systematic review and meta-analysis. *Bmj,* 339**,** b2433.

WALLANDER, J. L., SCHMITT, M. & KOOT, H. M. 2001. Quality of life measurement in children and adolescents: issues, instruments, and applications. *J Clin Psychol,* 57**,** 571-85.

WILLIAMS, H., ROBERTSON, C., STEWART, A., AIT-KHALED, N., ANABWANI, G., ANDERSON, R., ASHER, I., BEASLEY, R., BJORKSTEN, B., BURR, M., CLAYTON, T., CRANE, J., ELLWOOD, P., KEIL, U., LAI, C., MALLOL, J., MARTINEZ, F., MITCHELL, E., MONTEFORT, S., PEARCE, N., SHAH, J., SIBBALD, B., STRACHAN, D., VON MUTIUS, E. & WEILAND, S. K. 1999. Worldwide variations in the prevalence of symptoms of atopic eczema in the International Study of Asthma and Allergies in Childhood. *J Allergy Clin Immunol,* 103**,** 125-38.

WILLIAMS, H., STEWART, A., VON MUTIUS, E., COOKSON, W. & ANDERSON, H. R. 2008. Is eczema really on the increase worldwide? *J Allergy Clin Immunol,* 121**,** 947-54.e15.

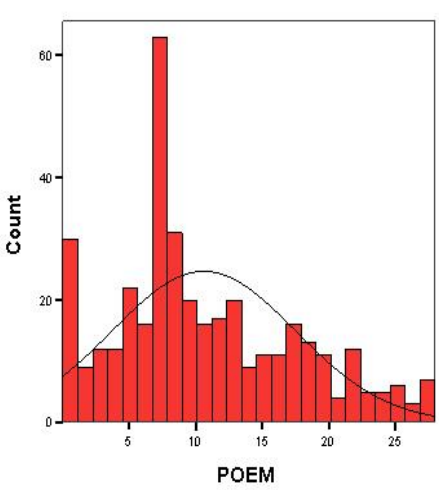
WOLFF, K. & FITZPATRICK, T. B. D. I. G. M. 2008. *Fitzpatrick's dermatology in general medicine,* New York ; London, McGraw-Hill.

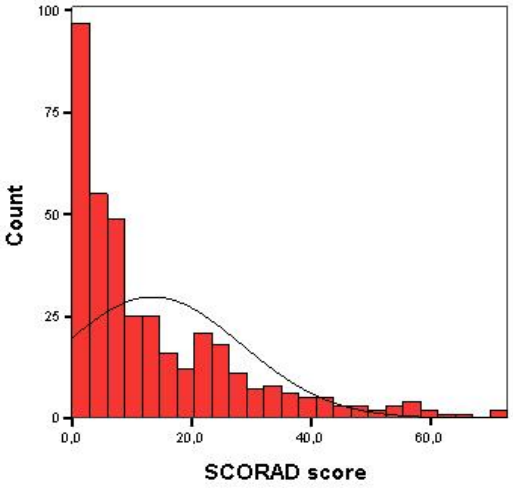
WOLVERTON, S. E. 2007. *Comprehensive dermatologic drug therapy,* Edinburgh, Elsevier Saunders.

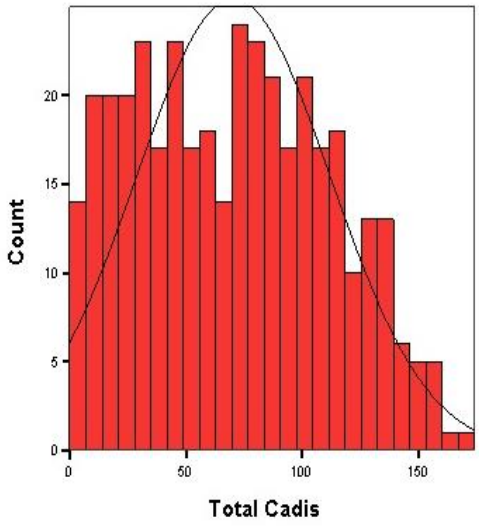
YANG, Y. W., TSENG, K. C., CHEN, Y. H. & YANG, J. Y. 2010. Associations among eczema, asthma, serum immunoglobulin E and depression in adults: a population-based study. *Allergy,* 65**,** 801-2.

