

The effect of hydrotherapy on the pain levels, stress levels, quality of life and functional disability in patients with rheumatic disease.

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Physiotherapy at the University of the Western Cape



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DECLARATION

I declare that “**The effect of hydrotherapy on pain, stress, quality of life and functional abilities in patients with Rheumatic Disease**” is my own work, that it has not been submitted for any degree or examination in any other university and that all the sources I have used or quoted have been indicated and acknowledged by means of complete references.



Signed: _____

LEVONA JOHNSON

ABSTRACT

Rheumatic disease is estimated to be one of the most disabling diseases in South Africa and the world. The most common rheumatic diseases are osteoarthritis, fibromyalgia, rheumatoid arthritis, gout and systemic lupus erythematosus. The symptoms of the disease include pain, stiffness, swelling, decreased function. The patient's functional abilities are severely affected by the pain which in turn, leads to poor quality of life and adverse stress. As a result patients who suffer with one or with a combination of rheumatic disease will experience pain, stress, decreased functional abilities and poor quality of life. The physical properties of water and the therapeutic effects of hydrotherapy, make hydrotherapy an effective form of exercise available to physiotherapists in the treatment of rheumatic disease. The aim of the current study was to determine the effects of a hydrotherapy intervention on the pain, stress, quality of life and functional abilities in patients with rheumatic disease. A quantitative and qualitative research design was employed to meet the objectives. The quantitative aspect involved an A-B-A design and the qualitative part of the study comprised in-depth interviews which took place after the intervention. The instruments used were the WHOQOL-BREF instrument, the Visual Analogue Scale (VAS), the Weekly Stress Inventory-Short Form (WSI-SF) and the Health Assessment Questionnaire. (HAQ). The sample consisted of 19 patients who were diagnosed with one or a combination of rheumatic disease. The study was conducted at the hydrotherapy pool at Groote Schuur Hospital in Cape Town. Within the study sample, the majority of the participants were female (84%) with osteoarthritis being common among the participants (53%). The mean age was 60 years. The intervention had a significant impact on pain reduction ($p = 0.0001$), quality of life ($p < 0.05$). However, the impact of hydrotherapy on stress and the social relationship domain in quality of life was inconclusive. It is thus evident from this study that hydrotherapy as a treatment modality for physiotherapists can be used to impact on the pain, quality of life and functional abilities in patients with rheumatic disease.

Keywords: Rheumatic disease, hydrotherapy, pain, stress, quality of life, functional abilities, rheumatoid arthritis, osteoarthritis, fibromyalgia, gout and systemic lupus erythematosus.



DEDICATION

I dedicate this research to the Lord Jesus Christ, my rock and my redeemer. “And we know that in all things God works for the good of those who love Him, who have been called according to His purpose.” – Romans 8:28

To my husband and love of my life, Ricardo Johnson. Thank you for being my number one supporter and for loving so unconditionally.

To my parents, the late Mr and Mrs Peter and Christine Sauls. Thank you for providing me with such amazing love and for giving me the platform to explore academically. Love never ends.

To my sister and best friend, the late Glenda Sauls. Sis, you started this journey with me. Thank you for always encouraging, for believing it was possible and for always desiring the best for me. Our love endures.



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Ricardo, the love of my life. Thank you for your unwavering love and support, always. Also for always placing so much confidence in my abilities in spite of my 'quiet' moments. You kept my determination and willpower going when I really needed it. I love you.

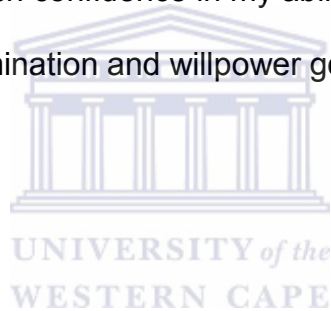
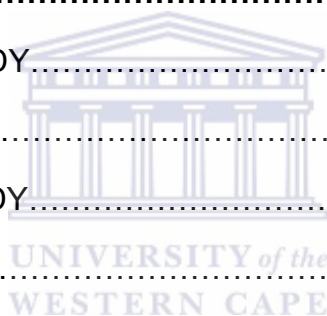


TABLE OF CONTENTS

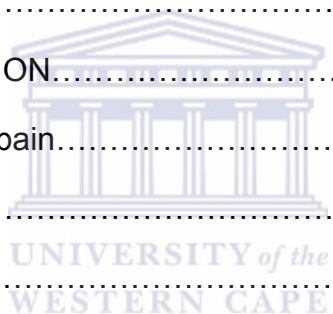
DECLARATION.....	II
ABSTRACT.....	III
DEDICATION.....	v
ACKNOWLEDGEMENTS.....	vi
CONTENTS.....	viii
LIST OF FIGURES.....	xi
LIST OF TABLES.....	xiii
CHAPTER 1.....	1
INTRODUCTION.....	1
1.1 BACKGROUND TO THE STUDY.....	1
1.2 OBJECTIVES OF THE STUDY.....	5
1.3 SIGNIFICANCE OF THE STUDY.....	6
1.4 DEFINITION OF TERMS.....	6
CHAPTER 2.....	8
LITERATURE REVIEW.....	8
2.1 INTRODUCTION.....	8
2.2 OVERVIEW OF RHEUMATIC DISEASE.....	8
2.2.1 Osteoarthritis.....	9
2.2.2 Fibromyalgia.....	10
2.2.3 Gout.....	11
2.2.4 Rheumatoid Arthritis.....	12
2.2.5 Systemic Lupus Erythematosus.....	13
2.3 IMPACT OF RHEUMATIC DISORDERS.....	15



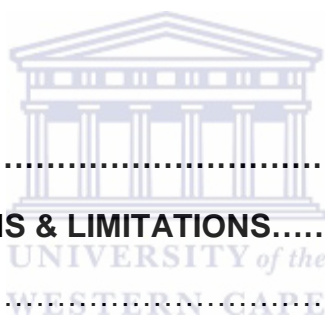
2.3.1	Osteoarthritis.....	15
2.3.2	Fibromyalgia.....	16
2.3.3	Gout.....	16
2.3.4	Rheumatoid Arthritis.....	17
2.3.5	Systemic Lupus Erythematosus.....	18
2.4	MANAGEMENT OF RHEUMATIC DISEASES.....	19
2.5	THE ROLE OF THE PHYSIOTHERAPIST IN MANAGING THE RHEUMATIC DISEASE.....	21
2.6	CONCLUSION.....	24
 CHAPTER 3.....		25
METHODOLOGY.....		25
3.1	RESEARCH SETTING.....	25
3.2	RESEARCH DESIGN.....	25
3.3	STUDY POPULATION AND SAMPLING.....	26
3.3.1	Quantitative part of study.....	26
3.3.2	Qualitative part of the study.....	28
3.3.3	Recruitment Procedure.....	28
3.4	SURVEY INSTRUMENTS / DATA COLLECTION.....	28
3.4.1	Research Instruments: Quantitative aspect.....	29
3.4.1.1	Visual Analogue Scale (VAS).....	29
3.4.1.2	Weekly Stress Inventory – Short Form (WSI-SF) Questionnaire.....	29
3.4.1.3	WHOQOL-BREF Instrument.....	30
3.4.1.4	Health Assessment Questionnaire.....	31
3.4.1	Research Instruments: Qualitative Aspect.....	32
3.5	INTERVENTION / PROCEDURE.....	32
3.6	TRUSTWORTHINESS.....	33
3.7	ETHICAL CONSIDERATIONS.....	34



3.8	DATA ANALYSIS.....	34
CHAPTER 4.....		36
RESULTS.....		36
4.1	INTRODUCTION.....	36
4.2	SOCIO-DEMOGRAPHIC DATA.....	36
4.3	DESCRIPTION OF THE PARTICIPANTS REACTION TO THE VARIOUS QUESTIONNAIRES.....	37
4.3.1	Pain (VAS).....	37
4.3.2	Stress.....	37
4.3.3	WHO-QOL-BREF.....	39
4.3.4	HAQ Disability Index.....	42
4.4	IMPACT OF THE INTERVENTION.....	44
4.4.1	Impact of hydrotherapy on pain.....	44
4.4.2	Impact on Stress.....	46
4.4.3	Impact on QOL.....	46
4.4.4	Impact on HAQ disability index.....	46
4.5	QUALITATIVE DATA.....	47
4.5.1	Access to hydrotherapy.....	47
4.5.2	Management.....	47
4.5.3	Impact of the hydrotherapy Intervention session.....	48
CHAPTER 5.....		52
DISCUSSION.....		52
5.1	INTRODUCTION.....	52
5.2	SOCIO-DEMOGRAPHIC DATA OF PARTICIPANTS.....	53
5.3	THE REPORTED STATUS OF PATIENT PRIOR TO INTERVENTION (PRIOR TO INTERVENTION INFORMATION)....	55



5.3.1	Pain.....	56
5.3.2	Stress.....	57
5.3.3	Quality of Life.....	57
5.3.4	Functional abilities (HAQ).....	58
5.4	THE REPORTED STATUS OF THE PATIENT POST INTERVENTION (IMPACT OF HYDROTHERAPY AS AN INTERVENTION).....	60
...		
5.4.1	Pain.....	61
5.4.2	Stress.....	62
5.4.3	Quality of Life.....	63
5.4.4	Functional abilities.....	64
5.5	IMPLICATIONS FOR PRACTICE.....	66
CHAPTER 6	68
CONCLUSION, RECOMMENDATIONS & LIMITATIONS	68
6.1	CONCLUSION.....	68
6.2	RECOMMENDATIONS.....	70
6.2.1	Short term recommendations.....	70
6.2.2	Long term recommendations (Future Research).....	70
6.3	LIMITATIONS OF THE STUDY.....	71



REFERENCES.....72

LIST OF APPENDICES..... 91

APPENDIX A. Ethical Clearance Letter

APPENDIX B. Information Sheet

APPENDIX C. Consent Form

APPENDIX D. Demographic Data

APPENDIX E. Visual Analogue Scale

APPENDIX F. Stress Questionnaire

APPENDIX G. WHOQOL BREF (Quality of Life Questionnaire)

APPENDIX H. Health Assessment Questionnaire (HAQ)



LIST OF FIGURES

FIGURE 3.1	VISUAL ANALOGUE SCALE	29
FIGURE 4.1	SUBJECTS (X AXIS) ORDERED BY DIFFERENCE IN VAS1 SCORES	37
FIGURE 4.2	PRE AND POST SCORES FOR EVENT	38
FIGURE 4.3	PRE AND POST SCORES FOR IMPACT	39
FIGURE 4.4	PRE AND POST SCORES FOR DISABILITY INDEX (DI)	44
FIGURE 4.5	VAS PAIN: POST-INTERVENTION (Y) AND PRE-INTERVENTION	45



LIST OF TABLES

TABLE 3.1	WHO-QOL-BREF-domains	30
TABLE 4.1	DEMOGRAPHIC DATA	36
TABLE 4.2	PRE AND POST INTERVENTION SCORES FOR PHYSICAL HEALTH = DOMAIN 1	40
TABLE 4.3	PRE AND POST INTERVENTION SCORES FOR PSYCHOLOGICAL HEALTH = DOMAIN 2	40
TABLE 4.4	PRE AND POST INTERVENTION SCORES FOR SOCIAL RELATIONSHIPS = DOMAIN 3	41
TABLE 4.5	PRE AND POST INTERVENTION SCORES FOR ENVIRONMENTAL = DOMAIN 4	41
TABLE 4.6	PRE-INTERVENTION HAQ-DI SCORE	42
TABLE 4.7	PRE AND POST INTERVENTION QUALITY OF LIFE SCORES	46
TABLE 4.8	THEMES AND CATEGORIES DEVELOPED FROM QUALITATIVE DATA ANALYSIS	50



CHAPTER 1

1. BACKGROUND: INTRODUCTION TO THE STUDY

Rheumatoid arthritis is a chronic, inflammatory disease that can lead to disability and significantly interfere with functional adaptation (Escalante & Del Rincón, 2002). Symptoms such as joint pain, stiffness, swelling, and fatigue are disease-specific stressors that tax the adaptive resources of patients and heighten the risk for patient reported declines in function (i.e. difficulties in carrying out activities of daily living) (Donahue, Gartlehner, Jonas, Lux, Thieda, Jonas, et al., 2008). It is estimated to be one of the most disabling diseases in South Africa (Escalante & Del Rincón, 2002).

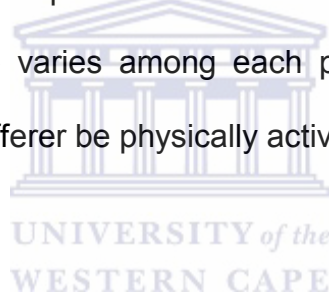
According to Helmick, Felson, Lawrence, Gabriel, Hirsch, Kwoh et al., (2008) osteoarthritis is the most common type of rheumatic disease/arthritis and the prevalence is on the rise. It has been reported that the prevalence of osteoarthritis increases with age and this has adverse effects on the suffering and socio-economic conditions of the patient (Jamtvedt, Dahme, Christie, Moe, Haavardsholm, Holm & Hagen, 2008). Half of the adult population will develop symptomatic osteoarthritis of the lower limbs at some point in their lives (Murphy, Schwartz, Helmick, Renner, Tudor, Koch et al., 2008). This increased risk is compounded as obesity increases. According to Lawrence, Felson, Helmick, Arnold, Choi, Deyo, et al., (2008) the prevalence of rheumatoid arthritis is estimated at 0.8 – 1.0% of adults. It was estimated that the prevalence of arthritis in the United States will increase from 45 million in 1997 to 60 million in 2020 and in Canada, the total would rise from 2.9 million in 1991 to 6.5 million in 2031 (Dominick, Ahern, Gold & Heller, 2004). In South Africa, one in every seven people is affected by one or a combination of rheumatic diseases/arthritis conditions (Dept of Health, South Africa, 1998). Rheumatoid arthritis has been reported to affect twice more women than it does

men. The symptoms include pain, fatigue and disability. Symptoms vary day to day and the course that the disease takes is unpredictable.

Rheumatoid arthritis has been found to impact on an individual's life in various ways. Rheumatoid arthritis has a significant impact on a patient's physical, emotional and social well-being. The factors affected by rheumatoid arthritis include daily activities, quality of life and life expectancy. Rheumatoid arthritis has also been reported as a chronic and progressive disease leading to considerable functional loss and disability (Klitz & Heijde, 2009; Kavunca & Evcik, 2004; Kalla & Tikly, 2003). According to Murphy et al., (2008) rheumatic disease/arthritis limits daily activities such as walking, climbing stairs, bathing and dressing. Slatkowsky-Christensen, Mowinckel and Kvien (2009) found in their study that patients with rheumatoid arthritis had significantly less physical functional abilities when compared with patients who had osteoarthritis in their hands. On the other hand, it was reported that patients with hand osteoarthritis had more pain and had more fibromyalgia-like symptoms than patients with rheumatoid arthritis.