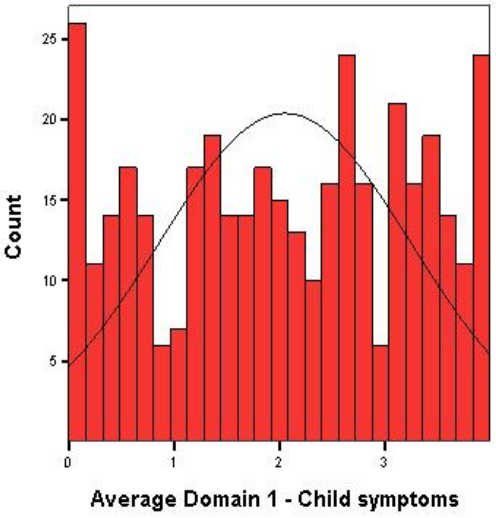
Appendix Ia

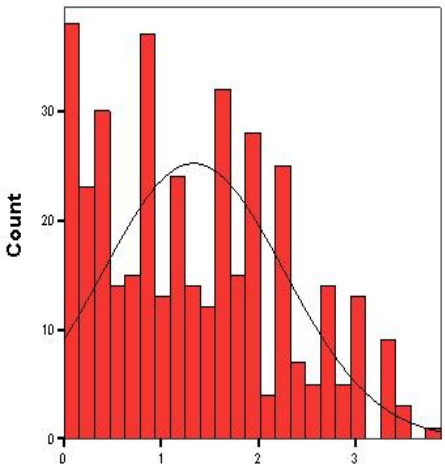
Histograms of Atopic Dermatitis



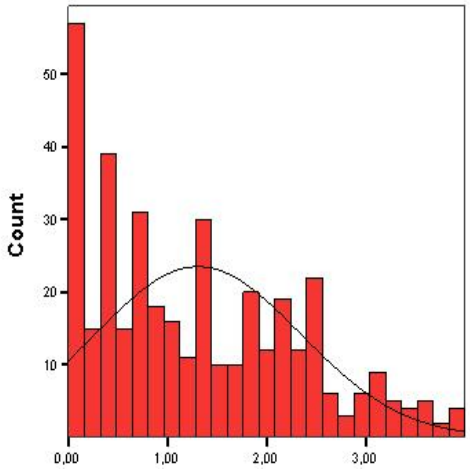




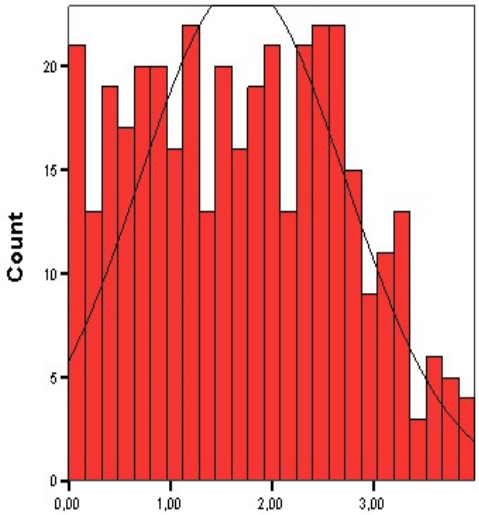




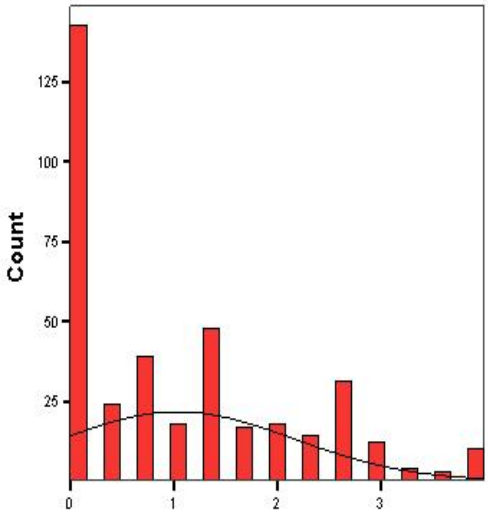
Average Domain 2 - Child limitations and behaviour



Average Domain 3 - Family and social function



Average Domain 4 - Parent emotion



Average Domain 5 - Parent sleep

Appendix Ib

Pairwise comparisons of CADIS domains across SCORAD severity classification

Post Hoc Tests

Multiple Comparisons
Bonferroni

Dependent Variable	(I) SCORAD interpretation	(J) SCORAD interpretation	Mean Difference (I-J)	Std. Error	P-value	95% Confidence Interval	
						Lower Bound	Upper Bound
Average Domain 1 - Child symptoms	Mild	Moderate	-1,057(*)	,138	,000	-1,39	-,73
		Severe	-1,576(*)	,211	,000	-2,08	-1,07
	Moderate	Mild	1,057(*)	,138	,000	,73	1,39
		Severe	-,519	,235	,083	-1,08	,05
	Severe	Mild	1,576(*)	,211	,000	1,07	2,08
		Moderate	,519	,235	,083	-,05	1,08
Average Domain 2 - Child limitations and behaviour	Mild	Moderate	-,568(*)	,113	,000	-,84	-,29
		Severe	-1,105(*)	,174	,000	-1,52	-,69
	Moderate	Mild	,568(*)	,113	,000	,29	,84
		Severe	-,537(*)	,194	,017	-1,00	-,07
	Severe	Mild	1,105(*)	,174	,000	,69	1,52
		Moderate	,537(*)	,194	,017	,07	1,00
Average Domain 3 - Family and social function	Mild	Moderate	-,48621(*)	,12508	,000	-,7870	-,1854
		Severe	-1,35029(*)	,19154	,000	-1,8109	-,8897
	Moderate	Mild	,48621(*)	,12508	,000	,1854	,7870
		Severe	-,86408(*)	,21353	,000	-1,3776	-,3506
	Severe	Mild	1,35029(*)	,19154	,000	,8897	1,8109
		Moderate	,86408(*)	,21353	,000	,3506	1,3776
Average Domain 4 - Parent emotion	Mild	Moderate	-,73272(*)	,12013	,000	-1,0216	-,4438
		Severe	-1,31215(*)	,18396	,000	-1,7545	-,8698
	Moderate	Mild	,73272(*)	,12013	,000	,4438	1,0216
		Severe	-,57944(*)	,20508	,015	-1,0726	-,0863
	Severe	Mild	1,31215(*)	,18396	,000	,8698	1,7545
		Moderate	,57944(*)	,20508	,015	,0863	1,0726
Average Domain 5 - Parent sleep	Mild	Moderate	-,689(*)	,134	,000	-1,01	-,37
		Severe	-1,533(*)	,205	,000	-2,03	-1,04
	Moderate	Mild	,689(*)	,134	,000	,37	1,01
		Severe	-,844(*)	,228	,001	-1,39	-,30
	Severe	Mild	1,533(*)	,205	,000	1,04	2,03
		Moderate	,844(*)	,228	,001	,30	1,39

* The mean difference is significant at the .05 level.