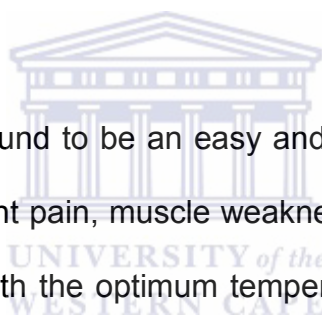
Dominick et al., (2004) stated that arthritis was one of the most common diseases and was the biggest cause of disability in the United States as well as in other developed countries. They further state that the prevalence of arthritis was expected to increase as a direct result of longer life expectancy. In addition, rheumatic disease also affects the quality of life of those people affected by the disease. The behavioural risk factor survey of 1996-1998 found that arthritis sufferers have worse health-related quality of life than people without the disease (Centres for Disease Control, 2006). According to Combe (2007) rheumatoid arthritis is associated with a high incidence of psychological stress.

Various interventions have been indicated to manage rheumatic disease/arthritis. Management of rheumatic disease and other activity varies with the severity of the symptoms (Luqmani, Hennel, Estrach, Birrel, Bosworth & Davenport, 2006). The main goals when treating rheumatoid arthritis are to prevent or control joint damage, prevent loss of function and decreased pain (Christie, Jamtvedt, Dahm, Moe, Haavardsholm & Hagen, 2007). According to Eustice (2003) pain is increased by too much stress and this further compromises the arthritis sufferer to cope with the additional difficulties that the disease presents. Stress that is built up without a release affects the body adversely. A vicious cycle between the pain and stress exists. When stress increases and goes unchecked, muscle tension increases. Consequently, this leads to more pain and ultimately worsens the symptoms of the disease. Eustice (2003) indicates that stress management should form part of the overall management of Arthritis. Stress is very subjective and therefore varies among each person. As part of treatment it is suggested that the Arthritis sufferer be physically active in order to relieve stress.



Currently, treatment plans for rheumatic disease/arthritis include pharmacological drugs, rest, physical activity, joint protection, use of heat or cold, physiotherapy and occupational therapy (Luqmani et al., 2006). The main aim of physiotherapy intervention is to reduce pain and maintain/restore optimum physical functioning. As a result, physiotherapy is appropriate for the majority of patients who suffer with pain, limited range of motion, impaired muscle function or decreased fitness as consequences of chronic musculoskeletal conditions. The way in which the symptoms of arthritis is managed affects the patients' ability to participate fully in activities both obligatory and discretionary (Backman, 2006).

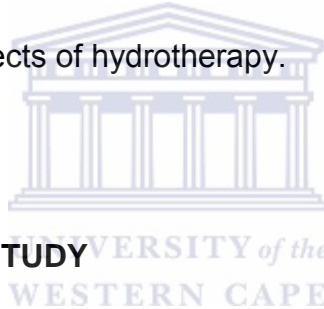
The role of the physiotherapist in the management of rheumatoid arthritis patients is important. Physiotherapy management will include the monitoring of the patient's physical functions and education for the optimal management of daily activities and the adoption of a less sedentary lifestyle (Fransen, 2004). Jamtvedt et al., 2008 highlighted that there is high quality evidence that exercise and weight reduction can assist in reducing pain and improving physical function in patients with osteoarthritis. Pain, limited functional ability, decreased quality of life and increased stress levels that are associated with rheumatic disease can be managed with interventions such as hydrotherapy. Hydrotherapy as an intervention may result in improvements in self-efficacy for function, pain and stiffness and may also produce physical and emotional improvements.



Exercise in water has been found to be an easy and enjoyable way to regain range of movement in a patient with joint pain, muscle weakness and spasm due to the physical properties of water coupled with the optimum temperature of 37-39°C (Duffield, 1976). Evcik, Yigit, Pusak and Kavunca (2008) showed that hydrotherapy was effective for pain management in fibromyalgia and it also proved that the effects were maintained long term. In addition to pain relief, health status also improved in fibromyalgia patients that had hydrotherapy intervention (McVeigh, Gaughey, Hall & Kane, 2008). However, others have suggested that the positive effects of hydrotherapy in fibromyalgia have only been proven in studies which involved short term exercise programmes (Langhorst, Musial, Klose & Häuser, 2009; Bartels, Lund, Hagen, Dagfinrud, Christensen & Danneskiold, 2007). Hydrotherapy has been identified as an intervention to manage rheumatic disease/arthritis but enough evidence does not exist to strongly support a short term and long term hydrotherapy treatment recommendation for patients suffering with some form or combination of arthritis conditions. However, hydrotherapy has been identified as giving short term benefits on pain and function (Jamtvedt et al., 2008). In

addition, a study conducted by Evcik et al., (2008) found that of the 63 patients that they researched those that were allocated weekly hydrotherapy as treatment for the fibromyalgia, demonstrated significant improvements in all outcome measures compared with the patients who were assigned weekly home-based exercises. This group of patients also maintained the benefits of hydrotherapy for 24 weeks after the end of treatment.

Therefore the overall aim of this study was to evaluate the effect of hydrotherapy intervention on various outcomes associated with patients with Rheumatic Disease. The study was based on the assumption that the persons suffering with a rheumatic disease would have pain, increased stress levels, poor functional abilities and poor quality of life and would benefit from the effects of hydrotherapy.



1.2 OBJECTIVES OF THE STUDY

The specific objectives of the study were to:

- To determine the pain levels of patients suffering with a rheumatic disease before and after hydrotherapy.
- To determine the stress levels of patients suffering with a rheumatic disease before and after hydrotherapy.
- To determine the quality of life of patients suffering with a rheumatic disease before and after hydrotherapy.
- To determine the functional abilities of patients suffering with rheumatic disease before and after hydrotherapy.

1.3 SIGNIFICANCE OF THE STUDY

The outcome of this study will provide information to rheumatologists; physiotherapists and health care workers on the impact regular hydrotherapy treatment may have on clients suffering with rheumatic disease/arthritis. It will provide a useful guideline regarding appropriate intervention strategies that could be implemented to assist rheumatic/arthritic clients in dealing with their pain levels, stress levels and quality of life. The information gained from this study will also be useful to physiotherapists when determining the period of time necessary to see changes in the clients' pain levels, stress levels functional abilities and quality of life. The outcome of this study will also highlight how overall disability status can be affected by a regular attendance of hydrotherapy treatment.



1.4 DEFINITION OF TERMS

Rheumatic Diseases (Rheumatism): disorders of the connective tissue, especially the joints and related structures, characterized by inflammation, degeneration or metabolic derangement. These diseases are painful and affect millions. The five most common types are Osteoarthritis, Fibromyalgia, Gout, Rheumatoid Arthritis and Systemic Lupus Erythematosus (Centres for Disease Control, 2006).

Hydrotherapy: the therapeutic use of the properties of water in the treatment of disease or illness (Duffield, 1976).

Pain: an unpleasant, sensory and emotional experience, associated with actual or potential tissue damage, or defined in terms of such damage (Butler & Moseley, 2003).

Stress: perceived inability to cope with an unpleasant or painful life situation. Any emotional, physical, social, economic or other factor that requires the individual to adapt or change to the circumstances. This adaptation could be in the form of physiological, psychological or behavioural changes, or a combination of these (<http://www.thephysiotherapysite.co.uk>; (Medical Dictionary, 2010).

Functional Ability: the ability to perform activities of daily and nightly living (Medical Dictionary, 2010).

Quality of Life: an individual's subjective feeling of well-being as it relates to emotional state, physical functioning, psychosocial attitudes or communication (Aaronson, 1988).



CHAPTER 2

LITERATURE REVIEW

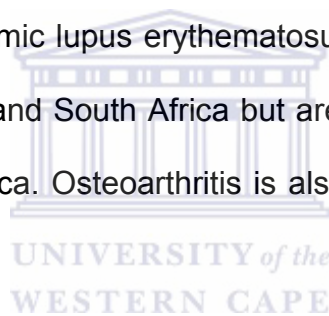
2.1 INTRODUCTION

In this chapter relevant literature is reviewed to get a clear overview of rheumatic disease. It aims to clearly illustrate the prevalence of rheumatic diseases both in South Africa and internationally. Furthermore in this chapter the impact of the rheumatic disease on the patient, the current management of rheumatic diseases and finally the role of the physiotherapist in the management of a patient with rheumatic disease is discussed.

2.2 OVERVIEW OF RHEUMATIC DISEASE

Arthritis can be defined as inflammation of the joints. This is a broad definition which aims to describe the signs and symptoms rather than provide a specific diagnosis. Thus it can be said that the term arthritis, is often used to refer to any disorder that affects the joints. The five most common forms of arthritis are osteoarthritis, fibromyalgia, gout, rheumatoid arthritis and systemic lupus erythematosus (Centres for Disease Control, (2006). These disorders fall within the broader category of rheumatic diseases. Rheumatic diseases (rheumatism) are painful conditions that affect millions. There are more than 100 types of rheumatic diseases. Some are described as connective tissue diseases because they affect the supporting framework of the body and its internal organs as well as the body's immune system. Osteoarthritis is as a result of "wear and tear" to the joints and rheumatoid arthritis happens when the immune system attacks the linings of joints, causing joint pain, swelling, and destruction. The symptoms of the disease can either have a gradual or sudden development and all rheumatic disease sufferers will experience pain and stiffness in and around one or more joints (Luqmani et al., 2006).

Certain factors increase the likelihood of developing a rheumatic disease. These factors include family history, genetic factors and environmental triggers. Gender definitely plays an important role. Rheumatic disease has been reported to be higher in females than in males as a general rule with 60% of arthritis sufferers being female. This could well indicate that hormones or other male-female differences predispose females to the development of rheumatic disease (Luqmani et al 2006; Eustice, 2003; Centres for Disease Control, 2006). Rheumatic diseases affect populations worldwide. In the United States osteoarthritis affects 27 million people, fibromyalgia affects 5 million people, gout affects 3 million people, rheumatoid arthritis affects 1,3 million people and systemic lupus erythmatosus affects between 161 000 and 322 000 people. In addition, rheumatoid arthritis and systemic lupus erythematosus have been reported to increase in frequency in East, Central and South Africa but are rare in West Africa. Gout is very prevalent in Sub-Saharan Africa. Osteoarthritis is also noted to be a universal disease (McGill & Oyoo, 2002).



2.2.1 Osteoarthritis

Osteoarthritis is primarily caused by the degradation of the collagen and proteoglycans in the cartilage, leading to fibrillation, erosion and cracking in the superficial cartilage layer. Over time the process affects the deeper cartilage layers and eventually clinically observable erosions are formed. In the early stages of the disease, patients experience stiffness and localised pain in the affected joints and these symptoms are usually relieved by rest. As the disease progresses or in more severe forms of osteoarthritis pain may be felt even when the patient is at rest. In the long-term, the weight-bearing joints may 'lock' or 'give way' due to the excessive internal damage and damage to the

cartilage. The results of these changes are pain, functional limitation and emotional suffering. (Luqmani et al., 2006).

Osteoarthritis is the most common form of arthritis. Half the adult population will develop symptomatic osteoarthritis of the lower limb at some point in their lives (Murphy et al., 2008). WHO estimates that 25% of adults over 65 years suffer from pain and disability associated with this disease. Almost any age can be affected but the prevalence increases considerably over 50 years in men and 40 years in women. This risk is compounded as obesity increases and as a result of longevity (Helmick et al., 2008).

The symptoms of osteoarthritis include joint pains, stiffness and swelling resulting in decreased function and mobility (Breedveld, 2004). As a result of these symptoms the sufferer experiences limitations in activities of daily living such as walking, climbing stairs, bathing and dressing (Murphy et al., 2008). It also affects the quality of life of those people affected by rheumatic disease. The resultant effect is a decrease in the quality of life in these patients and it has been reported that arthritis sufferers have worse health-related quality of life than people without the disease (Helmick et al., 2008; Murphy et al., 2008; The Centres for Disease Control, 2006)

2.2.2 Fibromyalgia

Fibromyalgia is a common disorder which has an unknown etiology. A physiological pain process together with multiple psychological and social factors all contribute to the development of fibromyalgia (Mannerkorpi & Gard, 2003). Two decades ago, the diagnosis of fibromyalgia was confirmed using the 'tender points' test. The patients needed to have a 3-month history of widespread musculoskeletal pain (pain on both sides of the body, the region above the waist & axial skeletal pain) and the presence of at least 11 of the 18 predefined 'tender points' (Wolfe, Smythe, Yunus, Bennet,

Bombardier, Goldenberg et al., 1990; Mannerkorpi & Gard, 2003). Tender points are specific outlined places on the body that are locally painful when 4kg of pressure is applied to it (Harth & Nielson 2007). Recently, the criteria have been redefined and it no longer anchors on the 'tender point' identification (WHO, 2010; American College of Rheumatology 2010). The new criteria include symptoms such as pain, fatigue, sleep disturbances and cognitive problems. The 'tender point' test was replaced by a 'widespread index and a symptom severity scale' (Wolfe, Clauw, Fitzcharles, Goldenberg, Katz, Mease, et al., 2010). The most common symptoms in fibromyalgia are pain, poor sleep, not feeling refreshed in the morning, headaches anxiety, depression, irritable bowel symptoms, parasthesias and a feeling of swelling in fingers and hands. The pain is aggravated after physical activity, stress and changes in the weather (Forseth & Gran, 2002). There is limited information on the prevalence of fibromyalgia. However, it has been reported that the prevalence of fibromyalgia in western society is estimated at 1-3%. Mostly the prevalence is estimated to range from 2-10% of the female population. It is more prevalent in women with middle-aged women mostly affected (Topbas, Cakirbay, Gulec, Akgol, Ak & Can, 2005; Mannerkorpi & Gard, 2003; Lindell, Bergman, Petersson, Jacobsson & Herrström, 2000). Finnish however is reported to have a low prevalence of 0.75% (Makela & Helióvaara , 1991).

2.2.3 Gout

Gout is a urate metabolic disorder which causes excess uric acid in the body. It is the most common form of inflammatory arthritis affecting men (Omole & Ogunbanjo, 2009; Sutaria, Katbamna & Underwood, 2006). It may often present as a polyarthritis and the knees, first metatarsal and ankle joints are most often involved in the disease (Saag & Choi, 2006; Mody & Naidoo, 1984). The American Rheumatism Association has outlined specific criteria for the diagnosis of gout. It is recommended that the knowledge

of the pathogenesis of the disease, understanding the use of anti-inflammatories and uric acid lowering drugs are important elements when treating this disease (Omole & Ogunbanjo, 2009). Early studies indicated that gout had a prevalence of 3.7 cases per thousand and that prevalence increased with age (O' Sullivan, 1972). More recently it has been established that 10% of the adult male population is affected and that it was the most common form of inflammatory disease in joints in men over the age of 40 years (Sutaria et al., 2006; Saag & Choi, 2006). The increase in the prevalence of gout that has been reported has been attributed to diet, lifestyle and longevity (Saag & Choi, 2006). Interestingly, gout has been reported to be rare in black South Africans when compared to other racial groups (Cassim & Mody, 1994; Mody & Naidoo, 1984).