Appendix Ic

Pairwise comparisons of CADIS and POEM across children's age levels

Post Hoc Tests

Multiple Comparisons
Bonferroni

Dependent Variable	(I) Age of child	(J) Age of child	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
						Lower Bound	Upper Bound
POEM	Younger than or 1 year old	1.1 - 2 years	4,569(*)	1,479	,022	,39	8,75
		2.1 - 3 years	5,324(*)	1,458	,003	1,21	9,44
		3.1 - 4 years	5,769(*)	1,509	,002	1,51	10,03
		Older than 4 years	6,363(*)	1,507	,000	2,11	10,62
	1.1 - 2 years	Younger than or 1 year old	-4,569(*)	1,479	,022	-8,75	-,39
		2.1 - 3 years	,755	,965	1,000	-1,97	3,48
		3.1 - 4 years	1,200	1,040	1,000	-1,74	4,14
		Older than 4 years	1,794	1,037	,843	-1,13	4,72
	2.1 - 3 years	Younger than or 1 year old	-5,324(*)	1,458	,003	-9,44	-1,21
		1.1 - 2 years	-,755	,965	1,000	-3,48	1,97
		3.1 - 4 years	,445	1,010	1,000	-2,41	3,30
		Older than 4 years	1,039	1,007	1,000	-1,80	3,88
	3.1 - 4 years	Younger than or 1 year old	-5,769(*)	1,509	,002	-10,03	-1,51
		1.1 - 2 years	-1,200	1,040	1,000	-4,14	1,74
		2.1 - 3 years	-,445	1,010	1,000	-3,30	2,41
		Older than 4 years	,594	1,079	1,000	-2,45	3,64
	Older than 4 years	Younger than or 1 year old	-6,363(*)	1,507	,000	-10,62	-2,11
		1.1 - 2 years	-1,794	1,037	,843	-4,72	1,13
		2.1 - 3 years	-1,039	1,007	1,000	-3,88	1,80
		3.1 - 4 years	-,594	1,079	1,000	-3,64	2,45

* The mean difference is significant at the .05 level.

Appendix Id

Comparisons of CADIS and POEM across other demographic profiles

Independent Samples Test across Gender										
		Levene's Test for Equality of Variances		t-test for Equality of Means						
		F	Sig.	T	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
									Lower	Upper
CADIS	Equal variances assumed	,050	,823	1,073	379	,284	4,595	4,282	-3,824	13,014
	Equal variances not assumed			1,072	364,009	,284	4,595	4,285	-3,831	13,021
POEM	Equal variances assumed	6,349	,012	1,277	379	,202	,906	,709	-,489	2,301
	Equal variances not assumed			1,296	378,158	,196	,906	,699	-,469	2,281

ANOVA across Income						
		Sum of Squares	df	Mean Square	F	Sig.
CADIS	Between Groups	2072,030	4	518,008	,301	,877
	Within Groups	642524,015	373	1722,584		
	Total	644596,045	377			
POEM	Between Groups	39,863	4	9,966	,208	,934
	Within Groups	17891,780	373	47,967		
	Total	17931,643	377			

ANOVA across level of education						
		Sum of Squares	df	Mean Square	F	Sig.
CADIS	Between Groups	14165,194	3	4721,731	2,767	,042
	Within Groups	643393,882	377	1706,615		
	Total	657559,076	380			
POEM	Between Groups	190,435	3	63,478	1,339	,261
	Within Groups	17877,318	377	47,420		
	Total	18067,753	380			

Independent Samples Test across partner in household										
		Levene's Test for Equality of Variances		t-test for Equality of Means						
		F	Sig.	T	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
									Lower	Upper
CADIS	Equal variances assumed	,184	,668	,122	379	,903	,520	4,268	-7,872	8,912
	Equal variances not assumed			,122	378,611	,903	,520	4,269	-7,873	8,913
POEM	Equal variances assumed	,879	,349	-,496	379	,620	-,351	,707	-1,741	1,040
	Equal variances not assumed			-,496	377,553	,620	-,351	,708	-1,742	1,041

ANOVA across level of age of caregiver						
		Sum of Squares	df	Mean Square	F	Sig.
CADIS	Between Groups	4302.395	4	1075.599	0.619	0.649
	Within Groups	653256.7	376	1737.385		
	Total	657559.1	380			
POEM	Between Groups	341.887	4	85.472	1,813	0.126
	Within Groups	17725.867	376	47.143		
	Total	18067.753	380			

Appendix II- Ethics Clearance Certificate

UNIVERSITY OF THE WITWATERSRAND, JOHANNESBURG

Division of the Deputy Registrar (Research)

HUMAN RESEARCH ETHICS COMMITTEE (MEDICAL)
R14/49 Dr Kiasha Govender

CLEARANCE CERTIFICATE	**M090305**
PROJECT	Quality of Life Study on Children with Atopic Dermatitis: an Assessment of the Imapct and Effects of Severity of Atopic Dermatitis: on Affected Patients and their Families
INVESTIGATORS	Dr Kiasha Govender.
DEPARTMENT	Department of Dermatology
DATE CONSIDERED	09.03.27
DECISION OF THE COMMITTEE*	Approved unconditionally

Unless otherwise specified this ethical clearance is valid for 5 years and may be renewed upon application.

DATE 09.06.10 **CHAIRPERSON** .....
(Professor P E Cleaton Jones)

*Guidelines for written 'informed consent' attached where applicable

cc: Supervisor : Dr D Modi

DECLARATION OF INVESTIGATOR(S)

To be completed in duplicate and **ONE COPY** returned to the Secretary at Room 10004, 10th Floor, Senate House, University.
I/We fully understand the conditions under which I am/we are authorized to carry out the abovementioned research and I/we guarantee to ensure compliance with these conditions. Should any departure to be contemplated from the research procedure as approved I/we undertake to resubmit the protocol to the Committee. **I agree to a completion of a yearly progress report.**

PLEASE QUOTE THE PROTOCOL NUMBER IN ALL ENQUIRIES...

Appendix III: Informed consent- Patient

INFORMED CONSENT FOR PATIENT

I,……(full name of parent/guardian) agree on behalf my child/ward……(full name of child/ward) to participate in the study entitled: Quality of life study on children with atopic dermatitis: as assessment of the impact and effects of severity of atopic dermatitis on affected patients and their families, which will be conducted at Chris Hani Baragwanath Hospital.

I have been informed by my study doctor about the nature and conduct of this study. I have also received, read and understood the patient information leaflet. I understand that participation in this study is voluntary and my child will not be discriminated against if I decide not to participate in this study. I also understand that I will not be paid for my child to participate in this study. I am aware that the results of the study will be anonymously processed into a study report. I agree for the collected data to be processed in a computerized system.

I agree to my child being examined by his/her doctor and recording the findings. I have had sufficient opportunity to ask questions and declare that I am prepared for my child to participate in the study.

Participant
Signature of parent/guardian or mark/thumbprint:
Printed name:
Date:
Time:

I,……., herewith confirm that the above participant has been fully informed about the nature, conduct and risks of the above study.

Investigator
Signature of investigator:
Printed name:
Date:
Time:

Witness
Signature of witness:
Printed name:
Date:
Time:

Appendix IV: Informed Consent- Parent/Guardian

INFORMED CONSENT FOR PARENT/GUARDIAN

I,……(full name of parent/guardian), parent/guardian of……(full name of child/ward) agree to participate in the study entitled: Quality of life study on children with atopic dermatitis: as assessment of the impact and effects of severity of atopic dermatitis on affected patients and their families, which will be conducted at Chris Hani Baragwanath Hospital.

I have been informed by my study doctor about the nature and conduct of this study. I have also received, read and understood the patient information leaflet. I understand that participation in this study is voluntary and I or my child will not be discriminated against if I decide not to participate in this study. I also understand that I will not be paid to participate in this study. I am aware that the results of the study will be anonymously processed into a study report. I agree for the collected data to be processed in a computerized system.

I agree to fill in the self-administered questionnaire. I have had sufficient opportunity to ask questions and declare that I am prepared for myself and my child to participate in the study.

Participant
Signature of parent/guardian or mark/thumbprint:
Printed name:
Date:
Time:

I,……., herewith confirm that the above participant has been fully informed about the nature, conduct and risks of the above study.