2.2.4 Rheumatoid Arthritis

Rheumatoid Arthritis is a chronic, autoimmune, inflammatory joint disease of unknown cause affecting 1% of the population worldwide. The symmetrical inflammatory polyarthritis is the primary clinical manifestation. At the onset of the disease, the small joints of the hands and feet are usually involved and then progresses to the larger joints. The inflammation of the joint lining/synovium spreads and erodes the articular cartilage and bone, causing joint deformity and progressive physical disability (Luqmani et al., 2006).

The disease is more common in females with a young peak age (usually under 40 years old). An increase in prevalence is directly related to age (Adebago & Davis, 1994). The United Kingdom reports approximately 100 new cases of inflammatory joint disease per hundred thousand each year. Of these numbers, 24 cases are rheumatoid arthritis. Sweden reports similar figures to that of the United Kingdom (Luqmani et al., 2006).

Rheumatoid arthritis among black South Africans was regarded as rare but it has been established that it does indeed affect the South African black population. It has also been noted that when the disease occurred in black South Africans it is as disabling as in any other population that the disease would manifest in (Adebago & Davis, 1994; Mody & Meyers, 1989). The mean age for blacks is reported as 44,6 years and the female to male ratio as 3:7:1 (Mody & Meyers, 1989).

In an earlier study by Solomon, Robin and Valkenberg (1975), it was reported that the prevalence of rheumatoid arthritis in South Africa was between 0.75% and 0.87%. More recently, Kalla and Tikly (2003) reported that South Africa's prevalence of Rheumatoid Arthritis was < 0.5% and was similar to other developing countries such as Nigeria, Indonesia, Pakistan, China, the Philistines and Argentina. In addition, the authors also report that in the South African black population, there is a difference between urban and rural populations. In some rural areas there were almost no cases reported and in the urban areas a prevalence of 0.95% was found. These statistics were similar to rural areas in other countries such as Indonesia, China and India where the prevalence ranged from 0.2% to 0.5% (Kalla & Tikly, 2003).

Opinions about the urban-rural differences in prevalence seem to lean toward the suggestions that the environment plays a role in the pathogenesis of rheumatoid arthritis. There is however no conclusive evidence to support this opinion. Research has also indicated that the increase in prevalence in South African blacks has been attributed to the possible increasing urbanisation experienced (Adebago & Davis, 1994).

2.2.5 Systemic Lupus Erythematosus

Systemic Lupus Erythematosus is a chronic auto-immune disease that can affect the skin, joints, kidneys, brain and other organs. It has an unknown etiology but it has been

established that genetic and hormones play an important role in the development of the disease (Uribe, Mc Gwin, Reveille & Alarcón, 2004). It affects millions of people worldwide (Tikly & Navarra 2008). Researchers have found that systemic lupus erythematosus is more prevalent among females of African and Asian descent who reside in industrialised countries. 99% of the patients affected are female. The signs and symptoms of the disease mostly start developing between the ages of 15 and 44 years (Robinson, Aguilar, Schoenwetter, Dubois, Russak & Ramsey-Goldman, 2010). Uribe et al., 2004). Studies conducted on the prevalence of systemic lupus erythematosus confirm that African American women are 3 times more likely to develop the disease and have more severe disabling symptoms than their Caucasian counterparts. It is confirmed that 'first nation' females over the age of 45 years have an increased prevalence (Uribe et al., 2004). Genetic and ethnic factors seem to have more influence over the disease activity than socio-economic factors (Uribe et al., 2004). Renal disease is the major cause of morbidity and mortality in the disease. Survival rates in developing countries are lower than in industrialised countries and the disease has a poor prognosis overall (Wadee, Tikly & Hopley, 2007; Mody, Parag, Nathoo, Pudifin, Duursma & Seedat, 1994).

Symptoms vary from person to person but almost all the patients will have joint pain and swelling (Hahn & Tsao, 2008; Boomsma, Bijl, Stegeman, Kallenberg, Hoffman & Tervaert, 2002). The most frequently affected joints are the fingers, hands, wrists and knees. In order for the diagnosis to be confirmed the patients need to have 4 out of the 11 typical signs of the disease present. The more common symptoms (50% of patients) include fatigue (malaise), a skin rash ('butterfly') over cheeks and bridge of nose (Hahn & Tsao, 2008). There is no cure for systemic lupus erythematosus. Treatment includes nonsteroidal anti-inflammatory (NSAIDS), corticosteroid creams and anti-malaria drugs (Hahn & Tsao, 2008).

It is clear from the literature that osteoarthritis is the most common form of rheumatic disease with 65% of people affected compared worldwide. Although the prevalence differs for each type of rheumatic disease, it is noted that an increase in the prevalence is reported for each of the five most common diseases. With the exception of gout, female dominance is most prevalent. All the diseases have pain, stiffness and swelling as common joint symptoms.

2.3 IMPACT OF RHEUMATIC DISORDERS

Rheumatic disease has been found to be a major cause of disability among populations. In addition, it has been found to impact at individual, community and population level. Literature has shown that patients with a form or combination of rheumatic disease experiences pain, adverse stress, decreased functional abilities and poorer quality of life (Davis, Zautra & Reich, 2001; Revenson, Schiaffino, Majerovitz & Gibofsky, 1991). Research has also identified stress as being common in the rheumatic disease patient. It has been attributed as a factor for increased levels in pain for the rheumatoid arthritis and osteoarthritis sufferers (Zautra & Smith, 2001; Revenson et al., 1991). Furthermore, Davis et al., (2001) found that among women with chronic pain, the patients with osteoarthritis were less vulnerable to the negative effects of social stress than their fibromyalgia counterparts.

2.3.1 Osteoarthritis

Osteoarthritis is the most prevalent cause of physical disability among the elderly population (Breedveld, 2004). The symptoms of osteoarthritis include joint pains, stiffness and swelling resulting in decreased function and mobility. It limits daily activities such as walking, climbing stairs, bathing and dressing (Murphy et al., 2008). The impact of the disease is not only physical but can also manifest as depression and anxiety in the suffering patient. It also affects the quality of life of those people affected

by the rheumatic disease (Breedveld, 2004). The behavioural risk factor survey of 1996-1998 found that arthritis sufferers have worse health-related quality of life than people without the disease (Helmick et al., 2008). In addition to this, osteoarthritis has a substantial impact socially and economically. (Breedveld, 2004). There is a great need to find therapies that will reduce disease activity and thereby maintain the patient's function (Breedveld, 2004).

2.3.2 Fibromyalgia

Fibromyalgia is characterised by joint pain, bodily pain, joint stiffness, sleep disturbances and high levels of distress and anxiety (Campos & Vázquez, 2011; Mannerkorpi & Gard, 2003) Women with the disease generally have decreased muscle strength in their upper and lower limbs. These patients struggle with activities of daily living at home, work and during leisure time. All these symptoms together with the emotion-focused coping skills lead to a severe decrease in the health-related quality of life in these patients (Mannerkorpi & Gard, 2003). Studies have shown that fibromyalgia sufferers experience poorer quality of life than patients with other chronic diseases. (Campos & Vázquez, 2011; Cardoso, Curtolo, Natout & Lombard, 2011; Salaffi, Carotti, Gasparini, Intorcia & Grassi, 2009; Mannerkorpi & Gard, 2003).

2.3.3 Gout

Severe gout is accompanied by severe/significant joint pain, stiffness and swelling which results in decreased functional activity. The more joints involved and the more frequent the flares of 'gouty attacks', the more severe the impact on the patients' quality of life (Becker, Schumacher, Benjamin, Gorevic, Greenwald, Fessel et al., 2009; Kester, 2006). A flare has a negative impact on walking, putting on shoes and participating in recreational sports and activities. Physical function is further compromised in those

patients who have associated comorbidities (Becker et al., 2009; Kester, 2006). This disease also has an adverse effect on the economy with approximately 20% of employed gout patients reporting absenteeism from work during the year as a result of a flare (Kester, 2006). In addition, the mortality rate of the disease is very high and is increased when comorbidities exist (Singh & Strand, 2008; Choi & Curhan, 2007).

2.3.4 Rheumatoid Arthritis

Rheumatoid arthritis is a complex disease that leads to physical and work-related disabilities and is associated with elevated socio-economic costs (Polisson, 2010; Corbacho & Dapuetto, 2009; Kalla & Tikly, 2003; Pugner, Scott, Holme & Hieke, 2000).

Spontaneous remission is uncommon (5-10%) and approximately 33% of patients are unable to work after 5 years of having the disease. Approximately 50% have substantial functional disability after 10 years of the disease (Polisson, 2010). Poor prognostic factors include persistent synovitis, early erosive disease, extra-articular findings, positive serum RF findings, family history of RA, male sex and advanced age (Woolf & Pfleger, 2003).

The severe pain experienced by patients leads to decreased functional abilities and quality of life and results in an adverse effect on global health, the functional and working status as well as compromising the physical and emotional components of the health-related quality of life of the patient (Somers, Shelby, Keefe, Godiwala, Lumley, Mosely-Williams et al., 2010; Corbacho & Dupueto, 2010). The patients generally stop working 20 years earlier than expected (Woolfe & Pfleger, 2003) and the disease is associated with premature death. Therefore; in the management of rheumatoid arthritis the focus must also be on the improvement, restoration and preservation of quality of life (Klitz & v.d. Heijde, 2009).

2.3.5 Systemic Lupus Erythematosus

Fatigue is one of the commonest and most disabling symptom which patients with systemic lupus erythematosus experience. They further struggle with mood disorders, poor sleeping patterns, low levels of aerobic activity, joint pain, joint swelling and have associated fibromyalgia (Tench, Mc Curdie & White, 2000). The signs and symptoms of the disease have an adverse effect on the functional ability and quality of life in these patients. It has also been reported that functional ability and quality of life is directly related to the disease activity (Benitha & Tikly, 2007; Wadee et al., 2007).

These patients experience large functional morbidity as well as physical and occupational disability. The disease adversely affects the patient's psychological and social life which leads directly to decreased happiness and changes in their relationships. Approximately 66% of Systemic Lupus Erythematosus patients report having either temporary or permanent inability to perform activities of daily living at work and home (Boomsma et al., 2002; Robinson et al., 2010).

There is sufficient evidence to suggest that the patients that suffer from a form or combination of rheumatic disease experiences pain, stiffness, decreased function, poorer quality of life and increased distress. A large body of research has been conducted about the impact that rheumatoid arthritis has on the individual and society and many negative effects have been established. However, literature on the impact that osteoarthritis, gout, fibromyalgia and systemic lupus erythematosus has on the individual and society is less extensive. It is also noted that in these rheumatic diseases the quality of life is severely affected when functional activity is reduced.

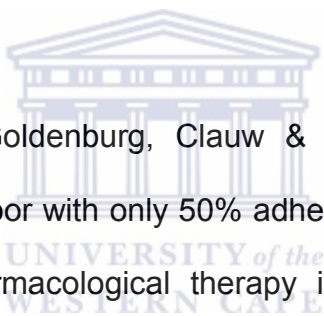
2.4 MANAGEMENT OF RHEUMATIC DISEASES

Management of rheumatic diseases involves the entire multi-disciplinary team. The entire team should be in agreement with the aims of treatment of the patient. The main aims of treatment are to control the signs and symptoms of the disease, maintaining function and the development of self-efficacy. All the aims are achievable when the inflammation is suppressed with the ultimate goal being remission. When remission is not possible, the management goals are to control the disease activity, alleviate pain, maintain function for activities of daily living and work and to maximise quality of life (Luqmani et al., 2006).

There are a variety of treatment options available. These include the pharmacological treatment, non-pharmacological treatment and surgery (Knevel, Schoels, Huizinga, Aletaha, Burmester, Combe et al., 2010; Luqmani et al., 2006). Intensive pharmacological intervention is mainly used in the treatment of rheumatic disease. The aim is to control the synovitis. When the synovitis is adequately controlled, the patients experience an increase in function and self-efficacy. It has been reported that complete remission in rheumatoid arthritis is almost unachievable (Luqmani et al., 2006).

At present the pharmacological approach includes analgesics and non-steroidal anti-inflammatory drugs (symptom relieving drugs) for pain relief and the reduction of stiffness and swelling. Disease modifying drugs (drugs that retard the disease progression) also play an important role (Luqmani, 2006; Blumenauer, Cranney, Burls, Coyle, Hochberg, Tugwell & Wells, 2003).

The ultimate treatment goal is to achieve complete remission. Blumenauer et al., (2003) states that optimal management of rheumatoid arthritis includes arresting or controlling the disease progression. This includes disease-modifying therapy and the management of the physical, social, emotional and occupational problems. There is an increase in the aim to use the Disease-modifying anti-rheumatic drug (DMARD) therapy to cause early and sustained suppression of the disease activity. When a state of adequate disease suppression is achieved, NSAIDs and corticosteroids can be stopped. Also, achieving early disease suppression may improve medium and long-term outcomes in the rheumatoid arthritis patient. Although there is an increase in the amount of therapies available for rheumatoid arthritis at present (Chee, Capell & Madhok, 2005), the best medication sequence is still not known (Blumenauer et al., 2003).



A recent review study by Goldenburg, Clauw & Fitzcharles (2011) reported that compliance to medication is poor with only 50% adherence to this management choice. They conclude that non-pharmacological therapy is as important as drugs in the management of rheumatic disease. Non pharmacological intervention involves the physiotherapist, occupational therapist, social worker, dietician and psychologist. Belonging to a support group is also recommended.

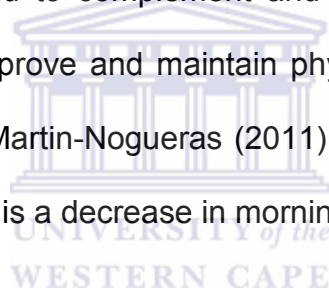
Reconstructive surgery is considered for patients with end-stage joint damage that is causing unacceptable pain or limitation of function with significant alteration of joint anatomy. Reconstructive surgery can be done at any point in the course of the rheumatic disease (Forseth & Gran, 2002).

According to the researchers of WA Burden of Disease (2004) treatments for arthritis should include medication, pain management, hydrotherapy, physiotherapy, energy conservation and joint protection.

2.5 THE ROLE OF THE PHYSIOTHERAPIST IN MANAGING RHEUMATIC DISEASE

Physiotherapy forms part of the management of rheumatic disease from diagnosis and continues throughout the entire duration of the disorder (Fransen, 2004). Physiotherapists are well trained to treat the rheumatic disease patient. As a profession, physiotherapy is focussed on maximising mobility and quality of life by using clinical reasoning to select and apply appropriate treatment. Therefore, all the different diagnoses which fall under the rheumatic disease umbrella are completely within the scope of the full qualified and trained physiotherapist (Australian Physiotherapy Association, 2005).

Physiotherapy has been found to complement and enhance the contributions of the pharmacological agents to improve and maintain physical functioning (Luqmani et al., 2006). De Dios Sancho and Martin-Nogueras (2011) concluded that when RA patients receive physical therapy there is a decrease in morning stiffness and pain levels.