Investigator
Signature of investigator:
Printed name:
Date:
Time:

Witness
Signature of witness:
Printed name:
Date:
Time:

Appendix V: Information Sheet- Patient

PARTICIPANT INFORMATION LEAFLET FOR PATIENT
STUDY NUMBER: **DATE:**
PATIENT NUMBER:

TITLE OF THE STUDY: AN ASSESSMENT OF THE IMPACT OF SEVERITY OF ATOPIC DERMATITIS ON THE QUALITY OF LIFE OF AFFECTED PATIENTS AND THEIR FAMILES.
STUDY INVESTIGATOR: Dr K Govender
INSTITUTION: University of the Witwatersrand

This document may contain words that you do not understand. Please ask the study doctor to explain any words or information that you do not clearly understand. You may take home an unsigned copy of this information leaflet and consent form to think about or discuss with your family before making your decision as to whether to allow your child/ward to participate in this study or not. Before you agree for your child/ward to participate, it is important that you understand the purpose of the study and the procedures involved. This information leaflet is to help you to decide if you want your child/ward to participate in this study. If you have any questions, do not hesitate to ask me. If you agree for your child to participate, you will be asked to sign a consent form to confirm you understand the study procedure and that you are willing for your child to participate.

We are inviting your child to participate in a research study conducted at the pediatric dermatology outpatient clinic at Chris Hani Baragwanath Hospital.

Your child has been diagnosed with atopic dermatitis. Atopic dermatitis is a chronic itchy skin problem that can affect any age group but usually occurs in children. It is not contagious. There may be a family history of eczema, asthma or runny nose. In this study, we want to learn how atopic dermatitis affects the daily activities and quality of life in your child, your family and yourself.

Participation in this study is being offered to all children less than 6 years old with atopic dermatitis and their parent/guardian. At your appointment, your child will be examined and the findings will be recorded in his/her file and on anonymous record sheets for the study. After that you will be asked to complete a questionnaire which is confidential. The study will be conducted over 3 months. Your child will only be examined for the purpose of the study on one visit, therefore the total time required for your participation and that of your child in this study will be a maximum of 1 hour.

Participation in this study is voluntary. Your child/ward will not be discriminated against if you decide for him/her not to participate in this study. Your child/ward will still receive all his/her medication. Your child/ward will not be harmed in any way during the study. There are no risks in this study. No medication will be tested on your child/ward. Your child will still continue with his/her normal treatment. If your child`s treatment is changed, it is because the state of his/her skin condition has changed and is not related to the study. There are no direct benefits to you or your

child/ward for participating in this study. You will not be paid for taking part in the study.

All information obtained during the course of this study, including hospital records, personal data and research data will be strictly confidential. Data that may be reported in scientific journals will not include any information that identifies your child as a clinical participant in this study. The information might also be inspected by the University of the Witwatersrand, Human Research Committee.

This study protocol has been submitted to the University of the Witwatersrand, Human Ethics Committee. If you require any information regarding your rights as a research participant, or have any complaints regarding this research, you may contact Prof Cleaton Jones, Chairperson of the University of the Witwatersrand, Human Research Ethics Committee established to help protect the rights of research participants at 011-717 2229.

For further information regarding the study, contact study doctor: Dr K.Govender 0836500980.
Alternatively you may contact the following study volunteer:

- Dr T Hoffman- 0824151969

Appendix VI: Information Leaflet- Parent/Guardian

PARTICIPANT INFORMATION LEAFLET FOR PARENT/GUARDIAN
STUDY NUMBER: **DATE:**
PATIENT NUMBER:

TITLE OF THE STUDY: AN ASSESSMENT OF THE IMPACT OF SEVERITY OF ATOPIC DERMATITIS ON THE QUALITY OF LIFE OF AFFECTED PATIENTS AND THEIR FAMILES.
STUDY INVESTIGATOR: Dr K Govender
INSTITUTION: University of the Witwatersrand

To participant: This document may contain words that you do not understand. Please ask the study doctor to explain any words or information that you do not clearly understand. You may take home an unsigned copy of this information leaflet and consent form to think about or discuss with your family before making your decision as to whether to participate in this study or not. Before you agree to participate, it is important that you understand the purpose of the study and the procedures involved. This information leaflet is to help you to decide if you want to participate in this study. If you have any questions, do not hesitate to ask me. If you agree to participate, you will be asked to sign a consent form to confirm you understand the study procedure and that you are willing to participate.

We are inviting you and your child to participate in a research study conducted at the paediatric dermatology outpatient clinic at Chris Hani Baragwanath Hospital.

Your child has been diagnosed with atopic dermatitis. Atopic dermatitis is a chronic itchy skin problem that can affect any age group but usually occurs in children. It is not contagious. There may be a family history of eczema, asthma or runny nose.

In this study, we want to learn how atopic dermatitis affects the daily activities and quality of life in your child, your family and yourself. These details cannot be assessed by us when we examine your child. That is why we want you to fill in a questionnaire yourself. By completing this questionnaire, you are helping us to learn if assessing quality of life in your family as a result of your child`s skin problem, is important in the treatment of your child.

Participation in this study is being offered to all children less than 6 years old with atopic dermatitis and their parent/guardian. At your appointment, your child will be examined and the findings will be recorded in your child/ward's file and on anonymous record sheets for the study. After that you will be asked to complete a questionnaire which is confidential. The study will be conducted over 3 months. You will only be required to fill in a questionnaire on one visit, therefore the total time required for your participation and that of your child in this study will be a maximum of 1 hour.

Participation in this study is voluntary. You will not be discriminated against if you decide not to participate in this study. Your child will still receive all his/her medication. Your child will not be harmed in any way during the study. There are

no risks in this study. No medication will be tested on your child/ward. Your child will still continue with his/her normal treatment. If your child`s treatment is changed, it is because the state of his/her skin condition has changed and is not related to the study. There are no direct benefits to you or your child for participating in this study. You will not be paid for taking part in the study.

All information obtained during the course of this study, including hospital records, personal data and research data will be strictly confidential. Data that may be reported in scientific journals will not include any information that identifies you as clinical participant in this study. The information might also be inspected by the University of the Witwatersrand, Human Research Committee.

This study protocol has been submitted to the University of the Witwatersrand, Human Ethics Committee. If you require any information regarding your rights as a research participant, or have any complaints regarding this research, you may contact Prof Cleaton Jones, Chairperson of the University of the Witwatersrand, Human Research Ethics Committee established to help protect the rights of research participants at 011-717 2229.

For further information regarding the study, contact study doctor: Dr K.Govender 0836500980.
Alternatively you may contact the following study volunteer:

- Dr T Hoffman- 0824151969

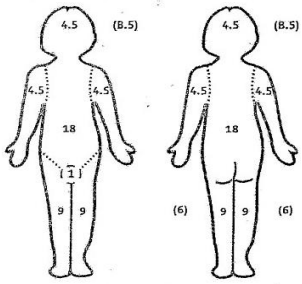
Appendix VII

Severity Scoring of Atopic Dermatitis

The SCORAD Index[1]

SCORAD European Task Force on Atopic Dermatitis	
Last Name	**First Name**

Institution					
Physician					
Date of birth			**Date of visit**		
DD	MM	YY	DD	MM	YY



Figures in parenthesis for children under two years

Group	Description	SCORAD Score
1	mild	0 - 20
2	moderate	20 - 40
3	severe	40 and ≥ 60

A: Extent — Please indicate the area involved:

B: Intensity

Criteria	Intensity	Means of calculation
Erythema		Intensity items (average representative area) 0 = absent 1 = mild 2 = moderate 3 = severe
Edema / Papulation		
Oozing / crust		
Excoriation		
Lichenification		
Dryness*		* Dryness is evaluated on uninvolved areas

SCORAD A / 5 + 7B / 2

Age :

Sex :