The role of the physiotherapist in the early stage of the disease is focussed on maintaining or improving physical function especially the patient's mobility. Physiotherapy is concerned with the consequences of the disease. The goals of physiotherapy in inflammatory diseases are to reduce symptoms of disease, improve function and minimise disability. Most of the physiotherapist's efforts are concentrated on activities of daily living to allow the patient to maintain productivity in the workplace and also for some leisure activities.

Appropriate rest of joints when the joints are actively inflamed and exercise to maintain muscle power are recommended (Luqmani et al., 2006).

As the disease progresses the role of physiotherapy changes. The focus is then placed on maintaining and/or improving function and strength, minimising pain and maintaining and/or improving optimum quality of life in the patients. The anatomical and functional rehabilitation management include joint protection, the maintenance of physical function and fitness and the prevention of impairment (Stucki & Kroeling, 2000).

The management techniques employed by physiotherapists include electrotherapy, joint mobilisations, thermotherapy/cryotherapy, soft tissue mobilisations and hydrotherapy (Fransen, 2004; Brooks & Lund, 2002).

Exercise has been widely advocated in the management of rheumatic disease. The exercises that the physiotherapist employs are: range of movement, strengthening and aerobic/endurance exercises. The range of movement exercises aims to maintain/improve the range of movements in the affected joints, to relieve stiffness and to maintain/improve flexibility.

Strengthening exercises are used to maintain/improve the muscle strength and has a positive effect on the functional limitations especially in the elderly.

Aerobic/endurance exercises aims to improve cardiovascular fitness, improve overall functioning and assist with weight control (Luqmani et al., 2006; Latham, Bennett, Stretton & Anderson, 2004). Aerobic exercises in RA patients should be moderate to hard and that the exercises should be performed three times per week for 30-60 minutes. They recommend that the exercises can either be performed in water or be land-based and be carried out under supervision in a clinical environment (Strenstrom &

Minor, 2003). Performing low effort exercises more than twice per week was one of the factors that was reported that promoted health-related quality of life in people with rheumatic diseases (Arvidsson, Arvidsson, Fridlund & Bergman, 2011).

Exercise as part of management has been reported to produce improvements in the patients' energy levels, fatigue, functional status and muscle strength. Exercise should be included in the rheumatic disease patient's treatment regardless of the disease so that the goal of improving functional ability is achieved (Fiechtner & Dinning, 2009; Forseth & Gran, 2002; Ramsey-Goldman, Schilling, Dunlop, Langman, Greenland, Thomas, et al., 2000).

Thermotherapy, of which hydrotherapy is an example, is one of the techniques that were used to bring about these positive effects. Hydrotherapy is a form of physiotherapy conducted in a heated pool and used in the treatment of rheumatic disease. Geytenbeck (2002) found that there is high to moderate quality evidence to support the benefit of hydrotherapy in pain, function, self-efficacy, joint mobility, strength and balance especially in older people with rheumatic conditions and low back pain.

There is some evidence to suggest that hydrotherapy has beneficial effects on patients suffering with fibromyalgia and OA. These benefits include improvements in the quality of life, pain, function and symptoms of distress (Langhorst et al., 2009; Evcik et al., 2008; Gowans, de Hueck, Voss & Richardson, 1999). However, very little is known about the duration and amount of hydrotherapy intervention that should be administered (Van Turbergen & Hidding, 2002).

2.6 CONCLUSION

There have been many studies conducted on the effects of land-based exercise, electrotherapy modalities and other physiotherapy techniques utilised in treating rheumatic conditions. With the exception of the studies on the effects of hydrotherapy on fibromyalgia, there are not sufficient studies conducted on the effects of hydrotherapy on the other rheumatic diseases (one or a combination) especially long-term hydrotherapy treatment. Although all these techniques have been highlighted there is no strong evidence for the role and impact of hydrotherapy in the management of rheumatic disorders.



CHAPTER 3

METHODOLOGY

3.1 RESEARCH SETTING

The study was conducted at Groote Schuur Hospital, Department of Physiotherapy at the hydrotherapy pool in Observatory, Western Cape. The hydrotherapy pool was specifically designed to assist in the rehabilitation of the disabled patient. The floor of the pool is mechanically operated. The patients get in on a level surface and then the physiotherapist lowers the surface of the pool until the desired level of water submersion is achieved. The reverse is done at the end of the hydrotherapy session when the patients need to get out of the pool. Due to this feature, the patients do not have to negotiate steps to get into and out of the pool. The pool has been designed in such a way that there is a looking glass on the level below the pool. This allows the physiotherapist to view the patient's execution of the exercises and make the necessary corrections.



3.2 RESEARCH DESIGN

This study employed both a quantitative and qualitative research study design. The quantitative design included a quasi-experimental, single group pretest posttest design. The A-B-A design was used in which the response to the experimental treatment condition (B) is compared to baseline responses (A) taken before and after administering the treatment condition. Quantitative research plays a major role in building up evidence based knowledge (Sousa, Driessnack & Mendes, 2007). Quasi experimental study designs are often used to assess the benefits of specific interventions (Harris, Bradham, Baumgarten, Zuckerman, Fink & Perencevich, 2004). Quasi-experimental research designs are experimental designs that do not provide for \

full control of extraneous variables primarily because of the lack of random assignment to groups. A disadvantage of using this study design is that there are often alternative explanations for the observed outcomes (Polit, Beck & Hungler, 2001) and researchers thus have to control for confounders.

The qualitative part of the study comprised of individual in-depth interviews that took place after the intervention. The in depth interviews aimed to obtain the views of the participants on the impact of the intervention.

3.3 STUDY POPULATION AND SAMPLING

3.3.1 Quantitative part of study

The patients recruited for the study were from the Arthritis Foundation of South Africa in Cape Town residing within the Groote Schuur hospital catchment area. Inclusion and exclusion criteria for the study are listed below. The number of participants for the study was influenced by the size of the pool and how many people it could accommodate. A convenience sample of 20 patients diagnosed with a rheumatic disease or a combination of rheumatic diseases was recruited for the quantitative aspect of the study.

Inclusion Criteria:

1. Patients had to be diagnosed with 1 or a combination of Rheumatic diseases for more than 2 years.
2. Patients could be any age and racial group.
3. Patients had to be ambulant (assistive devices included).
4. Patients had to be available once a week for 6 months to participate in a hydrotherapy class.

Exclusion Criteria:

1. Patients who had contraindications to hydrotherapy such as:
 - i. Severely debilitated patients or those who had an active febrile condition.
 - ii. Patients who suffered with incontinence of urine or faeces.
 - iii. Patients who suffered with epilepsy.
 - iv. Patients who had a contagious skin infection.
 - v. Patients who suffered with incipient or established cardiac failure.
 - vi. Patients who had active lung infection such as Tuberculosis.
2. Patients who were wheelchair bound.
3. Patients who were diagnosed with psychiatric disease, cognitive impairments or any other serious medical condition.

3.3.2 Qualitative part of the study

The qualitative study sample was purposively selected based on the patients' diagnosis. Six patients who had participated in the intervention stage were selected to be interviewed.

3.3.3 Recruitment Procedure

A sample of 19 patients diagnosed with a Rheumatic Disease or with a combination of Rheumatic diseases were recruited for this study. Patients who suffered with a Rheumatic disease were targeted to participate in this study. These patients were mainly recruited from those who belonged to the Arthritis Foundation of South Africa in Cape Town. Other participants were referred from other state and private institutions.

3.4 SURVEY INSTRUMENTS / DATA COLLECTION METHODS

Prior to the start of the 6 month hydrotherapy intervention, the participants completed a general information chart which depicted demographic information as well as a series of questionnaires for pain levels, stress levels, quality of life and functional abilities. Assessments were done at the beginning of the hydrotherapy programme and then again at the end of the hydrotherapy programme which was six months later. The researcher and trained research assistants collected data for this study. In this study, the main variables of interest were quality of life of participants, stress levels, pain and functional abilities.

3.4.1 Research instruments: Quantitative aspect

3.4.1.1 VISUAL ANALOGUE SCALE (VAS)

The Visual Analogue Scale (Appendix E) is an assessment tool that is commonly used for pain. A horizontal line was used which is marked 0 on the left (start of the line) and 10 on the right (end of the line). From left to right the scale indicates the least amount of pain to the worst amount of pain that the patient could experience. The patients were instructed to place a circle to indicate the severity of their pain (Myles, Troedel & Reeves, 1999). A 33% decrease in pain represents a reasonable standard for determining that a change in pain is meaningful from the patient's perspective (Jensen, Chen & Brugger, 2003).



Figure 3.1 Visual Analogue Scale

Numerical Score	0 1 2 3 4 5 6 7 8 9 10										
Rating	No Pain	Mild pain	Moderate Pain	Severe Pain	Very Severe	Worst pain possible					

3.4.1.2 WEEKLY STRESS INVENTORY-SHORT FORM (WSI-SF) QUESTIONNAIRE

This Stress Questionnaire depicted the participants' reactions in different situations in the past week on a scale of X to 7 (Appendix F). X indicated that the situation did not happen at all and 7 indicated that the situation was extremely stressful. The questionnaire consists of 25 questions. It is a self-report scale that measures the total

number of minor stresses that occur in one week. The questionnaire is user-friendly and took the participants approximately 2-3 minutes to complete. The data collected gave information on the impact and event score for each participant. Both the event score (total number of events indicated) and the impact score (the sum of the subjective ratings of distress) has been shown to have good internal reliability. The WSI-SF has been found to be a valid brief instrument for measuring minor stressful situations (Brantley, Bodenlos, Cowles, Whitehead, Ancona & Jones, 2007).

3.4.1.3 WHOQOL- BREF instrument

In order to determine the quality of life of participants, the researcher used the WHOQOL- BREF instrument Appendix G). The World Health Organization Quality of Life (WHOQOL) questionnaires are among the most widely used quality of life assessment tools in the world with the WHOQOL-BREF being popular because of its shortened state (WHO, 1998). According to Taylor Rosen and Leibum et al., (2004) this tool was found to be valid and reliable for use amongst patients with rheumatoid arthritis. The authors reported on their test-retest reliability and found an intra-class correlation co-efficient of 0.71-0.91. This questionnaire has 26 questions which participants have to indicate the quality of life in four different categories. The four broad domains included are physical health (7items), psychological health (6 items), social relationships (3 items) and environment (8 items) see Table 3.1 below.

Table 3.1: WHO-QOL-BREF- domains

Domain	Facets incorporated within the domains
Physical health	Activities of daily living Dependence on medicinal substances and medical aids Energy and fatigue Mobility Pain and discomfort Sleep and rest

	Work Capacity
Psychological	Bodily image and appearance Negative feelings Positive feelings Self-esteem Spirituality / Religion / Personal beliefs Thinking, learning, memory and concentration
Social relationships	Personal relationships Social support Sexual activity
Environment	Financial resources Freedom, physical safety and security Health and social care: accessibility and quality Home environment Opportunities for acquiring new information and skills Participation in and opportunities for recreation / leisure activities Physical environment (pollution / noise / traffic / climate) Transport

3.4.1.4 HEALTH ASSESSMENT QUESTIONNAIRE (HAQ)

The Health Assessment Questionnaire (HAQ) is one of the first self-reported functional status measures which have been developed to use in many diseases including arthritis (Bruce & Fries, 2005; Fries, Spitz & Young, 1982). The questionnaire is a comprehensive outcome measure which is used in a wide variety of rheumatic diseases with its focus on patient orientated outcome measures instead of process outcome measures (Pincus, Swearingen, Wolfe (1999). For the purposes of this study the HAQ-DI was used to assess the functional ability of the participants. According to Bruce and Fries (2005) the HAQ –DI have been demonstrated to valid (construct validity from 0.71-0.95) and reliable with test-retest correlations of 0.85-0.95. In the HAQ-DI there are 20 items in eight categories which assess the functional activities including dressing and grooming, arising, eating, walking, hygiene, reach, grip and other activities. The HAQ-DI is scored on a four level response with 0 = without any difficulty; 1= with some difficulty; 2= with much difficulty and 3= unable to do. The component question that achieves the highest score, determines the score for category (Bruce & Fries, 2005).

3.4.2 Research instruments: Qualitative aspect

The in depth interviews were held telephonically by an independent research assistant. Pre -determined questions were formalized by the researcher to obtain information from the participants on the impact of the intervention. Detailed documentation of the information provided telephonically was written down and repeated back to the participants to ensure that the information was correct. The interviews were then produced into a manuscript. The data was further analyzed into emergent clusters and themes.

3.5 INTERVENTION / PROCEDURE

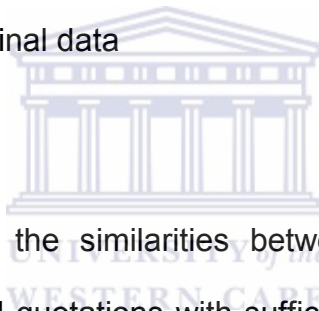
Prior to commencement of the study all participants identified were contacted and invited to participate in the study. The aims of the study were explained to the participants. On arrival at the intervention centre, information sheets and consent letters were given to the participants the researcher outlined the aims and objectives of the study. Once informed consent was obtained, the participants were given the questionnaires and completed these questionnaires at the intervention centre. The intervention programme was guided by literature available on the subject. The intervention programme and guidelines were explained to participants and was run once per week for 6 months. The hydrotherapy content included a warm up with mobilising and stretching exercises and ended with a cool down. The main body of each exercise class focussed on joint mobilising, muscle strengthening, functional activities and endurance. After completion of the intervention programme, participants once again completed the questionnaires. It is important to mention that during this period the original intervention center became unavailable for a period of time and alternative venues had to be found. In depth interviews were conducted by a research assistant

with purposively selected participants after the intervention period. The research assistant was guided with specific open ended questions linked to the aims of the study.

3.6 TRUSTWORTHINESS

Although the qualitative aspect of the study was a small component of the study, every effort was made to ensure trustworthiness. In the qualitative part of the study the following procedure was used to enhance trustworthiness.

Credibility: The chosen methods and procedure of identifying participants are described. Based on the notes kept during in-depth interviews, a summary of the discussion was presented to the participants to clarify whether the summary is accurate and a true reflection of the original data



Transferability: To maintain the similarities between the context of sending and receiving, the researcher used quotations with sufficient details and precision (Mays & Pope, 2000).

Dependability: The researcher ensured dependability through ensuring that the information provided is accurate.

Conformability: Raw data and its analysis were subjected to peer examination by colleagues who have a better understanding in qualitative research. The study supervisor had to go through the field notes and transcriptions, data reduction and analysis, data reconstruction and synthesis (themes, categories, interpretation) to ensure that the findings were not biased by the researcher.

The in-depth interviews were conducted in English as this was the preferred language of the participants. Notes were made by the interviewer throughout the discussions and read back to the interviewee to ensure if correct documentation was made. The discussions were also recorded on audio tape to ensure accuracy in the data collection.

3.7 ETHICAL CONSIDERATIONS

The study sought the approval from the University of Western Cape's Higher Degree Committee to conduct the study. Their approval was received. The purpose of the study was explained to the participants. The participants were informed that their participation was voluntary and that they maintained the right to refuse participation. Verbal and written permission by means of a consent form and the information sheet which explained the purpose of the study were handed to the participants. The researcher gave the participants the assurance that the information obtained would be treated with confidence and patient confidentiality would be maintained.

3.8 DATA ANALYSIS

Information was captured on an Excel spreadsheet for each participant. The data was then analysed with the Statistical Package for Social Sciences (SPSS) for Windows. The data was analysed to determine the effect of a 6 month hydrotherapy intervention programme on the pain levels, stress levels, quality of life and functional abilities in patients suffering with Rheumatic disease. Descriptive statistics and inferential statistics were done. The participants' baseline assessment results were compared with the end of treatment results. Means, standard deviations and 95% confidence intervals were measured and determined the difference between the baseline and end results. The

WHOQOL-BREF questionnaire had items rated on a 5-point Likert scale and the domain scores were transformed to lie between 0 and 100. The higher the score on the questionnaire, the better the quality of life of the participant. To calculate the HAQ-DI score, the scores are averaged into an overall HQ-DI score from 0-3. Scores of 0-1 generally represent mild to moderate difficulty, 1-2 represent moderate to severe difficulty and 2-3 represents severe to very severe difficulty. Thus the lower the score on the HAQ-DI the better the functional ability of the participants.



CHAPTER 4

RESULTS


4.1 INTRODUCTION

In this chapter the bio-demographic data of the participants are presented, as well as the descriptive and inferential statistics for the impact of hydrotherapy on quality of life, pain, stress and functional ability.

4.2 SOCIO-DEMOGRAPHIC DATA

The study focused on patients with rheumatic diseases residing in the Western Cape. The sample consisted of 16 females and 3 males with a mean age of 60 years (SD=9.56) and a range of 38-75 years. Table 4.1 presents a summary of the demographic data of the participants

Table 4:1: Demographic data



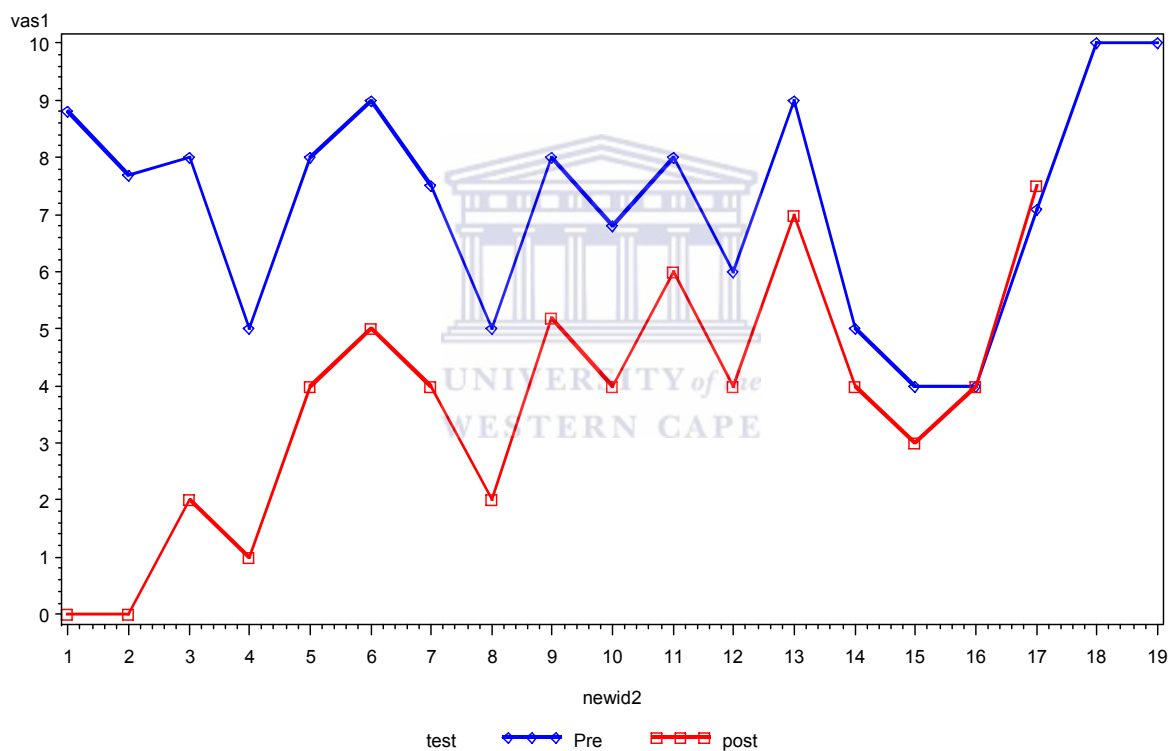
	N	%
Gender		
Male	3	15.8
Female	16	84.2
Age		
<50 years	2	10.5
51-60 years	5	26.3
61-70 years	9	47.4
>70years	3	15.8
Race		
Black	0	0
Coloured	15	78.9
Indian	3	15.8
White	1	5.3
Diagnosis		
Ankylosing spondylitis	1	5.3
Fibromyalgia	2	10.5
Fibromyalgia/Osteoarthritis	2	10.5
Fibromyalgia/Systemic Lupus Erythematosus	1	5.3
Osteoarthritis	10	52.6
Rheumatoid Arthritis	3	15.8

4.3 DESCRIPTION OF THE PARTICIPANTS REACTION TO THE VARIOUS QUESTIONNAIRES

4.3.1 Pain (VAS)

Pain was determined using the horizontal 0 – 10 Visual Analogue Scale. 0 indicates no pain and 10 indicates the worst amount of pain that the patient would experience. Figure 4.1 reflect the pain scores experienced by the group pre and post intervention.

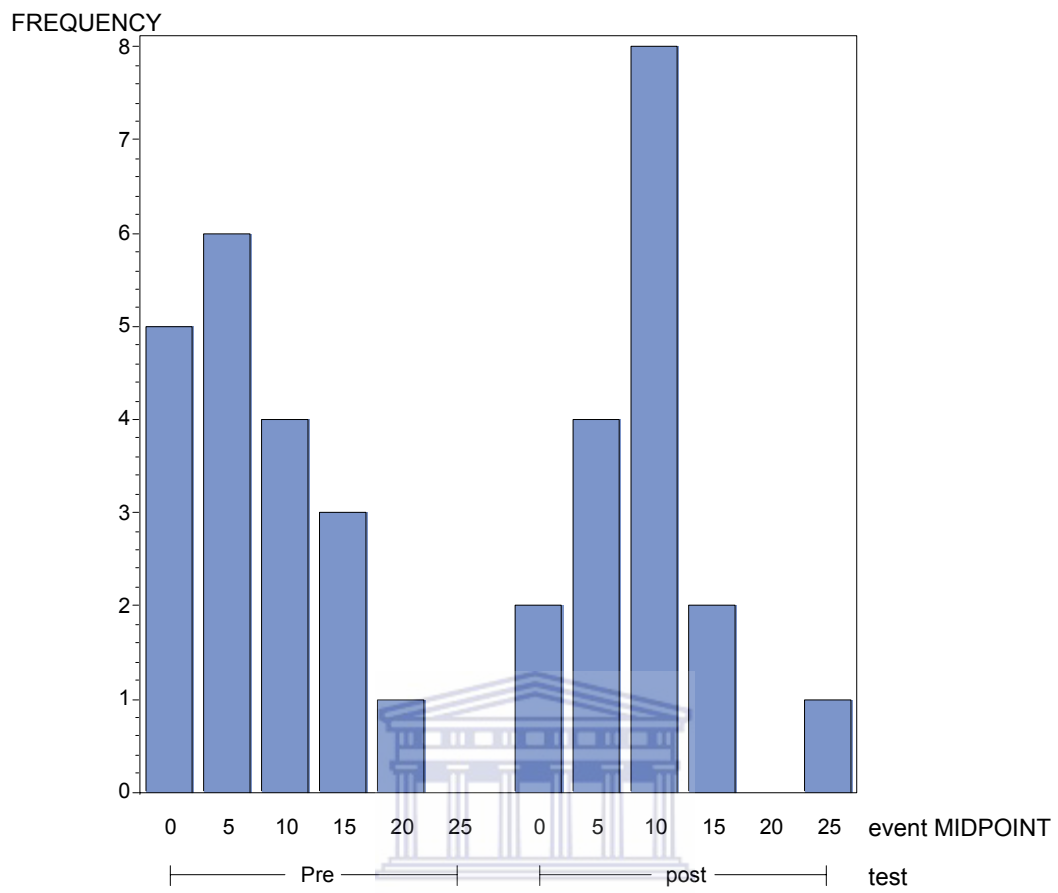
Figure 4.1: Difference in VAS scores pre and post intervention



4.3.2 Stress

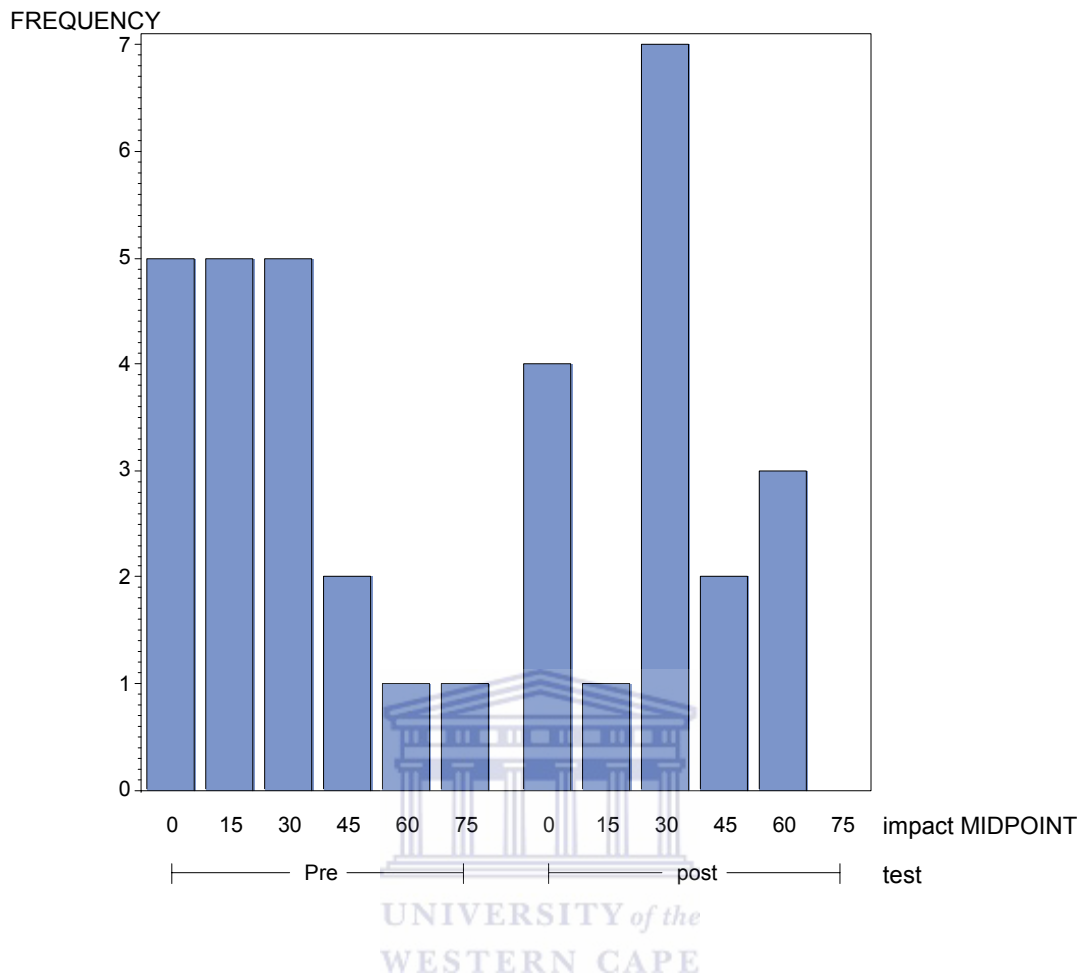
Stress was determined by linking the individuals' reaction to an event and then looking at the impact on their lives. The scale had 25 items and the lowest score that could be computed was 0 and the highest score would be 175. The lower the score the less stressful the past week has been. Figure 4.2 and 4.3 reflect the stress scores experienced by the group pre and post intervention.

Figure 4.2 Pre and Post scores for Event



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Fig 4.3: Pre and Post scores for Impact



4.3.3 WHO-QOL-BREF

The quality of life scores presented in Tables 4.2-4.4.5 below is the raw score for each domain of the quality of life questionnaire. In addition the raw scores are converted to a 0-100 scale and referred to as a transformed score (WHO, 1996). It is evident from the tables presented below that the transformed scores for all the domains improved from a range of 63-69 to a range of 75-88.

Table 4.2 Pre and post intervention scores for physical health = domain 1

Pre-intervention data (n=19)			Post-intervention data (n=17)		
No. of participants	Raw score/35	Transformed Score /100	No. of participants	Raw score/35	Transformed Score /100
1	16	31	1	20	44
3	20	44	3	24	63
6	24	63	7	28	75
7	28	75	5	32	88
2	32	88	1	35	100
Mean	25	63	Mean	28	75

Table 4.3 Pre and post intervention scores for psychological health = domain 2

Pre-intervention data (n=19)			Post-intervention data (n=17)		
No. of participants	Raw score/30	Transformed Score /100	No. of participants	Raw score/30	Transformed Score /100
1	12	25	1	18	50
2	18	50	2	21	63
7	21	63	9	24	75
5	24	75	3	27	88
4	27	88	2	30	100
Mean	22	69	Mean	25	81

Table 4.4 Pre and post intervention scores for social relationships = domain 3

Pre-intervention data (n=19)			Post-intervention data (n=17)		
No. of participants	Raw score/15	Transformed Score /100	No. of participants	Raw score/15	Transformed Score /100
1	9	50	2	11	69
5	11	69	3	12	75
6	12	75	8	14	94
5	14	94	2	15	100
Mean	11	69	Mean	12	75

Table 4.5 Pre and post intervention scores for environmental = domain 4

Pre-intervention data (n=19)			Post-intervention data (n=17)		
No. of participants	Raw score/40	Transformed Score /100	No. of participants	Raw score/40	Transformed Score /100
1	21	44	8	30	69
2	24	50	5	33	81
3	27	63	3	36	88
9	30	69	2	39	100
3	33	81			
1	36	88			
Mean	29	69	Mean	35	88

4.3.4 HAQ-Disability index

The HAQ –Disability index was used to determine the functional ability of the participants. Table 4.6 indicates the actual scores reported by the participants’ pre and post intervention. The functional activity that participants most commonly struggled with included upper limb function such as reaching and grasping as well as doing household chores.

Table 4.6: Pre-intervention HAQ-DI score

Category	Item	Pre-intervention Score				Post intervention Scoring			
		0	1	2	3	0	1	2	3
Dressing and grooming	Dress yourself	9	8	0	2	13	4	0	0
	Shampoo your hair	12	5	0	2	17	0	0	0
Arising	Stand up from a straight chair	9	10	0	0	10	7	0	0
	Get in and out of bed	9	10	0	0	15	2	0	0
Eating	Cut your meat	17	2	0	0	16	1	0	0
	Lift a cup or glass to your mouth	19	0	0	0	16	1	0	0
	Open a new milk carton	16	2	1	0	15	2	0	0
Walking	Walk outdoors on flat ground	13	4	2	0	14	3	0	0
	Climb up 5 steps	9	6	4	0	12	2	3	0
Hygiene	Wash and dry your body	13	6	0	0	15	2	0	0
	Take a tub bath	11	7	1	0	14	3	0	0
	Get on and off the toilet	18	1	0	0	16	1	0	0
Reach	Reach and get a 5 pound object (2.25kg) from above your head	6	10	3	0	14	1	2	0
	Bend down to pick up clothing from the floor	9	7	3	0	12	4	1	0

Grip	Open car doors	17	2	0	0	17	0	0	0
	Open jars which have been previously opened	14	4	1	0	15	2	0	0
	Turn faucets (taps) on and off	13	5	1	0	14	3	0	0
Activities	Run errands and shop	11	8	0	0	13	4	0	0
	Get in and out of a car	10	7	1	0	10	7	0	0
	Do chores such as vacuuming or yardwork	7	8	2	2	7	7	2	1

0=without any difficulty

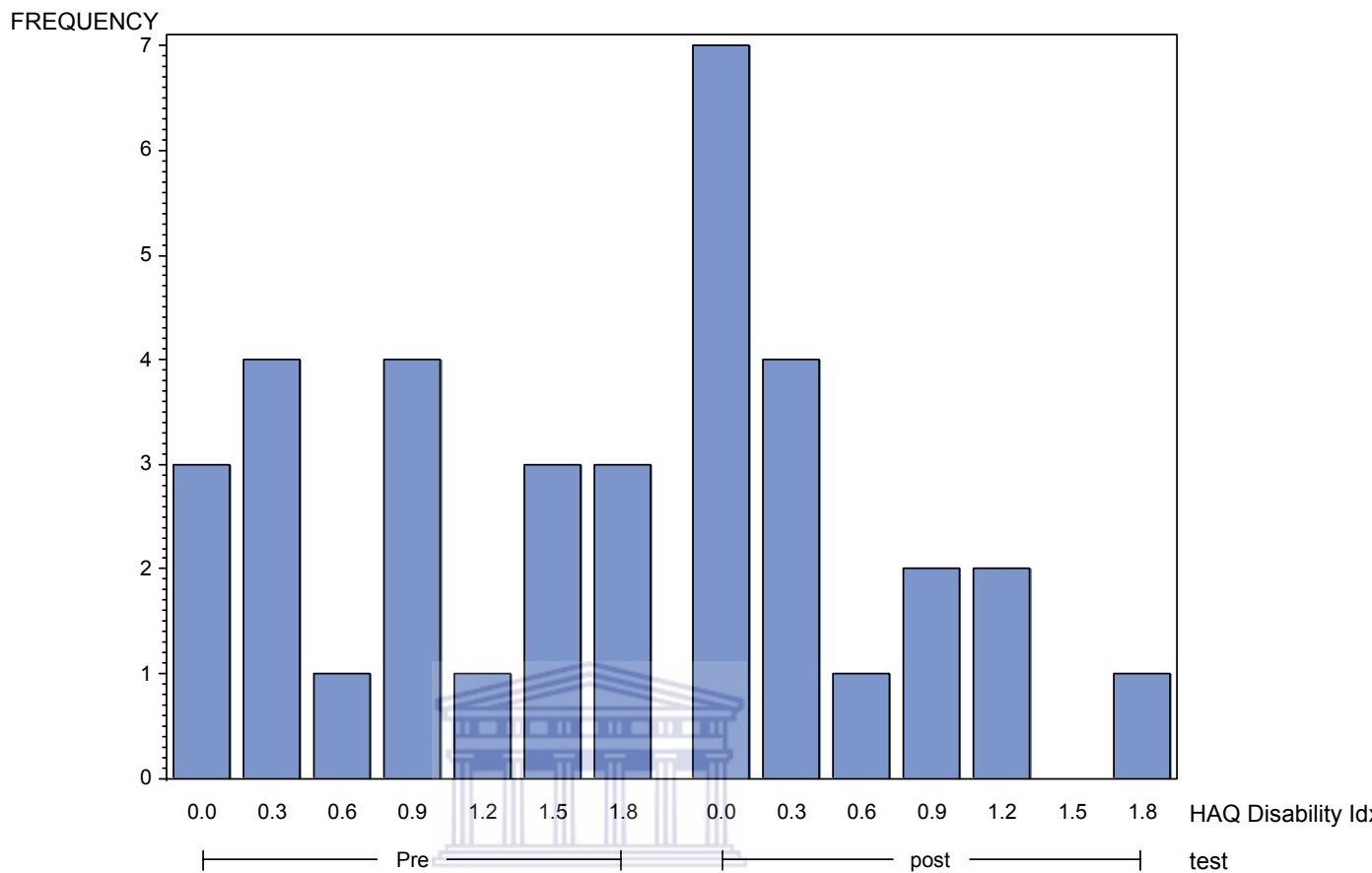
1= with some difficulty

2=with much difficulty

3= unable to do

To calculate the HAQ-DI score, the scores are averaged into an overall HQ-DI score from 0-3. Scores of 0-1 generally represent mild to moderate difficulty, 1-2 represent moderate to severe difficulty and 2-3 represents severe to very severe difficulty. Within the current study, prior to the intervention, the disability index ranged from 0-1.8 with variations within this scale thus indicating that the participants had a moderate to severe disability with even distribution within the scale (Figure 4.4.). However post intervention although the overall disability range did not change, more participants were at the lower end of the scale.

Figure 4.4: Pre and Post scores for Disability Index (DI)



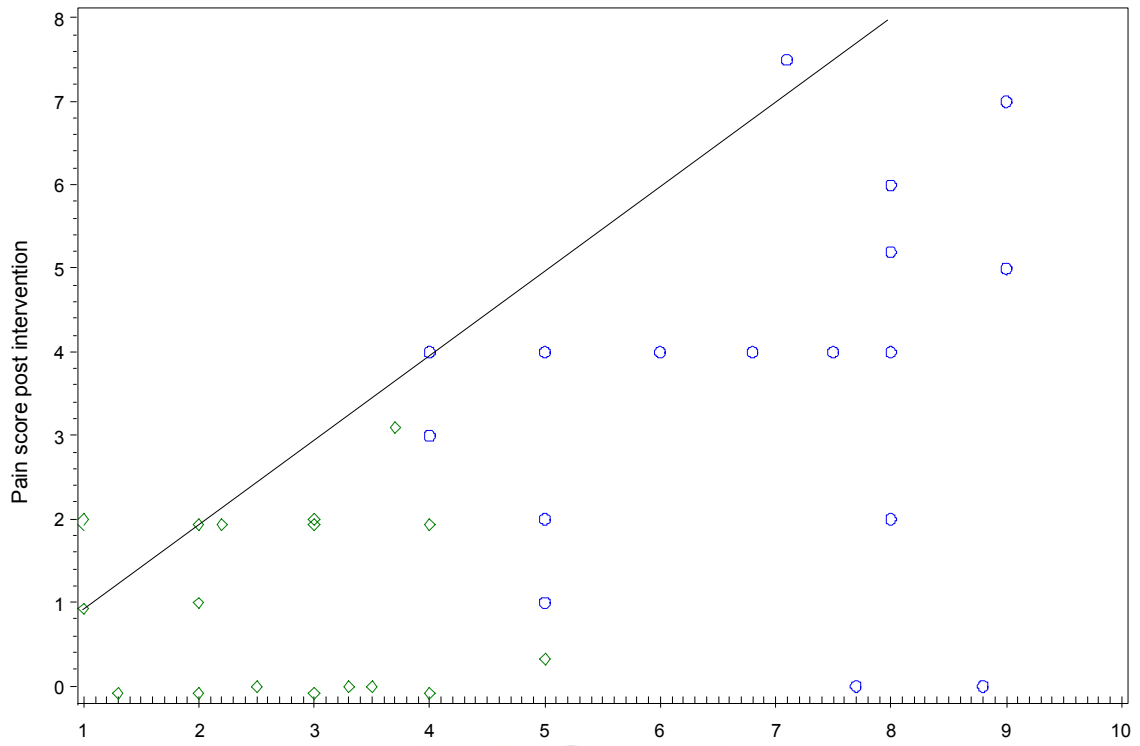
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4.4 IMPACT OF THE INTERVENTION

4.4.1 Impact of hydrotherapy on pain

Prior to the intervention, the mean pain score for the participants was 7.2 (SD=1.8) and a range of 4-10. Post intervention, the mean pain score was 3.7 (SD=2.2) and the range was 0-7.5. Using the Wilcoxon Signed Rank Test the improvement from pre-intervention to post-intervention was found to be statistically significant ($p=0.0001$).

Figure 4.5: VAS Pain: Post-intervention (Y) and Pre-intervention (X)



4.4.2 Impact on stress

Prior to the intervention, the mean event score for the participants was 7.63 (SD=6.06) and a range of 0 -19. Post intervention, the mean event score was 9.4 (SD=5.9) and the range was 1- 25. Using the Wilcoxon Signed Rank Test the improvement from pre-intervention to post-intervention was not found to be statistically significant ($p=0.3$). Prior to the intervention, the mean impact score for the participants was 24.4 (SD=21.07) and a range of 0 -76. Post intervention, the mean impact score was 29.94 (SD=19.08) and the range was 1- 62. Using the Wilcoxon Signed Rank Test the improvement from pre-intervention to post-intervention was not found to be statistically significant ($p=0.16$).

4.4.3 Impact on the QOL

Four main domains were included in the study namely physical health, psychological health, social relationships and environment. The pre and post intervention quality of life scores are presented in Table 4.1 below.

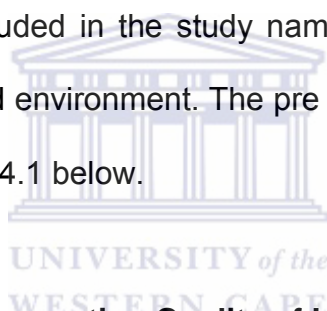


Table 4.7 Pre and Post Intervention Quality of Life Scores

Domains	Pre-intervention	Post intervention	P-value
Physical health	24.5 (SD=3.8)	28.1 (SD=3.5)	$p=0.005^{**}$
Psychological health	22.2 (SD=3.8)	24.6 (SD=2.8)	$p=0.012^*$
Social relationships	12.0 (SD=1.3)	12.8 (SD=1.3)	$p=0.11$
Environmental	29.4 (SD=3.8)	32.9 (SD=3.2)	$P=0.002^{**}$

*Significant at 0.05 level

** Significant at 0.01 level

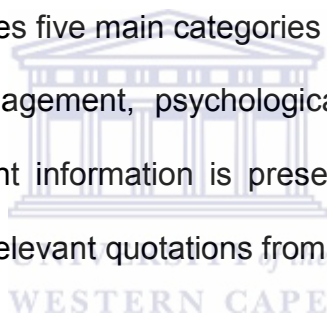
4.4.4 Impact on HAQ disability index

Prior to the intervention, the mean HAQ disability index score for the participants was 0.86 (SD=0.65) and a range of 0 -1.8. Post intervention, the mean HAQ disability index

score was 0.5 (SD=0.54) and the range was 0- 1.8. Using the Wilcoxon Signed Rank Test the improvement from pre-intervention to post-intervention was found to be statistically significant ($p=0.01$).

4.5 QUALITATIVE DATA

Six clients were purposively selected for the qualitative aspect of the study. The participants had varying diagnosis which included two clients with osteoarthritis, one with rheumatoid arthritis, one with osteoarthritis and fibromyalgia, one with a combination of fibromyalgia and SLE and one with AS. The results are presented with participants responses in quotations. Three broad themes were identified from the responses which included access to hydrotherapy, management and impact of hydrotherapy. Within the themes five main categories were identified and these included limited facilities, holistic management, psychological impact, functional impact and group support. All the relevant information is presented in Table 4.8 below and the information is supported with relevant quotations from the participants.



4.5.1 Access to hydrotherapy

Accessibility to hydrotherapy was highlighted as a problem and the main reason was the limited facilities available for this service. The participants indicated that the main factors influencing their hydrotherapy attendance was the convenience of the location at hospital where they attended the clinic as well the public transport available dropped them at the hospital.

4.5.2 Management

Management of the condition was identified as a theme as participants highlighted the impact of the current intervention in relation to their other forms of management. Based on the information provided by the participants, the hydrotherapy intervention influenced their number of visits to the doctor and physiotherapist. They also reported

taking less medication for their pain during the intervention period and post intervention had to increase the medication they are taking.

4.5.3 Impact of the hydrotherapy intervention session

The intervention impacted on various aspects of the participants' life which included psychological impact, functional impact and group support. Within the category of psychological impact the participants reported on the influence of the sessions on their self-image and depression. Participants also highlighted the functional impact as it related to their flexibility, endurance and functional ability. The participants also referred to the importance of the group session and having a platform to share their experiences and receive encouragement from one another



Table 4.8

Themes and categories developed from qualitative data analysis				
Themes	Categories	Subcategories	Participants experiences	Quotes
Accessing hydrotherapy groups	Limited facilities	Convenience	Participants reported that travelling to GSH group was convenient	“convenient for travelling and could travel on my own”. “I don’t own a car so it is a bit awkward to go elsewhere”.
		Transport	Participants reported that transport to GSH was easier as they did not always have their own vehicles	
Management	Holistic management	Medical	Participants indicated that they had less visits to their GP and less medical expenses	“I visited my GP less during hydrotherapy classes.” “Did not visit my physician as much and my medical bills were less.” “Visits to my physiotherapists were less.” “Now I find myself visiting my GP more, often for pain killers.”
		Physiotherapy	Participants felt that during their period of the intervention they needed less “hands on” physiotherapy management	
		Medication	Participants reported that since stopping the sessions they are now taking more pain medication	
Impact of hydrotherapy session	Psychological impact	Improved self-image	Participants felt that they were able to do things for themselves and became independent.	“felt good, energized.” “mentally I felt better” “during hydrotherapy I became very independent because I experienced less pain. “we often laughed.” “The classes gave me a positive attitude in life, now I’ve become so depressed.” “I could handle family stresses better because hydrotherapy sort of eases the tension that you are experiencing at the moment.” “I became happier because we often laughed.”
		Depression	Participants reported that their lack of interaction within the group sessions led to depression	

	Functional impact	Improvement in flexibility	Participants reported an improvement in flexibility and mobility in their joints. Participants reported that they became more active	<p>‘I could lift my arms & legs easier.’</p> <p>‘I now lack mobility without the classes.’</p> <p>“could walk for longer periods without any pain.”</p>
		Improvement in endurance	Participants reported an improvement in their endurance.	“before hydro, I could not walk or move for long periods.’
		Improvements in ADL	Participants reported an improvement in their ability to perform ADL.	<p>“could do more at home.’</p> <p>“could do much more duties at home.’</p> <p>“now without classes, the pain restricts me from doing various tasks and pain keeps me awake at night.’</p> <p>‘I now need help with shopping because there are no classes.’</p>
	Group support	Platform to share difficulties experienced	Participants benefitted from being able to talk to other people in the group about difficulties experienced without feeling isolated in their disease.	<p>“The group sessions were wonderful because I made more friends and we could relate to one another.’</p> <p>“The group sessions were great because I made a lot of friends and I could speak to them about my ailments.”</p>
		Receiving Encouragement/motivation	The participants received tremendous understanding and support from others facing similar issues/difficulties.	‘The group sessions were great fun because we joked with one another in the pool and I could speak to them about my ailments.’
		Sharing coping skills	<p>Participants received different perspectives and viewpoints on shared issues.</p> <p>Participants helped each other to find new ways to cope with the difficulties experienced.</p>	“the group therapy motivated me more.”

CHAPTER 5

DISCUSSION

5.1 INTRODUCTION

Butler and Moseley (2003) defines coping with life and chronic pain as ‘the ability to identify, manage and overcome the issues which stress us all.’ They suggest that one example of an active coping strategy is exploring ways to move. Literature has shown that clients with a form or combination of rheumatic disease experiences pain, adverse stress, decreased functional abilities and poorer quality of life (Luqmani et al., 2006). Hydrotherapy is one of the interventions which are available in the treatment of rheumatic diseases (Geytenbeck, 2002).

Hydrotherapy has been used to treat rheumatic diseases for many years. The effects of hydrotherapy in conditions such as fibromyalgia have been studied (Mc Veigh et al., 2008, Evick et al., 2008, Gowans et al., 1999) but little is known about the duration and amount of treatment needed (van Tubergen & Hidding, 2002). In the current study the researcher looked at the effects of hydrotherapy on the pain levels, stress levels, quality of life and functional abilities in patients with rheumatic diseases. This study included patients with one or with a combination of rheumatic diseases and was not exclusive to one type of disease. Literature most commonly reports on the effect of hydrotherapy on one type of rheumatic disease such as fibromyalgia and osteoarthritis (Langhorst et al., 2009; Mc Veigh et al., 2008; Gowans et al., 1999).

The current study shows that a hydrotherapy intervention can impact on improving components of the health of patients suffering with various rheumatic disorders. The findings of the current study can assist in highlighting hydrotherapy as an intervention that could be used to improve the quality of life and functional status of patients with rheumatic diseases.

The objectives of this study was to determine the pain levels, stress levels, quality of life and functional abilities of patients suffering with a rheumatic disease before and after hydrotherapy. This chapter discusses the findings of the current study and compares them with similar studies. Limitations of the study are also discussed.



5.2 SOCIO-DEMOGRAPHIC DATA OF PARTICIPANTS

Rheumatic disease has been reported to be common amongst females with the most common disorder being osteoarthritis. The study population in the current study was found to be mainly female (84.2%). A study conducted by Owino, Oyoo and Otieno, (2009) reported that 87% of the patients in their study were female. Furthermore, this finding is supported by literature which highlights that most rheumatic diseases are more prevalent in females (WHO, 2010; Topbas et al., 2005; Gard & Mannerkorpi, 2003; Lindell et al., 2000; Adebago & Davis, 1994). Studies have indicated that genetic and environmental factors may predispose females to rheumatic diseases (Rubtsov, Fischer, Meehan, Gillis, Kappler & Marrack, 2011; Oliver & Silman, 2009). Literature suggests that the bone structure of females are more susceptible to weight and impact which causes degeneration to take place faster in women than in men. Also, male hormones may suppress the immune system whereas female hormones

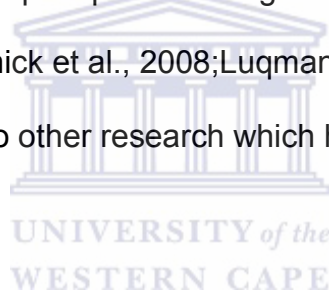
appear to stimulate the immune system. There is no conclusive evidence as to the high prevalence of rheumatic disease among females but there is a strong leaning towards the hormonal factor (Rubbtsov et al., 2011; Oliver & Silman, 2009; Fairweather, Frisancho & Rose, 2008).

It is interesting to note which age group was most prevalent in the current study. The age group which ranged from 61-70 years were mostly represented (47.4%). The second most prevalent age group ranged from 51-60 years of age. These findings are similar to that which has been reported in the literature. Murphy et al 2008 and Helmick et al 2008 both reported that the prevalence of rheumatic disease increases significantly over the age of 50 years in men and 40 years in women. Furthermore, Topbase et al., (2005) and Makela & Heliövaara (1991) reported that in fibromyalgia the peak age ranged from 50-59 years and 55-64 years respectively. There was only a small percentage (10%) of the study group that was younger than 50 years of age. This could be due to the fact that most younger persons with rheumatic disease may still be in the working environment or that the younger patient does not experience severe disabling symptoms which encourages them to seek physiotherapy intervention.

In the study sample a large portion of the patients were from the coloured race (78.9%). There were no patients representing the black race. This is a common trend in South Africa and in the westernised world. It has been reported that rheumatic disease is uncommon in blacks in South Africa (Adebajo & Davis, 1994; Cassim & Mody, 1984). Although there seems to be growing evidence that rheumatic diseases do affect the black race, it is still not as prevalent as found in other racial groups in South Africa, Europe and North America (Adebajo & Davis, 1994; Cassim & Mody,

1994; Mody & Naidoo, 1984). Adebajo and Davis (1994) do however highlight that when rheumatic disease affects the black population, the symptoms are as severe and disabling as when it affects any other racial group.

Also noted in the current study was that a large portion of the study population had the diagnosis of osteoarthritis (52.6%). There are extensive studies reporting that osteoarthritis is the most common type of rheumatic disease worldwide (Helmick et al., 2008; Luqmani et al., 2006). Researchers have also reported that 50% of the adult population will develop osteoarthritis of the lower limb at some stage of their lives and their symptoms will require pharmacological and non-pharmacological intervention (WHO 2010; Helmick et al., 2008; Luqmani et al., 2006). The finding in this study therefore is similar to other research which has been reported.



The researcher realises that this is a small group and therefore cannot generalise the findings. However but it is important to note that within this study the normal trends of rheumatic disease was evident amongst the participants.

5.3 THE REPORTED STATUS OF PATIENT PRIOR TO INTERVENTION

Rheumatic disease has been widely reported as being very disabling to the patient suffering with one or a combination of rheumatic disease. Rheumatoid arthritis has been reported to be amongst the top diseases causing severe disability in South Africa (Donahue & Gartlehner, 2008; Escalante & Del Rincón, 2002). The most common symptoms in rheumatic disease are joint pain and swelling, decreased functional abilities (Somers et al., 2010; Donahue & Gartlehner, 2008; Murphy et al.,

2008; Kavunca & Evcik, 2004) as well as a decrease in the quality of life experienced (Klitz & v.d.Heijde, 2009; Dominick et al.,2004). The study therefore looked at the pain levels, stress levels, functional abilities and the quality of life of each patient in the study population.

5.3.1 Pain

Pain has been identified as a common symptom in patients with rheumatic disease (Corbacho & Dapuetto, 2010; Breedveld 2004). The severity of pain had adverse effects on the patients' abilities to perform activities of daily living. As a result of the decrease in function experienced, the patients' quality of life also decreases. Eustice (2003) highlighted the relationship between stress and pain. Pain can cause the stress levels of the patient to increase and the reverse is also true. In the current study the pain levels of the patients in this study were significantly reduced with the intervention. Prior to the intervention the mean pain score was 7.2 (SD= 1.8) and a range of 4-10. Researchers have found that the Visual Analogue Scale is a reliable pain measuring tool (Scrimshaw & Maher, 2001; Myles, Troedel & Reeves,1999). The linear scale of 10cm is divided into pain categories. 0 = no pain and 10 = worst pain possible. 0 - 1= no pain, 2 - 3= mild pain, 4 - 5= moderate pain, 6 -7= severe pain, 8 – 9= very severe pain and 10= worst pain possible. A 33% decrease in pain indicates a meaningful change in pain level from the patient's perspective (Jensen et al., 2003).The finding in this study indicates that prior to the intervention the patients' pain level fell within the severe pain category.

5.3.2 Stress

Stress is common in patients suffering with a rheumatic disease. Stress in rheumatoid arthritis and fibromyalgia has been more widely investigated than in the other forms of rheumatic disease. Rheumatoid Arthritis and fibromyalgia has been associated with high levels of distress (Nas, Sarac, Gur, Cevik, Altay, Erdal et al., 2011; Bai, Tomenson, Creed, Mantis, Tsifetaki, Voulgari et al., 2011; Combe, 2007; Mc Williams, Cox & Enns, 2003). Researchers reported that 20-60% of rheumatoid arthritis and fibromyalgia patients reported significant symptoms of distress (Nas et al., 2011 & Mc Williams et al., 2003). Riddle, Kong and Fitzgerald (2011) reported that there has to be a very high degree of stress present before self-reported outcomes are adversely affected. Contradicting this, Ames, Jones, Howe and Brantley (2001) and Garrett, Brantley, Jones and Mc Knight (1991) reported that minor stresses had more of an effect on the patients' general well-being and health related outcomes than major stresses. In this study the mean event score prior to the intervention was 7.63 (SD= 6.06) and a range of 0-19. The mean impact score prior to the intervention was 24.4 (SD=21.07) and a range of 0-76.

5.3.3 Quality of life

Patients suffering with one or with a combination of rheumatic disease coupled with its association with high pain levels and decreased functional abilities is not surprisingly also experiencing poor health-related quality of life. From the current study, the quality of life was low across all four domains namely physical health (63), psychological health (69), social relationships (69) and environmental (69). This is similar to literature which indicated that patients with rheumatic disease score poorly for all subscales on the quality of life outcomes survey (Walker & Littlejohn, 2007). A study conducted by Mc Williams et al., (2003) report that in rheumatoid arthritis and

fibromyalgia patients the domains mostly affected are physical, psychological and social. It is interesting to note that although rheumatic disease is rare among black South Africans (Adebajo & Davis, 1994; Cassim & Mody, 1994), it has been reported that blacks suffering with rheumatoid arthritis and systemic lupus erythematosus have very poor health-related quality of life. The physical disability in the black rheumatoid patients is worse when compared to the black systemic lupus erythematosus patients. In the black South African population that was studied it was concluded that the disease activity directly impacted on the quality of life (Benitha & Tikly, 2007). It is therefore logical to suggest that the quality of life is poor in rheumatic disease patients regardless of their race and geographics.

In the current study the mean scores are scored on a scale out of 100. The domain scores are scaled positively namely, higher scores indicate a higher quality of life (Walker & Littlejohn, 2007). It is noted that the mean scores for all the domains are between 63 and 69 during pre-intervention with physical health scoring the lowest. These results support what the literature reports. Corbacho and Duepueto (2010); Woolf and Pflieger (2003); Breedveld (2004) report that patients with rheumatoid arthritis and osteoarthritis suffer with poor health-related quality of life and is associated with the pain levels and resultant decrease in their functional abilities.

5.3.4 Functional abilities (HAQ)

Functional ability in the rheumatic disease patient is generally severely compromised. The contributing factors for the decreased functional ability have been laid at the feet of the disease activity, self-efficacy and pain levels experienced by the patient (Somers et al., 2010; Corbacho & Dapuetto 2010). There has been

extensive research conducted in the area of rheumatoid arthritis and functional ability. Researchers all agree that rheumatoid arthritis is the most common cause of 'reversible and treatable' functional disability among the rheumatic diseases (Plasqui, 2008; Benitha & Tikly, 2007; Kalla & Tikly, 2003). Somers et al., (2010) however states that patients who have high self-efficacy coupled with high disease activity will have better outcomes in functional ability than those with low self-efficacy. Corbacho and Duepueto (2010) concludes their study by emphasising the importance of aggressive pain management from the onset of the disease in order to maintain or help the functional prognosis of the patient. In the current study the functional ability of the patients were investigated in eight categories according to the HAQ disability index. These categories were dressing & grooming, arising, eating, walking, hygiene, reach, grip and common activities. Prior to the intervention all the subcategories of dressing and grooming, walking, reach, grip and common activities were severely compromised. The patients' functional abilities were also decreased in the eating and hygiene categories. It is important to highlight that prior to the intervention there were patients who were unable to be functional independent in the dressing and grooming category and in the subcategory of activity namely yardwork. The mean score for the functional ability was 0.86 (SD=0.65) with a range of 0-1.8. The finding in the current study is similar to studies conducted by Donahue and Gartlehner (2008); Murphy et al (2008) and Kavunca and Evcik (2004) in which the researchers have reported a decrease in the functional abilities of the rheumatic disease patient. These researches have highlighted walking; stair climbing, bathing and dressing as the activities of daily living which the rheumatic patient has difficulty performing. The researchers also agree that rheumatoid arthritis patients have more severe functional disability than their other rheumatic disease counterparts.

5.4 THE REPORTED STATUS OF THE PATIENT POST INTERVENTION

Hydrotherapy has been defined as the therapeutic use of the properties of water in the treatment of disease or illness (Duffield, 1976). The physical properties of water namely, buoyancy, resistance, warmth, hydrostatic pressure, specific gravity/density and turbulence all make water an ideal tool for rehabilitation. The buoyant property of water aids by reducing the effects of the centre of gravity; thereby allowing movement in water to be easier than on land. It can also be used to resist movement and support movement at the water surface. The resistance of the water can be used to strengthen muscles. The warmth of the water aids in increasing circulation and aiding in relaxation. Temperatures range from 34.4°C to 37°C. The hydrostatic pressure promotes improved blood circulation and thereby reducing swelling and creates a sense of well-being. Specific gravity allows the body to float in water and turbulence improves balance and co-ordination (Evcik et al., 2004; Duffield, 1976). Studies conducted on Rheumatoid Arthritis patients and Fibromyalgia patients all concur on the benefits of hydrotherapy. Researchers have found that hydrotherapy produces increased range of movement, improved muscle strength, decreased muscle spasm, decreased pain and improved health-related quality of life (Mc Veigh et al., 2008; Fransen, Nairn, Winstanley, Lam & Edmonds, 2007; Hall, Skevington, Maddison & Chapman, 1996). Hall, Skevington, Madison and Chapman (1996) suggested in their conclusion that hydrotherapy also provides psychological benefits to patient with rheumatoid arthritis. In rheumatic diseases, hydrotherapy has been shown to produce short term benefits on the pain levels, functional abilities and quality of life in the patients. The researcher found that in general the study duration has all been short-term (two weeks – three months) and was limited to include only one type of rheumatic disease (Jamtvedt et al., 2008; Eversden, Maggs, Nightingale & Jobanputra, 2007; Bartels et al., 2007; Fransen et al., 2007). It was also interesting

to note that most of the literature pertaining to the impact that hydrotherapy has on the quality of life in rheumatic diseases had been derived from studies conducted on fibromyalgia patients (Langhorst et al., 2009; Brooks, 2002; Geytenbeck, 2002). The available literature suggests that a short term hydrotherapy intervention does have an impact on the symptoms of rheumatic disease. More information is needed on the effects and maintenance of benefits of a long-term hydrotherapy intervention. The researcher was surprised to find no South African studies conducted on the impact of hydrotherapy in rheumatic disease.

The current study had a positive and significant impact on pain, functional ability and quality of life in the patients. The results on the impact of hydrotherapy on stress were inconclusive. Hydrotherapy can therefore be recommended as an intervention to be included in the management of rheumatic disease where the aims are to decrease pain, improve function and improve the quality of life.

5.4.1 Pain

The post intervention mean pain score was 3.7 (SD= 2.2) and a range of 0 -7.5. This implies that after the intervention the pain levels are described as mild (Jensen et al, 2003). The difference between the pre and post intervention scores are also significantly improved ($p=0.0001$). There were no patients who scored higher than 7.5 post intervention as opposed to severe maximum pain (10) which was indicated in the pre intervention range. The results are supported by studies which have found that hydrotherapy reduces the pain levels in the rheumatic disease patient (Langhorst et al., 2009; Mc Veigh et al., 2008; Brooks, 2002; Gowans et al., 1999). The results are confirmed by what the clients reported in the qualitative data. Subjectively, the patients reported that they had less pain during the intervention and consequently took less pain medication and had less visits to their practitioners and

physiotherapists. However, it is important to note that six months after the conclusion of the hydrotherapy intervention, the patients report that they have had to start increasing their pain medication again and had to visit their general practitioner more often. This may imply that the pain benefits achieved with hydrotherapy lasts less than six months post intervention. Van Tubergen & Hidding (2002) found that patients with Ankylosing Spondylitis may still experience the benefits of hydrotherapy up to two weeks to one month after the end of treatment. The result in this study could assist physiotherapists when prescribing the initial length of hydrotherapy intervention and the follow up classes. From this study it may be suggested that patients consider hydrotherapy as part of their weekly management and/or that they have less than six months period between interventions.



5.4.2 Stress

Literature reports that some form of exercise can positively impact on stress. Ramsey-Goldman et al., (2000) found that exercise improved the sense of well-being in systemic lupus erythematosus patients. Other researchers found that hydrotherapy provided psychological benefits to the fibromyalgia and rheumatoid arthritis patients (Langhorst et al., 2009; Gowans et al., 1999; Hall et al., 1996). In the current study the quantitative results on the impact of hydrotherapy on stress levels were inconclusive. One of the attributing factors to the inconclusive quantitative stress results could be the poor outcome measure used. However, in the qualitative data the patients reported definite improvements in their psychological status. They reported that they experienced less tension, became happier and had a more positive attitude. There was also a strong sense of being able to handle tensions better, including family tensions. The qualitative data supports the limited

data that reports that hydrotherapy has a positive effect on the stress levels of the rheumatic disease patient (Langhorst et al 2009; Mannerkorpi & Gard 2003). It is thus evident that a need may exist for qualitative investigations to explore patients' reactions to hydrotherapy intervention. This will also influence the decision-making of therapists when looking at the evidence to support hydrotherapy.

5.4.3 Quality of life

The literature reports that hydrotherapy intervention can improve the quality of life in the rheumatic disease patient. The studies conducted in this area have mainly focussed on fibromyalgia (Mannerkorpi & Gard, 2003). It has been reported that psychological health and social relationships can improve with hydrotherapy. Patients tend to report an overall feeling of improved well-being (Eversden et al., 2007; Mannerkorpi & Gard, 2003). In this study 3 out of the 4 quality of life domains showed significant improvements which included physical health ($p=0.005$), psychological health ($p=0.012$) and environmental. ($p=0.002$). Social relationships remained relatively unchanged ($p=0.11$). The mean scores post intervention ranged from 75-88 which indicates a significant increase in the quality of life (Walker & Littlejohn, 2007). Furthermore there is qualitative data to support the quantitative findings of the physical and psychological domains. Physically, the patients reported improvements in the flexibility and mobility in their joints. They also reported becoming more active and having more endurance. The improvements in the psychological health are reported as good improvements in self-image and depression. They were able to do more for themselves and became independent as a result of the hydrotherapy intervention. The result here supports the findings of the study by Mannerkorpi and Gard (2003) who reported that physiotherapy group

hydrotherapy treatment provided an improvement in the relationship to self and the world in fibromyalgia patients. The only contradiction to the reported literature is noted in the social relationship domain. The research into the impact that hydrotherapy has on social relationships is very limited but Mannerkorpi and Gard (2003) reported that hydrotherapy resulted in creating new relationships to social roles and new patterns for managing pain were created within the group environment. Group therapy in general is reported to be beneficial to the patients (Hidding, van der Linden, Boers, Gielsen, de Witte, Kester et al., 1993; Strauss, Spiegel, Daniels, Spiegel, Landsverk, Roy-Byrne et al., 1986). The qualitative results in this study support the findings of Mannerkorpi and Gard (2003). In the current study, group support came out strongly as a benefit of the hydrotherapy intervention. The patients reported that they benefitted from being able to share their difficulties within the group without feeling isolated in their disease. The hydrotherapy group classes also provided them with a group of people who faced similar issues/difficulties and therefore they received tremendous support and understanding from each other. Another aspect that was beneficial was being able to share coping skills within the group. The patients shared different viewpoints with each other and received different perspectives. This helped the patients to find new ways to cope with the difficulties they were experiencing. The researcher cannot explain the differences between the quantitative and qualitative data for social relationships. It can only be concluded that more investigation into this area of quality of life needs to be conducted.

5.4.4 Functional abilities.

Literature provides conclusive evidence that hydrotherapy has a positive impact on the functional abilities of the rheumatic disease patient. Various researchers reported

improvements in the function and health status in patients with fibromyalgia who participated in hydrotherapy intervention (Langhorst et al., 2009, Mc Veigh 2008; Saltskár, Grimstvedt & Mengshvel, 2001; Gowans et al., 1999). The functional abilities of patients suffering with osteoarthritis in the hips have also shown improvements following hydrotherapy (Brooks, 2002). In the current study the impact on the patients' health assessment was reported to improve significantly ($p=0.01$). Post intervention the mean HAQ disability index score intervention it was 0.5. (SD=0.65) with a range of 0-1.8. It is apparent post intervention that there were no patients who were functionally dependent in the dressing and grooming category. More patients reported being able to take a tub bath without any difficulty. Interestingly, yardwork/ vacuuming and getting into and out of a car remained unchanged. A possible reason could be that these activities are labour intensive and require significant flexibility. There were also significant improvements noted in walking, reach, and grip which would allow the patient even more functional freedom. Researchers have reported that rheumatic disease patients have severe difficulty with walking, stair-climbing, bathing and dressing (Donahue & Gartlehner, 2008; Murphy et al., 2008; Kavunca & Evcik, 2004) therefore; it is especially encouraging to find that hydrotherapy positively impacted on these activities.

It is evident that the quantitative results in this study are similar to the reported literature. These findings are also supported by the qualitative results. The patients very enthusiastically reported functional improvements in their flexibility, mobility, endurance and activities of daily living. These improvements resulted in the ability to walk further and longer, to do more at home for themselves, to perform their activities of daily living easier, to go shopping independently and to generally move

their arms and legs easier than before the intervention. This is an important symptom to show improvement because improved function has been directly linked to improved quality of life. (Cardoso et al., 2011).

Based on this information it is evident that hydrotherapy has a positive impact on the pain levels, quality of life and functional abilities in patients with rheumatic disease. The literature that the researcher found was mainly limited to short-term hydrotherapy interventions. The studies also focussed on one or two types of rheumatic diseases. The researcher found no literature on the effects of a long term hydrotherapy intervention on pain, stress, functional abilities and quality of life in a group of patients with various types of rheumatic diseases. The group dynamics provided the patients with the support which is usually achieved in a group therapy situation. The qualitative results support the quantitative data with the exception of social relationships (quality of life) and stress in which the quantitative data was inconclusive and qualitative data supported the literature.

5.5 Implications for practice

The findings of this study have a number of important implications for future practice. It is evident from the current findings that when managing patients with one or with a combination of the rheumatic diseases, the inclusion of hydrotherapy as part of the physiotherapy management is important. It is evident that hydrotherapy can be utilised, along with the other physiotherapy modalities to reduce pain, increase quality of life and improve functional abilities in patients with rheumatic disease. From the qualitative data it seems that after six months of no treatment following the

end of hydrotherapy, the symptoms of the disease were negatively impacted and thus influenced the quality of life and management strategies used by the participants. It can therefore be implied that hydrotherapy should be an ongoing part of the disease management or that the patients start a new cycle of hydrotherapy less than six months after the end of the previous cycle.

Another important implication is that hydrotherapy intervention provides the rheumatic disease patient with a structured and supervised group therapy programme. This group therapy programme is then able to offer support, reassurance, encouragement, motivation, inspiration and practical coping tips which assists in decreasing the stress levels of the participants. It also contributes to a general positive psychological impact.



CHAPTER 6

CONCLUSION, RECOMMENDATIONS AND LIMITATIONS

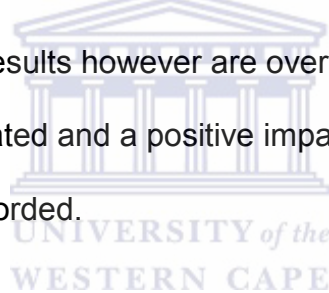
6.1 CONCLUSION

Literature has found that the five most common forms of rheumatic diseases are osteoarthritis, fibromyalgia, gout, rheumatoid arthritis and systemic lupus erythematosus. These diseases affect millions of people worldwide and are characterised by pain, stress, decreased quality of life and poor functional abilities. Osteoarthritis is the most common disease with 65% of people affected worldwide. With the exception of gout, female dominance is most prevalent. There have been many studies conducted on the effects of land-based exercise, electrotherapy modalities and other physiotherapy techniques utilised in treating rheumatic diseases. Although, hydrotherapy is one of the interventions available in the treatment of rheumatic disease, there are not sufficient studies conducted on the impact that hydrotherapy has on the different types (and combinations) especially in a long-term programme.

The main aim of this study was to evaluate the effect of a hydrotherapy intervention programme on the various symptoms associated with patients with rheumatic disease. The study was based on the assumption that that the patients suffering with a rheumatic disease would have pain, increased stress levels, poor quality of life and poor functional abilities and would benefit from the effects of hydrotherapy.

In the current study osteoarthritis was the most common disease (52.6%), female dominance was prevalent (84.2%), there were no blacks represented (0%) and the mean age was 60 years. This supports the literature that has been reported on disease, gender and race prevalence as well as on the mean age of the rheumatic disease patient.

The relevance of hydrotherapy is clearly supported by the current findings. Quantitatively, hydrotherapy had a positive and significant impact on pain, functional ability and quality of life (physical, psychological and environmental) in the rheumatic patient. The results of stress and the social domain in quality of life were inconclusive. The qualitative results however are overwhelmingly positive across all the outcomes that were evaluated and a positive impact on pain, stress, quality of life and functional abilities are recorded.



Therefore the study has shown that hydrotherapy does have a significant impact on pain, quality of life and functional abilities in the rheumatic disease patient and therefore can be used as a physiotherapy management intervention. The benefits of the intervention were maintained for a few months. The results were inconclusive on the impact that hydrotherapy has on the stress of the patient with rheumatic disease because the quantitative and qualitative results were contradictory.

RECOMMENDATIONS

6.2.1 Short term recommendations

- Hydrotherapy should be compulsory in the treatment of rheumatic disease
- Hydrotherapy should be administered two times per week.
- The interval between two hydrotherapy cycles should be less than six months.
- The hydrotherapy pools should be well maintained and accessible by public transport.

6.2.2 Long term recommendations (Future Research)

- It would be interesting to do a similar study where the effects of hydrotherapy on pain, stress, quality of life and function are evaluated with a larger sample size and with a control group.
- There is a need for more research to be conducted to determine the optimum frequency and duration of hydrotherapy intervention in rheumatic disease in order to make it more prescriptive.
- It would be interesting to gain new insight into the effect of a hydrotherapy programme on the outcomes of patients with rheumatic disease and combined co-morbidities such as HIV.
- It would also be interesting to explore the link between pain and functional abilities during a long term hydrotherapy intervention programme.

6.3. LIMITATIONS OF THE STUDY

- The current study was limited by the small sample size. This is due in part as a result of the size of the hydrotherapy pool and the maximum number of people that can be accommodated in it. Therefore, with a small sample size caution must be applied as the findings might not be made general.
- Another limitation of the study was the absence of a control group. The current sample population were their own controls.
- Thirdly, the study experienced drop outs. This is not unusual in this type of study.



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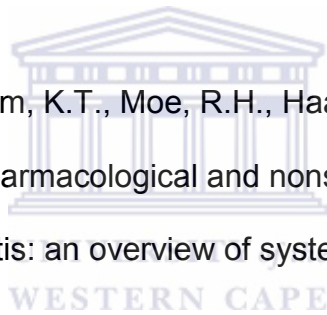
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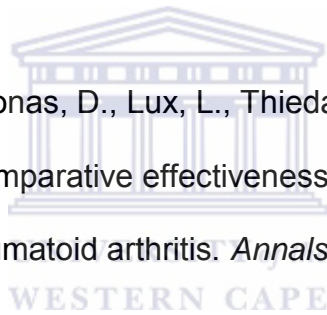
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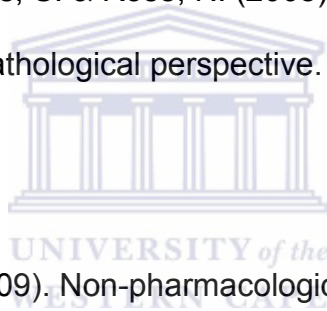
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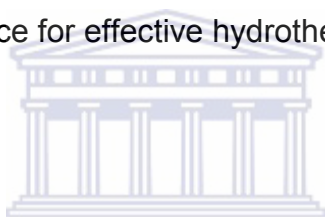
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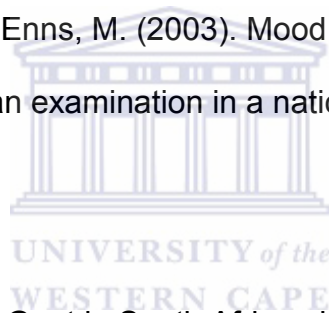
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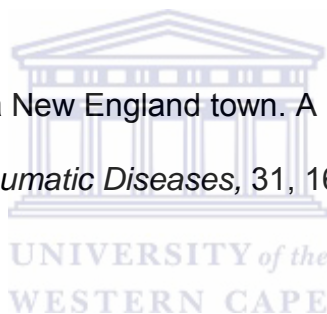
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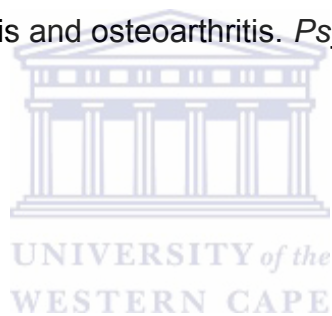
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APPENDICES