References: 1. European Task Force on Atopic Dermatitis. Severity Scoring of Atopic Dermatitis: The SCORAD Index. Dermatology, 1993; 186:28-31
2. Korotky NG, Taganov AV, Shimanovsky NL. Use of Advantan in the treatment of Atopic Dermatitis in children. Pediatriya, 2000: 5; 75-7
Bayer (Pty) Ltd, Registration number: 1968/011192/07, trading as Bayer Schering Pharma. 27 Wrench Road, ISANDO, 1609. Tel: (011) 921-505
Fax: (011) 921-5041. ADV.ZA 04/08/1

Appendix VIII

Patient- oriented eczema measure

Patient Number:
Study Number:

For how many days in the last week has your child had the following symptoms:

	0 days	1-2 days	3-4 days	5-6days	7 days
1. dryness					
2. flakiness					
3. itching					
4. oozing					
5. bleeding					
6. cracking					
7. disturbed sleep					

Appendix IX

Childhood Atopic dermatitis Impact Scale

Patient Number:
Study Number:

Please rate the following statements regarding the quality of life of your family over the last 4 weeks. Score each statement 0 to 4 depending on how strongly you agree with the statements. 0=never, 1=almost never, 2=sometimes, 3=often, 4=always

1. The skin condition affects how well my child sleeps.
2. Because of this skin condition, I limit my child's outdoor activities such as playing in parks and beaches.
3. My child's skin condition affects how well my spouse and I sleep.
4. I am bothered that this skin condition affects our vacation plans.
5. The skin condition affects our social lives.
6. This skin condition makes my child fussy and irritable.
7. I am bothered that my family stays home more because of this skin condition.
8. I am bothered that this skin condition affects our relationships with relatives.
9. My child scratches or rubs his/her skin.
10. This skin condition makes my child feel frustrated.
11. I worry about leaving my child with others because of this skin condition.
12. My child seems to cry more because of this skin condition.
13. I worry that my child's skin condition will continue.
14. My child's skin seems to be painful or irritated.
15. I am frustrated with my child's skin condition.
16. I/We avoid taking photos of my child because of this skin condition.
17. My child seems to be restless or hyperactive because of this skin condition.
18. I am bothered by how much time is needed to care for my child's skin condition.
19. I worry about the costs of my child's skin condition.
20. My child's skin condition affects my spouse's or my work performance due to missed time and decreased productivity.
21. Taking a bath makes my child uncomfortable.
22. My child's itching or scratching affects his/her play.
23. I feel helpless about my child's skin condition.
24. My child scratches his/her skin to get attention.
25. I am bothered by the reaction of strangers to this condition.
26. I am disappointed that my child has this skin condition.
27. Certain fabrics or clothes seem to bother my child's skin.
28. I worry that my child is exposed to things that may worsen this skin condition.
29. It is difficult to discipline my child because of this skin condition.
30. My child's skin condition has strained my relationship with my spouse and partner.
31. My child sleeps in my bed because of this skin condition.
32. I worry about the side effects from treatments for this skin condition.
33. I worry that this skin condition will affect my child's ability to make friends.
34. My child misbehaves more because of this skin condition.
35. This skin condition has affected how confident I feel about my child's medical care.
36. I am bothered by my child sleeping in my bed.
37. I am angry that my child has this skin condition.
38. I worry that this skin condition will affect my child's self-esteem.
39. My child's skin condition makes me feel sad or depressed.
40. My child's skin condition has affected my decision to have other children.
41. Children seem to avoid touching or playing with my child because of this skin condition.
42. I blame myself or feel guilty that my child has this skin condition.

43. My child dislikes having creams or ointments applied to his or her skin.
44. I am embarrassed by the way my child's skin looks.
45. My child's skin condition makes it hard to do what I enjoy.

Appendix X

Demographic details form

Age of child:

Sex of child:

Race of child:

Nature of caregiver:

Age of caregiver:

Race of caregiver:

Religion of caregiver:

Highest education achieved by caregiver:

Occupation of caregiver:

Marital status of caregiver:

Does caregiver cohabitate with his/her partner:

Household income: