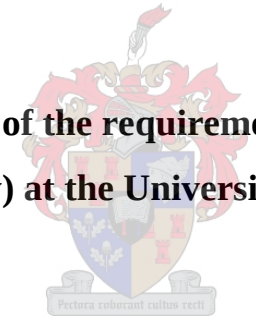
INFERTILITY-RELATED STRESS AND SPECIFIC ASPECTS OF THE MARITAL RELATIONSHIP

by

Elanza van der Merwe



Thesis presented in fulfilment of the requirements for the degree of Master of Arts (Psychology) at the University of Stellenbosch

Supervisor: Professor A P Greeff

Department of Psychology

March 2010

DECLARATION

By submitting this thesis electronically, I declare that the entirety of the work contained therein is my own, original work, that I am the owner of the copyright thereof (unless to the extent explicitly otherwise stated) and that I have not previously in its entirety or in part submitted it for obtaining any qualification.

March 2010

SUMMARY

In all or most cultures, the experience of infertility has the potential to threaten the well-being of individuals and relationships. The marital relationship of couples experiencing infertility might be impacted negatively by infertility-related stress. This study aimed primarily to examine the nature of the relationship between perceived infertility-related stress, experienced by husbands and wives in infertile couples, and four specific aspects of the marital relationship. In addition, it was examined whether there were significant differences in four specific aspects of the marital relationship between infertile couples at the onset of different types of infertility treatment, and a pregnant control group.

This cross-sectional, baseline study utilised standardised self-report questionnaires to make once-off assessments of infertility-related stress and four specific aspects of the marital relationship: communication, satisfaction with the sexual relationship, intimacy, and marital adjustment. The demographic characteristics of the participants were also recorded. A total of 84 women and 32 men from two infertility clinics in the Western Cape (N = 116) were studied.

From calculating Pearson correlation coefficients, highly significant correlations ($p < .001$) were found between infertility-related stress and all aspects of the marital relationship as measured in this study. Multiple regression analyses revealed communication as an important predictor of aspects of the marital relationship, in addition to infertility-related stress as a predictor. ANOVAs revealed no significant differences in specific aspects of the marital relationship between the infertile groups and the pregnant control group.

The findings suggest that high levels of infertility-related stress might be detrimental to the well-being of the marital relationship of couples experiencing infertility. In addition, the importance of communication as a buffer against the potential negative effects of infertility-related stress was emphasised. Future research should incorporate a longitudinal design and investigate the nature of the relationship between infertility-related stress and the marital relationship.

OPSOMMING

Infertiliteit word in alle of die meeste kulture beskou as ’n krisis wat die welstand van individue en verhoudings kan bedreig. Die huweliksverhouding van pare wat infertiliteit ervaar kan negatief beïnvloed word deur infertiliteitsverwante stres. Die primêre doelstelling van hierdie ondersoek was om die aard van die verhouding tussen waargenome infertiliteitsverwante stres, soos ervaar deur die mans en vroue in infertiele pare, en vier spesifieke aspekte van die huweliksverhouding te ondersoek. Bykomend is daar ook ondersoek of daar beduidende verskille voorgekom het in vier spesifieke aspekte van die huweliksverhouding tussen infertiele pare aan die begin van verskillende tipes van infertiliteitsbehandeling en ‘n swanger kontrolegroep.

Hierdie deursnee-, basislyn ondersoek het van gestandaardiseerde selfrapporteringsvraelyste gebruik gemaak ten einde eenmalige assesserings te doen van infertiliteitsverwante stres en vier spesifieke aspekte van die huweliksverhouding: kommunikasie, tevredenheid met die seksuele verhouding, intimiteit, en huweliksaanpassing. Demografiese besonderhede van die deelnemers is ook ingesamel en aangeteken. In totaal het 84 vrouens en 32 mans (N = 116) van twee infertiliteitsklinieke in die Wes-Kaap aan die ondersoek deelgeneem.

Met die berekening van Pearson korrelasiekoëffisiënte is hoogs beduidende korrelasies ($p < .001$) gevind tussen infertiliteitsverwante stres en die vier gemete aspekte van die huweliksverhouding. Op grond van meervoudige regressieontledings het kommunikasie na vore gekom as ‘n belangrike voorspeller van aspekte van die huweliksverhouding, bykomend tot infertiliteitsverwante stres. ANOVA’s het geen beduidende verskille in spesifieke aspekte van die huweliksverhouding tussen infertiele groepe en die swanger kontrolegroep getoon nie.

Die bevindinge dui daarop dat hoë vlakke van infertiliteitsverwante stres nadelig kan wees vir die huweliksverhouding van pare wat infertiliteit ondervind. Daarbenewens moet die belangrikheid van kommunikasie as ‘n buffer teen die potensiële negatiewe gevolge van infertiliteitsverwante stres beklemtoon word. Toekomstige navorsing sal baat by ’n longitudinale ontwerp en daar behoort voortgegaan te word met ondersoeke na die verband tussen infertiliteitsverwante stres en die huweliksverhouding.

ACKNOWLEDGEMENTS

For their permission to conduct this study, I thank:

- Dr Johannes van Waart – infertility specialist from Stellenbosch – for allowing me access to his patient base and for his friendly cooperation and personal interest in this research study.
- Prof Thinus Kruger – infertility specialist from Cape Town – for his permission to approach participants at the infertility clinic in Cape Town.

Furthermore, I hereby wish to express my sincere gratitude and thanks to:

- Prof Awie Greeff, who acted as my supervisor, for his continuous advice and optimism, and especially for always making time to listen to my ideas. Also, for giving me the space and autonomy to conduct my research in my own time and manner, and for always believing in my capacity to make a success of this research, even more so than I did myself.
- Prof Martin Kidd, for his guidance and assistance with the statistical analysis of the data and for his patience in explaining constructs.
- Mr Henry Steel, for assisting me in the statistical interpretation of my results, even though it was not required of him.
- Lizanne van Waart, who acted as my research partner, for all her help and motivation.
- Noeleen and Lydia at the infertility clinic in Stellenbosch, for their help, friendliness (and coffee breaks) during the stages of data collection.
- My friends, for always lending an ear and for ensuring that I stayed calm and in touch with reality: Lisa Bensch, Hermann Swart, Bianca Joseph, Cabriére Jordaan, Quentin Groenewald and Llewelyn Hill.
- My special friend Christo Lourens, for constantly encouraging me, being at my side during the difficult times, helping wherever he could, and for his ability to put obstacles in perspective. Thank you for believing in my ability to complete this project and for being my biggest supporter. Without you I would not have been able to do this.
- My mother and father, Elizabeth and Jacobus van der Merwe, for their ongoing support, motivation and encouragement. Your support was of great value to me.
- The Lord, for giving me the opportunity and the means to succeed.

CONTENTS

Declaration……ii
Summary..……..iii
Opsomming……iv
Acknowledgements……v
Contents……vi
List of Tables……xi
List of Figures……....xii

CHAPTER 1: Introduction, motivation for and aims of the study 1

1.1 Introduction 1
1.2 Background and context of the study 1
1.2.1 Infertility and sub-fertility 1
1.2.2 Treatment of infertility 2
1.2.2.1 Ovulation induction 2
1.2.2.2 Assisted reproductive technologies 2
1.2.3 Infertility and the marital relationship 4
1.2.3.1 Definition of research terms used in the study 5
1.3 Motivation for the study 6
1.3.1 Social relevance 6
1.3.2 Individual relevance 7
1.3.3 Scientific relevance 7
1.4 Aims of the study 8
1.5 Presentation of the thesis 8
1.6 Conclusion 8

CHAPTER 2: Theoretical conceptualisation of infertility 9

2.1 Introduction 9
2.2 Family systems theory 9
2.2.1 Overview of family systems theory 9
2.2.2 Central premises of family systems theory 10
2.2.2.1 Organisation of family systems 10
2.2.2.2 Dynamic nature of family systems 12
2.2.3 Application of family systems theory to infertility 13
2.3 Bio-psychosocial theory 14
2.3.1 Overview of bio-psychosocial theory 14

2.3.2 Application of bio-psychosocial theory to infertility 15
2.3.2.1 Infertility from a biological perspective 16
2.3.2.2 Infertility from a psychological perspective 17
2.3.2.3 Infertility from a social perspective 18
2.4 Conclusion 19

CHAPTER 3: Literature review 20
3.1 Introduction 20
3.2 Infertility-related stress 20
3.2.1 Infertility as a life stressor and psychosocial crisis 21
3.2.2 Infertility-related stress and the outcome of infertility treatment 23
3.2.3 Stressfulness of different types of infertility treatment 26
3.2.4 Congruence in partners' experience of infertility-related stress 27
3.3 Infertility-related stress and specific aspects of the marital relationship 28
3.3.1 Quality of marital communication 28
3.3.2 Level of satisfaction with the sexual relationship 30
3.3.3 Perceived intimacy in the marital relationship 32
3.3.4 Level of marital adjustment 34
3.4 Conclusion 38

CHAPTER 4: Methodology 39
4.1 Introduction 39
4.2 Problem formulation and research questions 39
4.3 Research design 40
4.4 Participants 41
4.4.1 Sampling strategy 41
4.4.2 Inclusion criteria 41
4.4.3 Demographic profile of participants 41
4.5 Measuring instruments 46
4.5.1 The Fertility Problem Inventory 46
4.5.2 The Enriching and Nurturing Relationship Issues, Communication and Happiness Scale: Communication Subscale 48
4.5.3 The Index of Sexual Satisfaction 48
4.5.4 The Personal Assessment of Intimacy in Relationships 49
4.5.5 The Dyadic Adjustment Scale 50

4.5.6 Biographical questionnaire 51
4.6 Procedure 53
4.6.1 Practical data collection 53
4.6.2 Ethical considerations 55
4.6.2.1 Informed consent 55
4.6.2.2 Confidentiality and anonymity 55
4.7 Data analysis 55
4.7.1 Scoring of questionnaires 55
4.7.2 Statistical analyses 56
4.8 Conclusion 57

CHAPTER 5: Results 58
5.1 Introduction 58
5.2 Primary aim 58
5.2.1 Pearson correlations 58
5.2.1.1 Infertility-related stress (FPI) and Quality of Marital Communication (ENRICH subscale) 59
5.2.1.2 Infertility-related stress (FPI) and Satisfaction With the Sexual relationship (ISS) 60
5.2.1.3 Infertility-related stress (FPI) and Perceived Intimacy (PAIR) 61
5.2.1.4 Infertility-related stress (FPI) and Marital Adjustment (DAS) 62
5.2.2 Additional Pearson correlations 63
5.2.2.1 Marital adjustment (DAS) and Quality of Communication (ENRICH subscale) 63
5.2.2.2 Marital adjustment (DAS) and Satisfaction with the Sexual relationship (ISS) 64
5.2.2.3 Marital adjustment (DAS) and Perceived Intimacy (PAIR) 65
5.2.2.4 Satisfaction with the Sexual relationship (ISS) and Quality of Communication (ENRICH subscale) 66
5.2.2.5 Quality of Communication (ENRICH subscale) and Perceived Intimacy (PAIR) 67
5.2.2.6 Satisfaction with the Sexual relationship (ISS) and Perceived Intimacy (PAIR) 68

5.2.3 Multiple regression results 70
5.2.3.1 Multiple regression model 1 72
5.2.3.2 Multiple regression model 2 73
5.2.3.3 Multiple regression model 3 75
5.2.3.4 Multiple regression model 4 76
5.2.3.5 Multiple regression model 5 78
5.2.3.6 Multiple regression model 6 79
5.3 Secondary aim 81
5.3.1 Differences between groups for specific aspects of the marital relationship 81
5.3.1.1 Differences in the quality of communication between groups 81
5.3.1.2 Differences in the level of satisfaction with the sexual relationship between groups 82
5.3.1.3 Differences in the level of perceived intimacy between groups 82
5.3.1.4 Differences in the level of marital adjustment between groups 83
5.3.2 Differences in the level of infertility-related stress between treatment groups 85
5.3.3 Relationship between the level of congruence of partners' experiences of infertility-related stress and specific aspects of the marital relationship 87
5.4 Conclusion 87

CHAPTER 6: Discussion and conclusion 88
6.1 Introduction 88
6.2 Discussion 88
6.2.1 Primary aim 88
6.2.1.1 Infertility-related stress and quality of communication 88
6.2.1.2 Infertility-related stress and satisfaction with the sexual relationship 91
6.2.1.3 Infertility-related stress and perceived intimacy 92
6.2.1.4 Infertility-related stress and level of marital adjustment 93

6.2.2 Multiple regression results 95
6.2.2.1 Regression model 1 95
6.2.2.2 Regression model 2 95
6.2.2.3 Regression model 3 96
6.2.2.4 Regression model 4 96
6.2.2.5 Regression model 5 96
6.2.2.6 Regression model 6 97
6.2.3 Secondary aims 99
6.2.3.1 Congruence in partner's experience of infertility-related stress 100
6.3 Limitations and recommendations 100
6.4 Implications for marital interventions 102
6.5 Conclusion 103

REFERENCES 105

APPENDICES 117

APPENDIX A: QUESTIONNAIRES 117

Biographical questionnaire: Infertility Treatment Group 118
Biographical questionnaire: Control Group 120
The Fertility Problem Inventory (FPI) 122
The Enriching and Nurturing Relationship Issues, Communication and Happiness Scale (ENRICH): Communication Subscale 125
The Index of Sexual Satisfaction (ISS) 126
The Personal Assessment of Intimacy in Relationships (PAIR) 128
The Dyadic Adjustment Scale (DAS) 130

APPENDIX B: INFORMED CONSENT 133

LIST OF TABLES

Table 1 – *Response Rate of Participants: Treatment and Control Groups (N = 116)* 42

Table 2 – *Basic Demographic Information of Participants (N = 116)* 43

Table 3 – *Additional Demographic Information of Participants (N = 116)* 44

Table 4 – *Additional Demographic Information of Female Participants (n = 84)* 45

Table 5 – *Summary of Questionnaires Utilised in the Present Study: Internal Reliabilities* 52

Table 6 – *Correlation Matrix of all Research Variables:* 69
Infertility-related stress, Marital Adjustment, Quality of Communication, Satisfaction with the Sexual relationship, and Perceived Intimacy

Table 7 – *Summary Statistics for Regression Model 1* 72

Table 8 – *Summary Statistics for Regression Model 2* 74

Table 9 – *Summary Statistics for Regression Model 3* 75

Table 10 – *Summary Statistics for Regression Model 4* 77

Table 11 – *Summary Statistics for Regression Model 5* 78

Table 12 – *Summary statistics for regression model 6* 80

Table 13 – *Differences between Groups: Communication (ENRICH) Subscale* 81

Table 14 – *Differences between Groups: Satisfaction with the Sexual Relationship (ISS)* 82

Table 15 – *Differences between Groups: Perceived Intimacy (PAIR)* 83

Table 16 – *Differences between Groups: Marital Adjustment (DAS)* 84

Table 17 – *Factorial Analysis of Variance:* 85
Fixed Effect tests for Interaction between Group and Gender

Table 18 – *ANOVA's: Differences in Infertility-related Stress between Treatment Groups* 86

LIST OF FIGURES

Figure 1 - A bio-psychosocial theory for infertility 15

Figure 2 - Scatterplot showing the relationship between the FPI infertility-related stress and the ENRICH communication subscale total scores 59

Figure 3 - Scatterplot showing the relationship between the FPI infertility-related stress and the ISS sexual satisfaction total scores 60

Figure 4 - Scatterplot showing the relationship between the FPI infertility-related stress and the PAIR intimacy total scores 61

Figure 5 - Scatterplot showing the relationship between the FPI infertility-related stress and the DAS marital adjustment total scores 62

Figure 6 - Scatterplot showing the relationship between the DAS marital adjustment and the ENRICH communication subscale total scores 63

Figure 7 - Scatterplot showing the relationship between the DAS marital adjustment and the ISS sexual satisfaction total scores 64

Figure 8 - Scatterplot showing the relationship between the DAS marital adjustment and the PAIR intimacy total scores 65

Figure 9 - Scatterplot showing the relationship between the ISS sexual satisfaction and the ENRICH communication subscale total scores 66

Figure 10 - Scatterplot showing the relationship between the ENRICH quality of communication subscale and the PAIR intimacy total scores 67

Figure 11 - Scatterplot showing the relationship between the ISS sexual satisfaction and the PAIR intimacy total scores 68

Figure 12 - Diagram presenting a model of possible relationships between all research variables 70

Figure 13 – Regression model 1 72

Figure 14 – Regression model 2 73

Figure 15 - Regression model 3 75

Figure 16 – Regression model 4 76

Figure 17 – Regression model 5 78

Figure 18 – Regression model 6 79

CHAPTER 1

INTRODUCTION, MOTIVATION FOR AND AIMS OF THE STUDY

1.1 Introduction

This chapter consists of four discussion points, providing the reader with essential information that will clarify the nature of the present study. Firstly, the background to and context of the study will be provided by giving a broad overview of infertility and infertility treatment. Essential medical terminology and psychological research terms that need to be understood in order to grasp the gist of the study will be defined. The second discussion point will centre on the motivation for the present research. Thirdly, the aims of the study will be clarified. Under the fourth discussion point an outline of the organisation and presentation of the current thesis will be provided.

1.2 Background and context of the study

1.2.1 Infertility and sub-fertility

A clinical diagnosis of infertility is made if a couple fails to become pregnant after regular, unprotected sexual intercourse for a minimum of twelve months (Eunpu, 1995; Leiblum, 1997; Tierney, McPhee, & Papadakis, 1999; Watkins & Baldo, 2004; Wright, 2003). Globally, approximately eight to twelve percent of couples, translating to between 80 and 168 million people, are or have been infertile (Bhatti, Fikree, & Khan, 1999; Burns & Covington, 2006; Cooper-Hilbert & Hilbert, 1993; Emslie, Grimshaw, & Templeton, 1993; Healy, Trounson, & Andersen, 1994; Raymond, 1991; Wright, 2003). Epidemiological studies show infertility to be a significant problem in Africa, with provincial prevalence rates ranging from 30 to 40% (Leke, Oduma, Bassol-Mayagoitia, Bacha, & Grigor, 1993).

It is important to acknowledge the term sub-fertility, also defined as reduced fertility (Wright, 2003). If sub-fertility affects both partners it will most likely result in infertility, while sub-fertility in only one partner may or may not result in infertility. Research has indicated that many couples receiving infertility treatment are often sub-fertile and may have become pregnant without any infertility treatment (Wright, 2003). The present study focuses solely on infertility and will not take possible sub-fertility into consideration.

1.2.2 Treatment of infertility

The medical technology available for the treatment of infertility is highly advanced. When a couple presents for infertility treatment for the first time, several treatment options, tailored to their specific needs, are available to them. It is crucial to understand what each type of treatment entails and to become familiar with the medical terminology of the different treatments in order to be able to understand the nature of the present research. A detailed discussion of these aspects therefore follows.

1.2.2.1 Ovulation induction

One of the first treatment options for infertility is ovulation induction (OI). During OI treatment, ovulation-enhancing medication is administered to stimulate the ovaries of the woman to ovulate and produce mature ova (eggs) (Daiter, 2008; Dr. Johannes Van Waart, personal communication, August 10, 2008). Different types of ovulation-enhancing medications are available, and the infertility specialist will decide which is the most suitable for each individual woman. The aim will be to select a medication that will have the minimum side-effects. In addition to administering ovulation-enhancing medication, the infertility specialist develops a detailed schedule for sexual intercourse for each individual couple, taking into consideration the woman's most fertile periods during her ovulation cycle. Pregnancy tests are administered monthly in order to monitor whether the treatment has been successful. At the infertility clinics where the data for the present study was collected, it is protocol that couples should attempt to fall pregnant by means of OI for at least one year before they are qualified to move on to some of the more advanced treatment options, referred to as assisted reproductive technologies (Van Waart, personal communication, August 10, 2008).

1.2.2.2 Assisted reproductive technologies

Assisted reproductive technologies (ART) include several medical procedures or interventions that are used to assist in conception (Andrews, 1999). All assisted reproductive technologies involve obtaining and utilising a sperm sample from the man – for this reason ovulation induction (OI) is not categorised under assisted reproductive technologies. The following ART treatment options will be elaborated upon below: (i) intrauterine insemination (IUI), (ii) in vitro fertilisation (IVF), (iii) gamete intra-fallopian transfer (GIFT), and (iv) intra-cytoplasmic sperm injection (ICSI).

(i) Intrauterine insemination

Intrauterine insemination (IUI), also called artificial insemination, is mostly recommended for less severe cases of infertility, often when a male factor is identified as the cause of infertility,

and for women under the age of 41 (*Artificial insemination for infertility*, n.d.). Ovulation-enhancing medication is usually administered to the woman and the couple continue with their normal sexual routine in the period between intrauterine inseminations. Spermatozoid is the term used to refer to a sperm specimen collected from the man – after collection the specimen is washed in the laboratory in order to select the most motile sperm. The procedure of IUI involves the insertion of a catheter through the woman's cervix (the opening of the uterus) to make an insemination of spermatozoid into the woman's uterine cavity (*Artificial insemination for infertility*, n.d.). The date of insemination is determined by the infertility specialist by taking into consideration the woman's most fertile periods during her ovulation cycle, therefore inseminations will usually be done once monthly. IUI is a minimal medical procedure, does not require anaesthesia and, if done properly, should cause little or no discomfort to the woman. At the infertility clinics where the data for the present study was collected it is protocol that a couple only becomes eligible for the more advanced treatment possibility, in vitro fertilisation, if they have not been able to achieve pregnancy after three intrauterine inseminations (Dr. Johannes Van Waart, personal communication, August 10, 2008).

(ii) In vitro fertilisation

In vitro fertilisation (IVF) is the most commonly used ART procedure. IVF is used to overcome many fertility problems, but is used particularly in the case of blocked fallopian tubes in the woman or sperm deficiencies in the man (*Assisted reproductive technologies*, 2008b). IVF consists of four stages of treatment. Firstly, ovulation is induced in the woman by administering fertility medication that stimulates the ovaries to produces more than one mature ovum (egg). Secondly, as many mature ova as possible are extracted from the follicles of both ovaries, using a needle during an ultrasound vaginal sonar (called a laparoscopy). The woman is sedated for this procedure. In the third step of IVF, the extracted ova and sperm from the male's sperm sample are mixed together in a test tube and placed in an incubator for a specified time in order to fertilise. Lastly, if microscopic analysis reveals an embryo to have developed, with sufficient cell division, the embryo is transferred back into the woman's uterus via insemination, hopefully to develop into a foetus (*Assisted reproductive technologies*, 2008b; Barker, 1980; Wessels & Nel, 1988). Most women can return home a few hours after the procedure, but they will most likely need mild pain medication afterwards. In the case of IVF treatment being unsuccessful, either GIFT or ICSI treatment can be considered as alternative treatment options.

(iii) Gamete intra-fallopian transfer

Gamete intra-fallopian transfer (GIFT) treatment is used when the male's spermiogram is poor, as well as for other male factor problems. The procedure of GIFT is very similar to that of IVF, with the distinction that the mature ova collected from the woman's ovaries via laparoscopy are combined with the man's sperm in a dish in a laboratory and then surgically injected into the woman's fallopian tube. Thus, if GIFT treatment is successful, fertilisation of the ova occurs inside the woman's body and the embryo implants naturally, whereas fertilisation occurs in an incubator in the laboratory in the case of IVF treatment (Barker, 1980; Wessels & Nel, 1988). This procedure is no longer used as much as it was previously because the success rate of IVF is, on average, higher.

(iv) Intra-cytoplasmic sperm injection

Intra-cytoplasmic sperm injection (ICSI) treatment is used for severe male factor infertility: in cases of low sperm count, low sperm motility (slow movement of sperm), low sperm quality, or where the sperm cannot enter the ovum lining. The basic procedure of ICSI is the same as for IVF. During ICSI, however, the extracted ovum of the woman is placed inside a dish in the laboratory and a single sperm (rather than as many sperms as possible, as with IVF) is injected into the ovum with a needle (*Assisted reproductive technologies*, 2008a). This is called direct fertilisation. The mixture of sperm and ovum is then incubated in the laboratory and, if an embryo develops, it is transferred to the woman's uterus via insemination. It is important to note that more treatment options are available than those discussed here, but they are not relevant for the purpose of the present study.

1.2.3 Infertility and the marital relationship

The previous section aimed to provide a good understanding of infertility, the different infertility treatment options and the associated medical terminology. The relationship between infertility and the marital relationship will now be discussed. Important research terms that will be used throughout the thesis will also be clarified.

In all or most cultures, infertility is seen as "… a crisis that has the potential to threaten the stability of individuals, relationships, and communities" (Burns & Covington, 2006, p. 1). In the past, many research studies have focused on how infertility has an impact on the individual. More recently, this focus on the individual has shifted to a focus on groups, such as couples and families (Burns & Covington, 2006). It is crucial to focus on the couple experiencing infertility as a unit, considering that infertility is most often a shared stressor. According to Farley (World Health Organization, quoted in Wright, 2003, p. 1), "… Infertility is not really an issue of either

partner, [but] an issue of the couple". Even though only one member of the couple usually receives a diagnosis of infertility (Leiblum, 1997), infertility can be better understood as a couple-level stressor because the experience influences both partners in the relationship or marriage (Jordan & Revenson, 1999).

Research indicates that the infertility experience can have an impact on almost every aspect of a couple's psychosocial functioning. Some aspects that may be affected are the couple's identity, decisions concerning treatment, shared beliefs about the importance of being a parent, as well as the experience of continuous and day-to-day stress associated with treatment (Jordan & Revenson, 1999). Satisfaction with the marital and sexual relationship may also be influenced by the infertility experience (Greil, 1997; Lalos; Mahlstedt; Wirtberg; all cited in Holter, Anderheim, Bergh, & Möller, 2006; Möller & Fällström, 1991; Newton, Sherrard, & Glavac, 1999), as can communication and intimacy in the marital relationship (Schmidt, Holstein, Christensen, & Boivin, 2005.

1.2.3.1 Definition of research terms used in the study

(i) Infertility-related stress

The term infertility-related stress refers to the level of such stress perceived by each spouse individually. In the context of the present study, stress is viewed as a response to a stressful event or stressor, namely infertility (Newton et al., 1999). A more detailed discussion of infertility-related stress is provided in Chapter Three.

(ii) Specific aspects of the marital relationship

Four specific aspects of the marital relationship are measured in this study and will be referred to collectively throughout the thesis. The specific aspects of the marital relationship are: (i) the quality of communication in the marriage as perceived by each spouse; (ii) the level of satisfaction of each spouse with their sexual relationship; (iii) the level of intimacy in the marital relationship, as perceived by each spouse; and (iv) the couple's level of marital adjustment (general satisfaction with the marital relationship) as perceived by each spouse.

(iii) Different types of infertility treatment

It should be noted that, throughout the present study, reference will be made to different types of infertility treatment. Whenever the term different types of infertility treatments is used, it will refer to four types of infertility treatment, grouped as follows: (i) ovulation induction (OI), (ii) intrauterine insemination (IUI), and (iii) in vitro fertilisation (IVF) or intra-cytoplasmic sperm injection (ICSI). The IVF and ICSI treatments are grouped together as one treatment group because the procedures are so similar.

1.3 Motivation for the study

The motivation for the present study is linked to two main factors, namely the high prevalence of infertility and the potentially devastating effects that infertility may have on the marital relationship. Many studies focus on the influence of infertility-related stress on the individual, while relatively few studies have focused on the couple as a unit of analysis (Andrews, Abbey, & Halman, 1991; Benazon, Wright, & Sabourin, 1992; Hirsch & Hirsch, 1989; Levin, Sher, & Theodos, 1997; Ulbrich, Coyle, & Llabre, 1990). Research exploring the relationship between infertility-related stress and the marital relationship is needed. The present study attempts to gain a better understanding of this relationship: with such knowledge, infertile couples can be assisted in their experience in the best possibly way on an individual and relationship level.

1.3.1 Social relevance

The World Health Organization (WHO) has acknowledged the magnitude and significance of infertility as a public health issue of global concern, especially in developing countries (Burns & Covington, 2006). Epidemiological studies show infertility to be a significant problem in Africa, with provincial prevalence rates ranging from 30 to 40% (Leke et al., 1993). The findings of a recent review indicate a 9% prevalence of infertility (international estimate), while 56% of couples are seeking medical treatment for infertility (Boivin, Bunting, Collins, & Nygren, 2007). Yearly, approximately 1 000 couples are referred to the Reproductive Medicine Service at the Grootte Schuur Hospital Infertility Clinic in South Africa (Dyer, Abrahams, Hoffman, & Van der Spuy, 2002a). As these statistics show, individuals experiencing infertility make up a considerable proportion of our society.

Infertility affects couples and families. Since family units form the core of society, a healthy society depends on healthy family structures (Trotzer & Trotzer, cited in Greeff & Malherbe, 2001). American statistics suggest that approximately 15% of reproductive couples experience stress as a result of infertility (Spector, 2004). An inverse relationship between infertility-related stress and successful treatment outcome has been proposed in numerous studies (Cwikel, Gidron, & Sheiner, 2004; Fachinetti, Volpe, Matteo, Genazzani, & Artini, 1997; Hjollund et al., 2004; Newton et al., 1999; Smeenk et al., 2001). The present study will provide an insight into married couples' experiences of infertility and infertility-related stress, and into the relationship between infertility-related stress and specific aspects of the marriage. Better knowledge of important aspects of the marital relationship and how these may be influenced negatively by infertility and infertility-related stress could aid in the development of more effective marital enrichment programmes, which in turn can have a positive effect on family and, ultimately, on societal functioning (Greeff & Malherbe, 2001).

1.3.2 Individual relevance

Historically, there was a limited understanding of human reproduction and it was not known that males could also contribute to infertility. Accordingly, women were blamed and ostracised when they could not become pregnant (Burns & Covington, 2006). With the advancement of knowledge of human reproduction, this misunderstanding has been cleared up, especially in Western cultures. Menning (cited in Williams, Bischoff, & Ludes, 1992) states that men and women are influenced equally by the biological origins of infertility. The idea that a woman's status is often defined in terms of her fertility is, however, still a reality for some people, including women. Today, women in South Africa who are diagnosed as infertile often experience negative social consequences, such as ostracism, stigmatisation, abuse and economic deprivation (Alemnji & Thomas, 1997; Dyer, Abrahams, Hoffman, & Van der Spuy, 2002b; Gerrits, 1997; Sundby, 1997).

Similarly, research studies show that men who have been diagnosed as infertile may also experience negative effects, such as verbal abuse, stigmatisation and loss of social status. Many men describe the negative impact of infertility on marital stability. Both men and women experience intense stress due to infertility and see it as a life crisis, and as a potential threat to marital stability and the success of their marriage (Dyer et al., 2002b; Markestad, Montgomery, & Bartsch, 1998). The present study will thus contribute to the understanding of how infertility may impact on the marital relationship of infertile couples. When the marital relationship of a couple is influenced negatively by any factor, the health and well-being of each spouse in the couple will also be influenced. By gaining a better understanding of the effects of infertility-related stress on the marital relationship, a study such as the present one may thus be able to contribute by providing suggestions for protecting the marital relationship and, in turn, also the well-being of each individual in that relationship.

1.3.3 Scientific relevance

As will be shown in Chapter Three, recommendations have been made by numerous previous research studies for more researchers to examine the marital relationship of infertile couples (Greil, 1997). The marital relationship of couples experiencing infertility may be affected by infertility-related stress in various ways. As mentioned, infertility-related stress may influence a couple's experience of their marital and sexual relationship (Lalos; Mahlstedt; Möller & Fällstrom; all cited in Holter et al., 2006; Newton, Sherrard, & Glavac, cited in Peterson, Newton, Rosen, & Schulman, 2006), while the quality of communication and intimacy in the marital relationship might also be affected (Schmidt et al., 2005). A study such as the present one will thus be of great value in contributing to the currently under-researched field of the

relationship between infertility-related stress and aspects of the marital relationship of infertile couples.

1.4 Aims of the study

The primary aim of the present study was to examine the nature of the relationship between perceived infertility-related stress, as experienced by husbands and wives in infertile couples, and four specific aspects of the marital relationship. Secondary aims of the study were to assess whether there were significant differences in four specific aspects of the marital relationship between infertile couples at the onset of different types of infertility treatment and a pregnant control group. The study will also examine whether there were significant differences in the level of perceived infertility-related stress between three groups of infertile couples at the onset of different types of infertility treatment.

1.5 Presentation of the thesis

Following from the above, Chapter Two provides a theoretical conceptualisation of infertility. Two theoretical frameworks that can be applied to infertility are presented. Chapter Three presents a review of the literature on infertility, infertility-related stress and the marital relationship. Chapter Four covers the research methodology: the problem formulation and research questions; the research design; the identification and demographic characteristics of participants; the measuring instruments administered; the procedures for data collection and ethical considerations; and, finally, the methods of data analysis. In Chapter Five the results of the quantitative data are presented. Pearson correlation coefficients, multiple regression analyses and ANOVAs are reported. The results and limitations of the present study are discussed, recommendations for further research are made and final conclusions are drawn in Chapter Six.

1.6 Conclusion

It is noticeable that the experience of infertility and infertility-related stress can have far-reaching effects on the individual and the couple. It has been shown that a better understanding of the nature of the relationship between infertility-related stress and aspects of the marital relationship is needed (Greil, 1997). More clarity is also needed on the magnitude of the potential effects of infertility-related stress on the marital relationship, as well as on the nature of such effects, whether positive or negative. This information can be utilised to assist couples in coping with infertility and to protect the marital relationship from potential negative effects. The present study aims to examine couples' experiences of infertility-related stress and to present a baseline profile of specific aspects of their marital relationship: ultimately, to gain more insight into the experiences of infertile couples.

CHAPTER 2

THEORETICAL CONCEPTUALISATION OF INFERTILITY

2.1 Introduction

This chapter will provide an overview of two theoretical frameworks, namely family systems theory and bio-psychosocial theory, that are deemed appropriate to conceptualise infertility-related stress and its relationship to specific aspects of the marital relationship – quality of communication, satisfaction with the sexual relationship, perceived intimacy, and marital adjustment. It is beyond the scope of the present study to provide a comprehensive discussion of each theory. However, sufficient information will be supplied to clarify the main constructs underlying family systems theory and bio-psychosocial theory. Lastly, relevant aspects of each theory will be applied to infertility.

2.2 Family systems theory

2.2.1 Overview of family systems theory

Family systems theory developed as a branch of Ludwig von Bertalanffy's general systems theory (Von Bertalanffy, 1968). In order to fully understand family systems theory, a basic grasp of general systems theory is needed. General systems theory challenged the mechanistic theories that were predominant in the mid-twentieth century, arguing instead that organisms are complex, interactive, and organised (Von Bertalanffy, 1968). A general systems perspective focuses on and investigates the manner in which underlying components of a system interact with one another in order to form a whole. A systems perspective does not merely focus on separate parts, but on how all the separate parts are connected, interdependent and interrelated. From a systems perspective, one will examine how any fluctuation in one part of the system can affect other components of the system, which, in turn, can affect the initial component. General systems theory thus suggests that a holistic view is necessary to fully understand all the dynamics involved in any situation (Von Bertalanffy, 1968).

A system is defined as a set of objects with relationships between the objects and between the attributes of the objects (Hall & Fagan, in Barker, 2007). Almost any assembly of different parts will meet these criteria, therefore a more complex description was needed for a living system such as a cell or individual organism. Bertalanffy's general systems perspective provides a suitable alternative. In recent years, the general conclusion has been made that the family is "… an example of an open, ongoing, goal-seeking, self-regulating social system and that it shares the features of all such systems" (Broderick, 1993, p. 37). In addition, specific characteristics, such as a family's structuring of gender and generation, differentiate if from other social systems.

Also, each individual family is moulded by its own specific and unique characteristics (e.g. size, life stage, complexity), the psychobiological characteristics of the individual family members (e.g. gender, age, health, fertility, temperament), and the family's socio-cultural position in the larger society (Broderick, 1993). To summarise, a comprehensive definition of the family systems theoretical framework proposes that the "… individual behaviours of men and women are best understood in the context of their mutual interactions and systemic relationships" (Bertalanffy, cited in Peterson et al., 2006).

2.2.2 Central premises of family systems theory

The central premises of family systems theory will be discussed in this section, specifically the organisation and dynamic nature of the family system. Relevant terms related to each central premise will also be clarified.

2.2.2.1 Organisation of family systems

(i) Holism

Family systems theory is built upon the premise that, in order to master daily challenges and tasks of life and to adjust to the needs of its separate members, family systems organise themselves accordingly (Broderick, 1993). The concept of holism underlies this premise of organisation. Thus, from a family systems perspective one will focus on the family as a whole, and not merely on the separate parts or individual family members. As Aristotle and others have noted, the whole is greater than the sum of its parts and has qualities that cannot be deduced from the combined characteristics of each part . Jackson (1965, p. 5) suggests that measures are needed that "…do not simply sum up individuals into a family unit; we need to measure the characteristics of the supra-individual family unit". Family systems theory thus recognises that the family system is the result of all individual members together, and that the interaction and communication between all individual members should be studied in order to understand the system as a whole (Broderick, 1993).

(ii) Hierarchies

Another concept of family systems theory is that families organise themselves into hierarchies; in other words, families organise themselves into smaller units or subsystems (Minuchin, 1974). Subsystems are often created and organised according to gender or generation. In family systems theory, a distinction is made between three primary subsystems: marital (couple), parental and sibling. Generally, each subsystem is comprised of members who work to accomplish the relevant tasks of the specific subsystem. Families have been found to experience difficulties when the lines between subsystems become blurred and members from one subsystem enter another subsystem, for example when a child is involved in aspects of the marital subsystem (Fleming, 2003; Minuchin, 1974; Minuchin, Rossman, & Baker, 1978).

(iii) Boundaries

As family members organise themselves into hierarchies they draw boundaries between what is internal and part of (included in) the family system, and what is external to and not included in the family system (Broderick & Smith, 1979). Boundaries are created at every level of the family system, as well as between subsystems (Broderick & Smith, 1979; Fleming, 2003). Families differ in the permeability of their boundaries, with some families being more open and others more restricted in their boundaries. Information into and out of the family is regulated by boundaries; once again, some families are more permeable and allow information to flow freely, whereas other families may strictly regulate what information may be discussed with people outside the family system. Another aspect of boundaries is that the permeability of boundaries may change with the age and need of family members, an example being adolescents and young adults who press for more freedom and permeability in the family system (Broderick, 1993; Fleming, 2003).

(iv) Interdependence

As families organise themselves into a family system, all individual members and subsystems that make up the family system are interdependent and mutually influenced by each other (Von Bertalanffy, 1975; Whitchurch & Constantine, 1993).

2.2.2.2 Dynamic nature of family systems

Another central premise of family systems theory is that families are dynamic in nature, with strategies and patterns that guide the manner in which they interact with each other (Broderick, 1993; Fleming, 2003). The dynamic nature of families provides them with the ability to adapt to the changing challenges of daily life and to assist in the developmental growth of the individual family members. This dynamic nature of families can also be described by referring to family systems as open, ongoing systems, where the term "open" can be described as an information and energy flow between the family system and its environment, while "ongoing" focuses on the fact that change may occur in relationship to time (Broderick, 1993).

(i) Equilibrium

Families have to adapt to daily tasks and events and to long-term challenges and changes. Equilibrium is a concept used to explain how families always aim for a balance between the resources available to the family and the challenges with which the family is confronted (Broderick, 1993; Fleming, 2003). The family thus strives for a sense of balance, or homeostasis (Bradshaw, 1988), and when this is not reached the family may need to adjust its strategies and rules in order to restore this balance. Steinglass (1987) refers to morphostasis, a concept that alludes to the family system's ability to maintain its organisational structure, regardless of challenges. On the other hand, morphogenesis refers to the ability of the system to change and grow over time in order to adapt to the changing needs of the family. There is a constant dynamic tension in all family systems to maintain a balance between remaining stable and allowing change (Broderick & Smith, 1979).

(ii) Feedback loops

Feedback loop is a specific term in family systems theory that refers to the patterns or channels of interaction that assist families in moving towards morphostasis or morphogenesis (Broderick, 1993; Fleming, 2003). Positive feedback loops are patterns of interaction that assist in movement towards growth in the system. Negative feedback loops are patterns of interaction that assist in maintaining homeostasis. It should be noted that the words positive and negative are neutral and should not be interpreted as good or bad (Fleming, 2003).

(iii) Goal orientation

From a family systems perspective, families are viewed as goal oriented, as they strive to attain specific goals (Broderick, 1993; Fleming, 2003). Through patterns of interaction, whether through negative or positive feedback loops, the attainment of goals may become more or less possible. A family system is able to reach the same goals by taking different routes, and these are

termed equifinality (Fleming, 2003). Thus, the same beginning may lead to different possible outcomes, while one outcome may be attained through different possible routes.

2.2.3 Application of family systems theory to infertility

A systems perspective can aptly be applied to the study of the family as a system, since families consist of individual members who are all interactive, interdependent and interrelated. A family is a complex system and changes in one part of this system will have an impact on other, interrelated parts, or members, of the system. Family systems theory thus creates a framework from which to attempt to understand the complexity of families as an organised system.

A perspective that focuses on the larger system or context surrounding an individual (in this case, the marital relationship) is ideally suited to a focus on infertility and preferred to an individual perspective or focus, specifically because the experience of infertility is shared by both partners and experienced within this larger context of behaviour (the marital relationship). The level of congruence between the partners' experiences of infertility-related stress and specific aspects of the marital relationship – the quality of marital communication, satisfaction with the sexual relationship, perceived intimacy and the level of marital adjustment – may influence, as well as be influenced by, the experience of infertility. On the basis of family systems theory, a partner's adjustment to infertility will most likely be impacted by the systemic nature of the marital or couple relationship. As mentioned, infertility is often experienced as a crisis and has the potential to negatively influence different aspects of the marital relationship (Burns & Covington, 2006). The couple will attempt to adapt to the challenge of infertility, either through morphostasis or morphogenesis. Infertility may disturb the equilibrium of the marital relationship and result in stress and conflict. Each partner's experience of the processes of infertility in a marital relationship will thus be examined in the present study from a family systems perspective.

Numerous previous studies suggest and support the use of a family systems approach in infertility research (Andrews et al., 1991; Peterson, Newton, & Rosen, 2003; Ulbrich, Coyle, & Llabre, 1990). A recent study that examined how couples cope with infertility and what the implications are of different coping patterns and skills was guided by family systems theory (Peterson et al., 2006). Furthermore, Ulbrich et al. (1990) regard the couple as an interactive and interlinked unit that can be viewed from a systemic perspective of treatment. Although some studies, such as these mentioned above, have opted for a systemic framework to be applied to coping and infertility (Levin et al., 1997), researchers have called for additional studies using this framework (Greil, 1997).

2.3 Bio-psychosocial theory

2.3.1 Overview of bio-psychosocial theory

The bio-psychosocial theory emerged from the work of George Engel (1977) in the field of general systems theory, challenging the traditional biomedical model of medicine that was prevalent in earlier years. The biomedical model only valued and took into consideration physically observable and measurable biological factors in the assessment of any problem, neglecting to consider the all-important interplay of psychological and social factors with biological factors (Engel, 1977).

Partly based on social cognitive theory (Halligan & Aylward, 2006), a bio-psychosocial perspective argues that, for any individual, all three subsystems – biological, psychological and social – are interrelated and interdependent and that each system exerts an influence on the other (Engel, 1977). Thus, from a bio-psychosocial perspective, each individual experiences the interplay of biological, psychological and social factors. The biological subsystem refers to a person's physiological (biological) processes, the psychological subsystem to a person's knowledge, emotions, cognitions and beliefs, and the social subsystem refers to the influence of society and its values and norms on a person. Thus, bio-psychosocial theory acknowledges the possible influence of biological symptoms on the psyche of an individual, as well as the possible influence of the psyche on the biological system (Halligan & Aylward, 2006).

An ever-increasing number of researchers and clinicians are more recently opting for a bio-psychosocial spiritual approach in order to gain a more holistic picture of an individual's symptoms. Researchers in countries such as the United Kingdom, the United States and Germany have been reported to work from a bio-psychosocial perspective (Gatchel & Oordt, 2003). Especially in the field of psychology, where much research has been conducted on the mind-body connection, it would be considered neglectful to focus on only one system and not take into consideration all systems that play a role in an individual's life and context. The bio-psychosocial theory cannot provide comprehensive factual explanations of the mechanisms at work in the interaction between biological, psychological, and social systems. With the aim of arriving at a complete diagnosis, it does, however, provide the researcher or clinician with a general framework within which to theoretically and empirically explore all factors that potentially may contribute to an individual's experience of a given situation (Armitage & Conner, 2000).

2.3.2 Application of bio-psychosocial theory to infertility

A bio-psychosocial theory proves itself to be a useful and relevant framework for investigating infertility issues, as the interaction between biological, psychological and social factors is apparent in infertility. Figure 1 illustrates the reasoning behind a bio-psychosocial theory for the study of infertility.

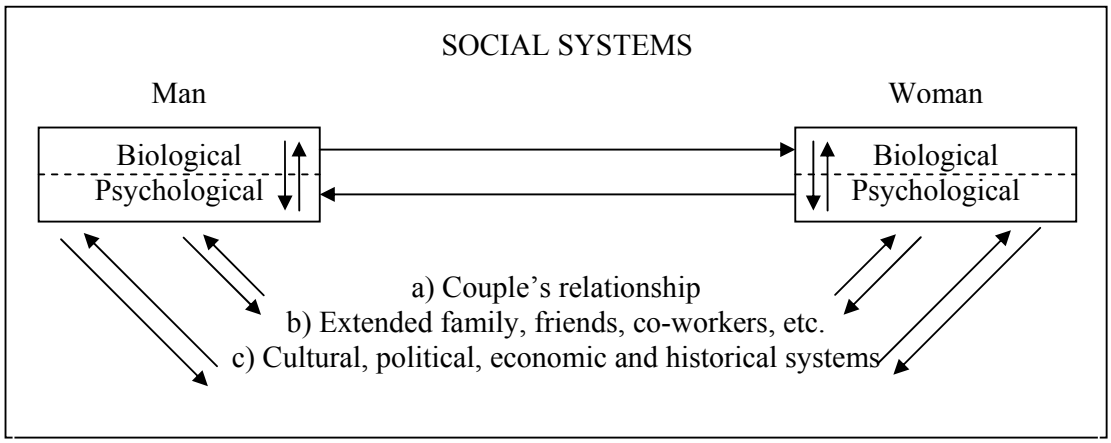


Figure 1. A bio-psychosocial theory for the study of infertility.
Note. Adapted from Williams, Bischoff, & Ludes (1992, p. 310)

In Figure 1, the arrows between the biological and psychological subsystems indicate that neither of these two subsystems is independent, but that they mutually influence each other (Williams et al., 1992). It is also illustrated how each individual finds himself or herself within numerous larger social systems, one of the most influential systems being the couple or interactional system. The behaviour of each individual plays a significant role in the interpersonal context in which the other individual plays out behaviour. Furthermore, the married couple is a part of other social systems, such as their extended family, networks of friends and co-workers. Finally, larger cultural, political, economic and historical systems also surround and can influence the married couple and other social systems.

Williams et al. (1992) emphasise the importance of the adoption of a bio-psychosocial perspective in the diagnosis of infertility. Their study suggests that infertile patients struggle with stressors and losses on many different levels, and supports the importance of understanding infertility from a biological, psychological and social viewpoint (Williams et al., 1992). Similarly, Gerrity (2001) reports the importance of acknowledging that infertility has a physical, emotional and existential influence on individuals and couples.

In the following sections, infertility will be discussed from a biological, psychological and social perspective respectively.

2.3.2.1 Infertility from a biological perspective

As indicated above, the biological factors of bio-psychosocial theory refer to the physiological factors of infertility. The biological causes of infertility affect men and women in equal proportions. In 35 to 40% of cases the male is infertile (called male factor infertility), and in 35 to 40% of cases the female is infertile (female factor) (Menning, 1980). In 15 to 20% of cases infertility is a combined problem between the male and female (combined/mixed infertility), while in the remaining 5 to 10% of cases the causes of infertility are unknown and cannot be explained by current technology, thus no physical anomalies can be found that cause the infertility (Cooper-Hilbert & Hilbert, 1993; Mahlstedt, MacDuff, & Bernstein, 1987; Speroff et al., in Eunpu, 1995; Williams et al., 1992).

Female factor infertility may be the result of three primary physical shortcomings: firstly, the woman may not be able to produce and release mature eggs due to hormonal imbalances or ovarian cysts; secondly, damaged or scarred fallopian tubes are not able to carry the egg from the ovary to the womb; and thirdly, structural abnormalities or hormonal problems may lead to the inability of the fertilised egg to implant in the uterine lining (Williams et al., 1992).

Male factor infertility may be due to the inability to produce a sufficient number of sperm and/or the inability to produce sperm of good quality. Inadequate sperm production can be the result of numerous causes (Kruger, Hulme, Van der Merwe, Viljoen, & Franken, 1990; Wessels & Nel, 1988), which will not be elaborated upon in the present study. Mixed factor infertility may be the result of a combination of possible causes of male and female infertility.

Unexplained infertility (also called psychogenic infertility) cannot be explained by medical tests, thus no biological origin of infertility can be found. Numerous research studies have been conducted on unexplained infertility, with one avenue of research findings suggesting a link between psychological factors and unexplained infertility. It is proposed that negative psychological factors, such as depression and high levels of stress, may result in decreased chances of achieving pregnancy (Cwikel et al., 2004; Hjollund et al., 2004; Smeenk et al., 2001). Numerous mechanisms for this proposed link between psychological factors and decreased fertility have been suggested in the research. A more comprehensive overview of the empirical literature on unexplained infertility is presented in Chapter Three.

There are different treatment possibilities for the treatment of male, female and mixed factor infertility. A comprehensive overview of the different treatment possibilities can be found in Chapter One. In order to select the appropriate treatment cycle for each individual couple, a thorough medical evaluation of the woman's fertility is conducted through a selection of tests, while a semen sample will be analysed in order to determine the male's fertility. The scope of the present study is not adequate to discuss which treatments are appropriate for which infertility problem. The psychological perspective on infertility will be discussed in the following section.

2.3.2.2 Infertility from a psychological perspective

For the individual and/or the couple, the experience of infertility may have numerous potential psychological effects, either positive or negative in nature. This study cannot discuss all possible effects, but will attempt to discuss some of the most prevalent psychological effects of infertility.

Fertility and childbearing during adulthood are anticipated experiences (Burns, 1987) and the experience of infertility often forces infertile individuals to redefine their identities (McDaniel, Hepworth, & Doherty, 1992). Meyers et al. (1995a) suggest that "infertility challenges deeply held beliefs, self-identity, adequacy, and competence" (p. 224). Infertility might be experienced as an "identity shock" (Möller & Fällström, 1991). The individual may experience losses, or be concerned about potential losses in the future, in aspects that mould identity, such as self-esteem, competence, body image, prestige and so forth (Eunpu, 1995). The individual's feelings that his or her identity is being threatened and the accompanying feelings of failure and stigmatisation may be endorsed by the regular, often invasive, treatment procedures. The term "treatment intrusiveness" (Benazon et al., 1992) refers to the physically invasive nature of some assisted reproductive treatment procedures, especially for the female. A combination of negative effects such as these mentioned above can damage an individual's self-image, especially when the failure to achieve a pregnancy is globalised and the individual starts regarding himself or herself as worthless and a failure in other areas of life as well. Depression, self-destructive thoughts and/or behaviours, as well as suicidal thoughts may be the result (Eunpu, 1995).

On an individual level, one or both partner(s) in the marital relationship may feel guilty and responsible for the infertility problem, especially if he or she is biologically responsible for the infertility problem. These feelings of guilt may be internalised. In addition, a partner who is not biologically responsible for the infertility problem might blame the partner who is diagnosed as infertile (McDaniel et al., 1992). These emotions, particularly guilt and blame, might lead to the development of difficulties in the marital relationship.

On a couple level the possibility of infertility may undermine the core purpose of marriage (Burns, 1987), and couples may re-evaluate previously held ideals about marriage as an institution (Day, 2005). Fertility and childbearing are often crucial components of the initial partner evaluation (Gerrity, 2001; Meyers et al., 1995b). When infertility is a possibility, spouses may start re-evaluating present interactions in their marriage. A re-evaluation of marital interaction is often seen in a couple's sexual relationship. Numerous studies suggest decreased sexual intimacy as a result of infertility and infertility-related stress (McDaniel et al., 1992; Meyers et al., 1995a, 1995b; Myers & Wark, 1996; Peterson, Newton, & Feingold, 2007). Infertile couples often report that sexual interaction becomes unpleasant and is lacking in spontaneity because it is perceived as a chore (McDaniel et al., 1992; Meyers et al., 1995a).

Infertility can thus be experienced as a developmental crisis that influences every aspect of a couple's life. Relationship strain can be experienced due to feelings of guilt or blame, the stresses of treatment, expensive treatment procedures and strain in the sexual relationship, to note a few causes (Benazon et al., 1992; Collins, Freeman, Boxer, & Tureck, 1992; Eunpu, 1995). The social perspective of infertility will be discussed in the following section.

2.3.2.3 Infertility from a social perspective

Prevailing societal norms and values can significantly influence the individual's or couple's experience of infertility. In most societies, childbearing is valued highly. Implicit and explicit norms dictate that couples should have and want to have children (Whiteford & Gonzalez, 1995). When couples cannot have children, it defies the societal norms and thus may be greeted with stigmatisation. Peers and family may view infertile couples negatively. Infertility has traditionally, before sufficient medical knowledge of the problem was gained, been treated as a female issue (Savage, 1992; Yeboah, Wadhwani, & Wilson, 1992). Infertile women were ostracised and stigmatised. Today, men may also bear the brunt of society's stigmatisation (Dyer, Abrahams, Mokoena, & Van der Spuy, 2004).

Individuals experiencing infertility report that they perceive their infertility as stigmatising (Whiteford & Gonzalez, 1995). In a study by Dyer et al. (2004), men reported suffering due to stigmatisation, verbal abuse and loss of social status. Some men felt that infertility influenced their identity negatively: "You see, you are … a man because you have children. But if you don't have children some other guys say you are a woman" (Dyer et al., 2004, p. 963). All but three men described being very affected by their infertility, mentioning feelings of pain, emptiness, inadequacy and/or guilt (Dyer et al., 2004). In a study by the same authors (Dyer et al., 2004),

women reported experiencing negative social consequences, such as marital instability (fear that a partner would leave them for someone who is fertile), abuse and stigmatisation.

Social relationships, both in one's intimate and general social milieu, may experience strain as a result of infertility (Atwood & Dobkin, 1992). Infertile individuals report that they find it difficult to be around children or pregnant women, and they may go as far as breaking up friendships and not attending family occasions in order to avoid these feelings of failure (Lampman & Dowling-Guyer, 1995). Interaction with peers or family may serve as a constant reminder of the couple's infertility and often also results in painful questions from others about family plans.

2.4 Conclusion

The present study examines infertility-related stress and how it is related to specific aspects of the marital relationship, as opposed to a focus on how infertility is related to individual well-being. From a family systems perspective, it is clear that infertility is a couples' issue. A holistic view of infertility is needed, with a focus on how the interaction between partners in a couple is crucial in understanding how each partner's behaviour affects the other, and how the marital relationship may in turn be influenced. In addition, infertility is a bio-psychosocial phenomenon, with a constant interplay between all three subsystems – biological, psychological and social. Both theoretical frameworks discussed above support a holistic view of infertility that complements the nature of the present study.

A comprehensive review of the literature on infertility, infertility-related stress and specific aspects of the marital relationship is provided in Chapter Three.

CHAPTER 3

LITERATURE REVIEW

3.1 Introduction

The primary aim of the present study was to investigate the nature of the relationship between the level of infertility-related stress, as experienced by male and female participants who formed part of infertile married couples, and specific aspects of the marital relationship.[1] The secondary aims were, firstly, to examine whether there were significant differences in specific aspects of the marital relationship between three infertile groups, at the onset of different types of infertility treatment,[2] and a pregnant control group. The three infertile groups will be referred to as treatment groups. Secondly, it was examined whether there were significant differences in the level of perceived infertility-related stress between the three groups of infertile couples at the onset of different types of infertility treatment. Two concepts that are central to the present study thus are infertility-related stress and specific aspects of the marital relationship.

This chapter will provide a comprehensive review of the relevant literature on these two main concepts.

3.2 Infertility-related stress

Different definitions of stress are found in the academic literature and stress is not always differentiated adequately from concepts such as 'pressure', 'strain', 'stressors' and 'demand' (Jones & Bright, 2001). The lack of clarity among researchers regarding the definition of stress may be problematic, as it could lead to ambiguity. For example, the term stress is often used to refer to the threatening situation as well as to the anxious response (Tucker-Ladd, 2000). Similarly, stress is sometimes used to describe an external environmental stimulus or stressor, while at other times to describe an internal response or strain (Jones & Bright, 2001).

The contemporary concept of stress suggests that it involves a demand that results in physiological, biochemical, psychological, and behavioural changes (Ogden, 2000). Various other definitions are used for stress, yet it is beyond the scope of the present study to go into a comprehensive discussion of all possible definitions. Stress can be defined, for the purpose of this study, as an individual's response (whether physiological, psychological and/or behavioural) to a demand or life event that he or she appraises as threatening. In terms of this definition,

[1] Specific aspects of the marital relationship: quality of communication, satisfaction with the sexual relationship, perceived intimacy, and marital adjustment.

[2] Different types of infertility treatment: ovulation induction (OI), intrauterine insemination (IUI), in vitro fertilisation (IVF) and/or intra-cytoplasmic sperm injection (ICSI). For a detailed description see Chapter 1.

infertility-related stress can be defined as the anxious response of the individual to the demand (or stressor) of infertility. Infertility is perceived as a low-control stressor. A low-control stressor is defined as a stressful situation about which an infertile couple can do "… little or nothing to influence the nature or the outcome of their situation" (Terry & Hynes, cited in Schmidt et al., 2005, p. 245).

Infertility-related stress is not a new phenomenon, and couples that are not able to meet the expectation to bear children, as imposed by themselves, their spouses and society, have been struggling with individual and relationship difficulties for years (Andrews et al., 1991). However, there has been increasing awareness of infertility-related stress and the difficulties infertile couples may experience over the past few years. In this section of the literature review, the literature on infertility as a life stressor and psychosocial crisis will be discussed firstly. Secondly, studies that examine the relationship between infertility-related stress and the outcome (or success) of infertility treatment will be examined. Thirdly, research on the stressfulness of different types of infertility treatment will be discussed. Finally, the literature on the level of agreement (or congruence) between couples' experiences of infertility-related stress will be discussed with relevance to its influence on the marital relationship.

3.2.1 Infertility as a life stressor and psychosocial crisis

> [My infertility is a blow to my self-esteem, a violation of my privacy, an assault on my sexuality, a final exam on my ability to cope, an affront to my sense of justice, a painful reminder that nothing can be taken for granted. My infertility is a break in the continuity of life. It is above all, a wound – to my body, to my psyche, to my soul] (Mahlstedt, cited in Eunpu, 1995, p. 346).

This quotation illustrates the extent to which infertility may be experienced as a painful life stressor, on the individual, physical, and/or psychological levels. Accordingly, infertility is quickly becoming one of a list of life stressors experienced by many heterosexual couples in middle adulthood (Jordan & Revenson, 1999) and is often compared to divorce, the death of a loved one (Baram, Tourtelot, Muechler, & Huang, in Holter et al., 2006) or to cancer or HIV/AIDS (Domar, Zuttermeister, & Friedman, 1993). Numerous studies support the finding that infertility is experienced nearly universally as extremely stressful (Golombok, 1992; Mahlsted et al., 1987; Wricht et al., 1991) and that it is one of the most upsetting experiences of people's lives (Guerra, Llobera, Veiga, & Barri, 1998).

Many research studies have found that infertility may have lasting effects on each partner's individual well-being, as well as on the marital relationship (Dunkel-Schetter & Lobel, 1991;

McEwan, Costello, & Taylor, 1987; Stewart & Glazer, 1986). Infertility affects almost all aspects of a couple's life together (Mahlstedt, in Holter et al., 2006). Whiteford and Gonzalez (1995, p. 343) describe the experience of infertility as an "emotional roller coaster", because many couples have to go through repeated treatment attempts to achieve pregnancy, each month alternating rapidly between emotions of intense hopefulness and hopelessness. When couples are informed of statistics that indicate that the chance of success of the first in vitro fertilisation attempt is only about 23% (statistics for the USA), their stress is exacerbated even more (American Society for Reproductive Medicine, in Jordan & Revenson, 1999).

There are many possible causes for the potentially stressful nature of infertility: financial strains (infertility treatment being very expensive); relationship strains (if the marital relationship is threatened by infertility); sexual strains (infertility treatment might result in sexual intercourse becoming mechanical and merely a chore); social strains (couples may experience pressure from society and social networks to have children); career plans (delayed); and the physically invasive nature of medical procedures, to name but a few (Benazon et al., 1992; Collins et al., 1992; Eunpu, 1995; Newton et al., 1999; Shiloh, Larom, & Ben-Rafael, 1991).

Various studies describe the experience of infertility and its effect on the individual and couple as a "crisis" (Atwood & Dobkin, 1992; Benazon et al., 1992; Connolly, Edelmann, Cooke, & Robson, 1992; Eunpu, 1995; Golombok, 1992; Menning, 1980; Möller & Follström, 1991; Shiloh et al., 1991; Wricht et al., 1991) or a prolonged life crisis (Lalos, in Holter et al., 2006). From a family systems perspective, each subsystem is comprised of members who work to accomplish the relevant tasks of that specific subsystem. In the case of infertility, infertile couples represent the marital subsystem and aim to accomplish childbearing, a developmental task and socially expected activity (Whiteford & Gonzalez, 1995). When not able to accomplish this task, the couple may experience a crisis.

When viewed from a psychosocial perspective, many couples may experience infertility as a psychosocial crisis. According to the psychosocial perspective developed by Newman and Newman (as discussed in Wait, Meyer, & Loxton, 2005), a person advances through eight stages of psychosocial development in his/her life. As development proceeds, specific developmental tasks, or life skills and abilities, have to be mastered by the individual in order to reach increased social competence. One of the developmental tasks in early adulthood (ranging from approximately 22 to 34 years) is parenting (Meyer, in Wait et al., 2005, p. 190). Infertile couples may feel pressured by society to have children, as most societies prize childbearing.

3.2.2 Infertility-related stress and the outcome of infertility treatment

The field of psychoneuroimmunology has emerged recently, examining how the mind can influence the body and vice versa (Irwin & Vedhara, 2005). The term psychosomatic infertility (also referred to as functional, psycho-physiological, or unexplained infertility) views infertility as a psychosomatic problem. It is proposed that emotional and psycho-physiological stress may be an important contributor to psychosomatic infertility (Brand, 1979). Accordingly, many research studies have been conducted to examine the relationship between stress and the outcome of infertility treatment. Most of the studies focus on the relationship between stress and the outcome of in vitro fertilisation (IVF) treatment, with a few studying other treatments, such as intra-cytoplasmic sperm injection (ICSI). Research findings in this field are discrepant, with some studies finding an inverse relationship between the level of infertility-related stress and the success of ART treatment, some finding a positive relationship between moderate infertility-related stress and treatment success, and still others finding no significant relationship at all. A brief overview of the three categories of research findings will be provided in the following section.

(i) Inverse relationship between infertility-related stress and treatment outcome

Numerous studies have proposed that stress, especially experienced over a long period of time (by either the male or the female), might have a negative impact on the outcome of infertility treatment, thus that stress might hinder the woman from falling pregnant (Cwikel et al., 2004; Fachinetti et al., 1997; Hjollund et al., 2004; Newton et al., 1999; Smeenk et al., 2001).

The two main mechanisms through which stress is proposed to decrease the odds of falling pregnant are (i) via the hypothalamus and (ii) via the pituitary gland (Marshall, Eagleson, & McCartney, 2001). The primary functions of the hypothalamus are to regulate the stress response and to regulate sex hormones. Increased stress levels result in a higher secretion of cortisol, the primary stress hormone. High levels of cortisol can be harmful to a person's health. Excessive stress may, for example, lead to a complete cessation of the menstrual cycle, called amenorrhea, which is often seen in female marathon runners. Less severe stress, both physical and psychological in nature, often results in irregular menstrual cycles. When stressed, the pituitary gland secretes more prolactin, a hormone that can be detrimental to the woman's reproductive health, as increased levels of prolactin may cause irregular ovulation (Marshall et al., 2001).

Anxiety and depression were measured in a multicentre prospective study with 291 female participants (Smeenk et al., 2001). Known predictors of pregnancy, and psychological factors and their relationship to the outcome of IVF/ICSI treatment were analysed. The results showed a

significant negative relationship between the psychological factors anxiety and depression, and treatment success. Higher anxiety and depression were associated with lower IVF/ICSI treatment success. Demyttenaere et al. (1998) found similar results. Boivin and Takefman (1995) also examined the relationship between stress and the success of IVF treatment in women. The women were asked to rate their stress on a daily basis for one IVF cycle. At the end of the IVF cycle the pregnancy test was undertaken and the women were assigned to either a pregnant or non-pregnant group according to the results. The daily stress ratings of these two groups were compared. The analyses showed that the non-pregnant group reported significantly higher levels of stress during the IVF treatment cycle, while their biological response to treatment was also lower than in the pregnant group.

Facchinetti et al. (1997) conducted an experimental study in which stress responses to a stroop task (a cognitive stress test that measures the ability to ignore irrelevant stimuli) were measured by examining blood pressure and heart rate. These physiological stress responses were then analysed to see if they predicted the outcome of IVF treatment. The results suggested that increased cardiovascular stress responses were related to lower success of IVF treatment. Csemiczky, Landgren and Collins (2000) studied the state of anxiety, personality profiles and stress hormones of 22 normally menstruating women receiving IVF treatment. The researchers related the scores on these measures to the outcome of the treatment. The results showed that the infertile women had significantly higher levels of cortisol and prolactin than the fertile control group. A trend emerged, with the women who did not fall pregnant exhibiting higher anxiety levels than the women who did succeed in falling pregnant.

Clarke, Klock, Geoghegan, and Travassos (1999) conducted a study to determine the relationship between psychological stress and semen quality among men receiving IVF treatment. Self-reported stress was compared to sperm parameters for a group of 40 males. It was found that semen quality decreased significantly with higher levels of reported psychological stress. Similar studies have shown stress to have a detrimental influence on many aspects of semen quality, such as sperm motility, morphology and concentration (Bents; Moghissi & Wallach; Giblin et al.; all cited in Clarke et al., 1999). Other studies have also found a significant decrease in the semen quality of IVF patients (Harrison, Callan, & Hennessey; Kentenich et al.; both cited in Clarke et al., 1999).

(ii) Positive relationship between infertility-related stress and treatment outcome

A positive relationship between infertility-related stress and treatment outcome has also been found. Cooper, Gerber, McGettrick and Johnson (2007) conducted a significant study. The Fertility Problem Inventory (FPI), measuring infertility-related stress, was administered over a period of three years to 129 couples in their first IVF treatment cycle. Couples who succeeded in falling pregnant with IVF treatment reported higher levels of sexual concern and need for parenthood, as measured with the FPI, than couples who did not fall pregnant. Also, couples who became pregnant had higher scores on the negative view of a child-free lifestyle subscale, need for parenthood subscale and the global stress scale. These findings suggest that moderate stress might be beneficial to couples wanting to fall pregnant. A possible explanation for this finding is that the study in mention presented only a small number of couples who had scores in the highest quartile of the FPI (higher scores on the FPI indicate higher stress levels), thus restricting the authors from drawing any conclusions about the influence of more severe infertility-related stress on treatment outcome.

(iii) No relationship between infertility-related stress and treatment outcome

The third category of research findings shows no association between infertility-related stress and treatment outcome (Merari, Feldberg, Elizur, Goldman, & Modan, 1992). Anderheim, Holter, Bergh, and Möller (2005) conducted a prospective, longitudinal study with 166 women undergoing their first IVF treatment cycle. Questionnaires measuring psychological well-being and social factors were administered on two occasions. The results showed no significant differences in the psychological variables between pregnant and non-pregnant women. In another study (Harlow, Fahy, Talbot, Wardle, & Hull, 1996), hormone secretion and state of anxiety scores were measured and both were found to increase during IVF treatment. Both state and trait anxiety were similar for the group who fell pregnant and the group who did not succeed in falling pregnant – these findings suggest that stress and the level of anxiety experienced during IVF treatment do not have a great impact on treatment outcome.

The exact impact of stress on infertility remains an open and unanswered question: in summary, it may be argued that some stress might be advantageous, while too much might be harmful to the couple. In the interpretation of the contrasting research findings, the following aspects should be taken into consideration. Some of the criticisms of studies on the impact of stress on the success of infertility treatment are that many of these studies have methodological shortcomings: too small sample sizes, unstandardised research questionnaires and inadequate research designs. A large caveat is also that there is no consensus on the most appropriate measures that should be used to measure stress in infertile couples.

3.2.3 Stressfulness of different types of infertility treatment

Specific aspects of the treatments gave rise to the question whether different types of infertility treatment – ovulation induction (OI), intrauterine insemination (IUI), in vitro fertilisation (IVF) or intra-cytoplasmic sperm injection (ICSI) – might differ in the level of stressfulness experienced by the individuals and couples undergoing such treatments.

It is suggested that the IVF and ICSI treatments may possibly be experienced as more stressful than the OI or IUI treatments, due to the fact that the OI and IUI treatments involve less physically invasive medical procedures. In this regard, it should be noted that OI involves no medical procedure other than taking ovulation-enhancing medication and scheduling sexual intercourse (Daiter, 2008). IUI involves ovulation-enhancing medication and a minimal medical procedure that does not require anaesthesia (*Artificial insemination for infertility*, n.d.). The IVF and ICSI treatments, however, are more advanced: both require anaesthesia and are also more expensive treatments than OI and IUI (*Assisted reproductive technologies*, 2008b). Furthermore, when taking into consideration the requirements of the infertility clinics (where data for the present study were collected) that a certain amount of time has to be spent in one treatment cycle before a couple is allowed to progress to the more advanced treatments, it should be noted that couples undergoing the IVF or ICSI treatments have also been trying to achieve pregnancy for a substantially longer period of time than the OI or IUI patients, who have just started the process. The IVF and ICSI patients might thus be more stressed, as they have been struggling with infertility for longer.

Furthermore, it is suggested that men may experience ICSI treatments as being more stressful than IVF (although the woman undergoes the physical treatment procedure, their spouses may also experience significant stress), due to the fact that the ICSI treatments are usually used in cases where male factor infertility has been diagnosed. IVF treatment, on the other hand, is usually recommended for couples with unexplained or female factor infertility. Men with male factor infertility report stigmatisation, a loss of self-esteem and feelings of guilt more often than men without male factor diagnosis (Nachtigall, Becker, & Wozney, in Lee, Sun, & Chao, 2001).

Not much research was found that addresses this specific question of whether different types of treatment might vary in the level of their stressfulness. Boivin et al. (1998) compared men undergoing ICSI (n = 18) and IVF treatment (n = 22). The men's distress levels were measured daily for one complete treatment cycle. The results showed that the ICSI patients reported marginally more distress on the days prior to retrieval compared to the IVF patients. However,

the psychological reactions of the two groups were not significantly different and it was concluded that there is no need to approach these patients differently during treatment.

3.2.4 Congruence in partners' experiences of infertility-related stress

When viewed from a family systems perspective, "…much of individual experience is mediated by the reciprocal influences of family members on one another" (Catherall, 2004, p. 127). Andrews, Abbey and Halman (1992) discovered that husbands' and wives' perceptions of their quality of life had an influence on their actual experience of quality of life. This concept of reciprocity can also be applied to couples dealing with infertility. Couple congruence is a concept developed by McCubbin, Thompson, Thompson, and McCubbin (1993). It can be defined as a general sense of agreement in a couple with regard to how they define stress and how they appraise the severity of the stressor. Higher levels of congruence are associated with better adaptation to stressors. Patterson (in Peterson et al., 2003) examined congruence and how it is related to couples' adaptation after treatment for coronary heart disease. Her study found that higher congruence between partners predicted decreased stress during stressful events. Other studies also found congruence to be a factor in better adaptation to stressors (Snell & Rosen, 1997).

Men and women may often view the intensity of stressors experienced during infertility differently. In a study by Andrews et al. (1991) it was found that many men experienced the stress associated with infertility as similar to that of other stressors in their lives. Women, on the other hand, experienced infertility-related stress as highly distressing and significantly different from other stressors in their lives, because infertility posed a specific threat to their sexual identity and their sense of identity as a woman (Peterson et al., 2006). On the other hand, Collins et al. (1992) found that men experienced infertility as emotionally intensely as women, yet the men in their study used different, more effective coping strategies than their female counterparts. The men in the latter study reported that they might perceive infertility as a threat to their roles as male and husband, resulting in feelings of failure and inadequacy. They also reported lowered self-esteem and feelings of sexual inadequacy due to infertility. Meyers et al. (1995a) refer to recent research that suggests that infertile men and women may actually experience similar amounts of emotional distress and negative psychological effects.

Couple congruence relating specifically to infertility has not been studied extensively. One of the few studies that did study couple congruence and infertility is a recent study on marital adjustment and depression in infertile couples by Peterson et al. (2003). The researchers asked more than 500 infertile couples presenting for in vitro fertilisation (IVF), intrauterine

insemination (IUI) or donor insemination to complete measures on their infertility-related stress and depressive symptoms. The Fertility Problem Inventory (FPI) (Newton et al., 1999) was administered to measure perceived infertility-related stress. Marital satisfaction and adjustment were also measured. This study revealed that husbands and wives had higher levels of marital satisfaction, as measured with the Dyadic Adjustment Scale (Spanier, 1976), when they perceived the level and magnitude of social infertility stress they were experiencing equally, as compared to husbands and wives who had different perceptions of the social infertility stress they experienced. It was also found that women in couples in which both they and their husbands attached similar importance to the need for parenthood showed significantly higher levels of marital satisfaction than women in couples where their husbands attached a greater importance to the need for parenthood. Incongruence in a couple was related to more depressive symptoms in women. Thus, Peterson et al. (2003) concluded that high congruence between partners' perceptions of stress might act as a buffer against high infertility-related stress experienced by couples.

3.3 Infertility-related stress and specific aspects of the marital relationship

Infertility is a stressor shared between partners and is likely to influence the marital relationship in some way, whether it be positive or negative. Infertile couples report many stressors, such as stress in sexual functioning, changes in social and family networks and stress related to the quality of the marital relationship (Greil, 1997; Lalos; Mahlstedt; Wirtberg; all cited in Holter et al., 2006; Möller & Fällström, 1991; Newton et al., in Peterson et al., 2006).

Research findings on the marital relationship of couples undergoing assisted reproductive technologies are conflicting (Burns & Covington, 2006; Reporaki, Punamäki, Unkila-Kallio, & Vilska, 2007). Such a discrepancy in findings is to be expected, however, as infertility is such a personal experience, with each couple's relationship dynamics very different from that of other couples. In interpreting conflicting research findings, the unique situation of each couple should be borne in mind. In this section the empirical evidence on the experience of infertility-related stress and its relationship to communication, satisfaction with the sexual relationship, perceived intimacy and the marital adjustment of marital couples will be reviewed. It should be noted that, although care is taken to discuss the research on each specific aspect of the marital relationship separately, these aspects overlap in many studies and some repetition of studies may occur.

3.3.1 Quality of marital communication

As is the case with most variables that are measured in research, different studies report different findings when examining the nature of the relationship between infertility, infertility-related

stress and the quality of marital communication. Some of these research findings are discussed in this subsection.

Some studies found increased marital communication during infertility, supporting the 'marital benefit' concept proposed by Schmidt et al. (2005). Holter et al. (2006) conducted a prospective, longitudinal study of 117 infertile couples. Among other psychological variables, they measured how couples perceived communication to be influenced by the experience of infertility. With regard to communication, 90% of the participants reported that communication between them did not decrease during infertility. In fact, many couples reported that infertility forced them to communicate better, which in turn led to increased emotional intimacy (Schmidt et al., 2005).

Schmidt et al. (2005) conducted a study (N = 2250) that measured the communication and coping strategies of participants, among other variables. The same variables were measured at the beginning of fertility treatment, as well as at a 12-month follow-up. Among the men, difficult marital communication and keeping infertility a secret from others were significant predictors of decreased marital benefit. No significant predictors were found among the women. The authors suggest that the final sample of participants might not be as representative as it should be, as many extremely stressed potential participants may have dropped out, resulting in the final sample possibly containing less stressed participants and not being representative of all infertile individuals.

On the other hand, studies have found decreased communication as a result of infertility-related stress (Bringhenti, Martinelli, Ardenti, & La Sala, 1997; Leiblum, Aviv & Hamer, 1998; Monga, Alexandrescu, Katz, Stein, & Ganiats, 2004; Newton et al., 1999; Slade, Emery, & Lieberman, 1997). Infertility is often experienced at an early stage in the couple's marriage and may be one of the first obstacles or problems the couple has to deal with. At such an early stage not all couples have yet developed adequate communication or conflict resolution skills (Mahlstedt, in Eunpu, 1995). Communication difficulties may result in problems with marital functioning. Infertility is often described as the silent crisis (Benazon et al., 1992). In 70% of couples infertility is due to one partner (Benson, in Andrews et al., 1991). The infertile individual can experience feelings of guilt and may doubt his or her spouse's affection (McDaniel et al., 1992). In addition, infertile individuals may fear being abandoned by their spouse in the hope of finding a partner who is able to provide them with children (Becker, Castrillo, Jackson, & Nachtigall, 2006; Meyers et al., 1995b). These feelings may place strain on the relationship. Couples may avoid discussing their emotions regarding infertility because they are afraid of making a partner feel worse or because the individual finds the experience too painful (Eunpu, 1995).

Gender can also be a factor in the extent to which an individual shares emotions about infertility: women are often more likely to share and look for social support from friends and/or relatives, while men are often not prone to sharing, also due to their societal upbringing to be the strong and silent one in a relationship (Baram et al., in Eunpu, 1995). In such an instance, the wife may feel that her husband is abandoning her because of his unwillingness to confide, while the husband may feel more anxious and confide even less. Both partners thus feel isolated at a time when they need each other's support most (Mahlstedt; Williams et al.; both cited in Eunpu, 1995). Also, because each partner is stressed, he or she might not have the resources left to look after his or her partner's needs (Andrews et al., 1991).

Finally, it should be noted that several studies have shown that women experience infertility as being more stressful than men (Henning & Strauss, 2002). Women experience marital and sexual relationships less positively than men after the diagnosis of infertility and during infertility treatment (Bringhenti et al., 1997; Leiblum et al., 1998; Monga et al., 2004; Newton et al., 1999; Slade et al., 1997). The ability to reproduce is often intimately tied to sexuality, self-image and self-esteem. Sexuality and sexual activity are also important means of expressing feelings of closeness and intimacy in a partnership. During infertility treatment the pleasurable experience of sexual intimacy may be affected negatively and this may contribute to marital distress. This leads into a discussion of the association between infertility-related stress and satisfaction with the sexual relationship.

3.3.2 Level of satisfaction with the sexual relationship

Once again, different findings are seen with regard to the nature of the relationship between infertility and infertility-related stress and the level of satisfaction with the sexual relationship: some suggest a positive association, while others suggest a negative or no association. Some of these studies are discussed in this section.

Infertility treatment might have a negative impact on marital adjustment – especially the sexual aspects of the relationship – and may lead to sexual dysfunction (Bell; Link & Darling; Lalos, Lalos, Jacobssen, & Van Schoultz, all cited in Ulbrich et al., 1990; Eunpu, 1995; Ohl et al., 2009). Coëffin-Driol and Giami (2004) reviewed the literature on the psychosocial influence of infertility and infertility treatment on marital sexuality: the existing research on infertile couples' sexuality and sexual satisfaction presents infertility as a detrimental experience for both women and men. Andrews et al. (1992) conducted a study (N = 275) to compare whether fertility-problem stress, experienced by both partners in infertile couples, is different from stress from

sources other than infertility. The researchers constructed questionnaires to measure stress, marital conflict, sexual self-esteem and sexual dissatisfaction. The results showed that higher levels of stress were related to decreased marital functioning and life quality for both men and women, regardless of whether the stress was infertility-related or from attempting to solve another problem. Higher levels of stress were related to increased marital conflict and sexual dissatisfaction, decreased sexual self-esteem and less intercourse. A gender difference was found in that the strengths of the inverse relationship between stress and reduced marital functioning and life quality for men was not dependent on the source of the stress, whereas for women fertility-problem stress showed higher negative influences on sexual identity and self-efficacy than general stress. Thus, men are also affected by infertility, but for them the impact of the problem is not fundamentally different from other, general problems.

Monga et al. (2004) also examined infertility and its relationship to sexual functioning (among other measured variables). With regard to sexual functioning, they found that women in infertile couples showed no significant decrease in functioning, yet men in the infertile couples scored significantly lower on the International Index of Erectile Function ($p = .05$) and also reported decreased sexual satisfaction ($p = .03$). Other studies found similar results: infertility is associated with decreased sexual self-esteem, less intercourse and decreased sexual satisfaction (Battaglia, Graziano, & Fonti, in Hirsch & Hirsch, 1989; Monga et al., 2004; Verhaak, in Schmidt et al., 2005). In another recent study, men reported decreased sexual desire and satisfaction after infertility diagnosis, regardless of the cause of infertility (Ramezanzadeh, Aghssa, Jafarabadi, & Zayeri, 2006).

Hirsch and Hirsch (1989) investigated whether infertility is related to decreased marital and sexual satisfaction and reduced self-esteem in comparison to couples not experiencing fertility problems ($N = 92$). Measures included the Hudson clinical measurement scales and a brief questionnaire developed by the authors to monitor the level of depression, self-esteem, marital discord and sexual dissatisfaction. The results revealed that infertile couples indicated less sexual satisfaction than their fertile counterparts. It has also been seen that satisfaction with the sexual relationship deteriorates in some couples, yet the marital adjustment of the couple and their general satisfaction with the relationship remains stable (Burns & Covington, 2006, Raval et al., in Monga et al., 2004).

In a study by Benazon et al. (1992) it was revealed that, due to the physically invasive nature of infertility treatment, also referred to as “treatment intrusiveness”, infertility treatment and the accompanying stress might lead to sexual dysfunctions: loss of libido, impotence, premature

ejaculation and/or a decrease in sexual activity (Elstein; Leader; Rosenfeld & Mitchell; all cited in Benazon et al., 1992). Couples may also experience anxiety, less spontaneity in sexual interactions, and less interest in sexual intercourse (Mahlstedt, in Benazon et al., 1992). Such sexual difficulties might, in turn, influence the marital relationship negatively and may lead to reduced marital satisfaction.

Another possible aspect of infertility treatment and the accompanying infertility-related stress is that infertile couples often experience sex as being a chore and not pleasurable any more (Siebel & Taymor, in Andrews et al., 1991). The following quotation illustrates the feeling some infertile individuals may experience: "I feel like I must produce at a specified, clinical, predetermined moment, when the act of sharing love…is something that should be…spontaneous" (Menning, 1980, p. 126). Another study also suggested that sexual expression in an infertile couple may become forced and mechanical and might lead to sexual difficulties (Siebel & Taymor, in Monga et al., 2004). In a study by Dennerstein and Morse (in Monga et al., 2004), 71% of infertile women said infertility reduced their enjoyment of sex and led to their sexual life becoming too mechanical and purposeful. Seeing sex as homework often produces impotence and a reduction in sexual intercourse (Freeman, Garcia, & Rickels; Menning; Siebel & Taymor; all cited in Andrews et al., 1991). Couples often cancel vacations and go to great lengths to have sex at specified times in order to provide the infertility specialist with adequate semen samples (Andrews, 1984). Abbey (in Monga et al., 2004) found that infertility was associated with increased sexual discord and decreased sexual satisfaction and frequency when compared to a control group.

Ulbrich et al. (1990) wanted to determine if stress and sexual satisfaction were related to changes in marital functioning. Their results showed that sexual satisfaction in males and females predicted marital adjustment significantly. Other research studies have showed improved or no change in sexual functioning when compared with controls (Daniluk; Fagan et al.; Leiblum, Kemmann, & Lane; Mazure & Greenfeld; Wright, Duchesne, & Sabourin; all cited in Monga et al., 2004).

3.3.3 Perceived intimacy in the marital relationship

The concept of intimacy is not easy to define (Ridley, in Popovic, 2005). Schaefer and Olson (1981) define intimacy as "a process and experience which is the outcome of the disclosure of intimate topics and sharing of intimate experiences" (p. 51). Intimacy, or the experience of closeness in a relationship, is a very important aspect of any marriage because it strengthens a couple's commitment to maintaining the relationship. Intimacy is positively associated with

marital well-being and marital adjustment (Dandeneau & Johnson, cited in Greeff & Malherbe, 2001; Kenny & Acitelli, 1994; Waring, McElrath, Lefcoe, & Weisz, 1981), while intimacy and marital satisfaction are directly related to each other (Schaefer & Olson, 1981; Tolstedt & Stokes, cited in Greeff & Malherbe, 2001).

Greil and Porter (1990) investigated marital intimacy among infertile couples. Half of the participants in their study reported that their marriages had become closer and more intimate, instead of more distant, due to the experience of infertility. Intimacy and marital communication are also intricately linked. Couples in the study by Greil and Porter (1990) reported that they became closer as a result of their infertility because they were required to maintain a high level of communication in order to deal with the infertility. Furthermore, many couples report that infertility forces them to communicate better, which in turn leads to increased emotional intimacy (Schmidt et al., 2005). In a study on marital benefit by Schmidt et al. (2005), it was found that, when infertility was kept a secret from others, it resulted in difficult marital communication, which was in turn a significant predictor for low marital benefit among men.

Intimacy may in some ways be seen as a variable that can have the potential to act as a buffer against the influence of stress on a husband's and wife's marital relationship. There are many research studies finding intimacy to be associated with marital quality (Harper & Elliot; Tolstedt & Stokes; Waring, all cited in Harper, Schaalje, & Sandberg, 2000). Intimacy is a core aspect of marital quality and a crucial aspect of interpersonal relationships (Dandeneau & Johnson, 1994; Merves-Okin, Amidon, & Bernt, 1991; Waring, 1981). Similarly, there have been studies that suggest a relationship between stress and intimacy (Cobb; Hobfoll & Leiberman; all cited in Harper et al., 2000). Elliot (in Harper et al., 2000) conducted a study in which life event stress was measured in young married couples and found that intimacy served as a buffer between stress and marital quality. Harper et al. (2000) conducted a study in order to address the relationship between intimacy, daily stress and marital quality in couples (N = 472). The Kansas Marital Satisfaction Scale (KMSS) (Schumm, Nichols, Schectman, & Grigsby, 1983), the Personal Assessment of Intimacy in Relationships (PAIR) (Schaefer & Olson, 1981), and the Hassles and Uplift Scale (Lazarus & Folkman, 1989) were administered. The results showed that daily stress was inversely associated with marital quality for males and females, and intimacy was found to mediate the relationship between stress and marital quality for husbands and wives.

There are few empirical studies on intimacy as a mediating factor of life-event stress. Weiss (1979) examined 171 single and married men for intimacy as a mediating factor and found that intimacy did act as a buffer for stress. He found, however, that there is a certain limit on the

levels of stress that can be mediated. Krause and Borawski-Clark (1994) examined the effect of social support on stress. Their results showed that emotional support helped individuals to cope with certain types of stress. There is agreement on the essential nature of intimacy, but there are many different views on the conceptualisation of intimacy (Harper & Elliot, 1988). This study will measure intimacy with the Personal Assessment of Intimacy in Relationships (PAIR) scale and use the definition proposed by Schaefer and Olson (1981). Intimacy is defined as the process of sharing intimate experiences (sharing and feelings of closeness) in five key areas. The key areas are emotional, social, sexual, intellectual, and recreational intimacy.

3.3.4 Level of marital adjustment

There are many definitions of marital adjustment, while the terms adjustment, functioning, quality and satisfaction are often used interchangeably (White, Stahmann, & Furrow, 1994). For the purpose of this study, the Spanier's (1976) definition is used, which defines marital adjustment as satisfaction with the marital relationship and spouse: while marital satisfaction, dyadic cohesion, dyadic consensus and affectional expression are all indicators of marital adjustment. Studies that use terms other than marital adjustment will also be reviewed, as they examined the same basic construct. There are three different categories of research findings on the relationship between the experience of infertility and marital adjustment: those that find no relationship, those that find a positive relationship, and those that find a negative relationship.

Various research studies indicate that the level of marital adjustment of couples undergoing infertility treatment remained at a stable, normal level throughout treatment, in comparison to standardised norms or fertile control groups (Burns & Covington, 2006; Connolly et al., 1992; Greil, 1997; Leiblum et al., 1998; Sydsjö, Ekholm, Wadsby, Kjellberg, & Sydsjö, 2005). Reporaki et al. (2007) conducted a one-year prospective study among successfully treated ART couples and a control group in which they examined the impact of treatment on the marital satisfaction, dyadic cohesion and dyadic consensus of married couples. The results showed no significant differences in dyadic cohesion and marital satisfaction between the experimental and control groups. Furthermore, many unsuccessful treatment attempts at pregnancy were related to good dyadic consensus and dyadic cohesion among ART women (Reporaki et al., 2007).

Holter et al. (2006) conducted a prospective, longitudinal study of 117 infertile couples. The authors assessed the couples' short-term emotional responses and views of their marital relationship following their first IVF treatment. Questionnaires were administered before, during and after treatment. The participants' marital relationship was assessed by two questions that asked directly if the individual felt that infertility had had a problematic influence on their

marriage and how communication had been influenced. More men than women reported that infertility had led to difficulties in their marriage before and during treatment. A majority of the participants reported that their marriages had improved before (statistically significant) and during IVF treatment (borderline statistically significant). No significant differences were found between the control and experimental groups after treatment.

The majority of studies focused on women's experiences of infertility. Dyer et al. (2004) examined men's experiences of infertility. Semi-structured, in-depth interviews were conducted with 27 infertile men. Most of the men in the study reported that they had a good and loving relationship, consistent with some studies that show no negative impact of infertility on the relationship, while some of the men reported that infertility led to arguments in their marriage. Four participants said their marriages were being influenced negatively: 'taking strain' or 'getting stale'. No participants, however, reported that their relationship might be threatened by infertility to the extent that they would consider separation and/or divorce. When questioned about the impact of infertility in general terms, and not referring to their own relationship, many men thought that it could have detrimental influences, such as divorce and domestic violence, alcohol or drug abuse, or extra-marital affairs (Dyer et al., 2004, p. 963). This study thus shows different viewpoints, yet the majority of men argued for no significant influence of infertility on their own relationship.

On the other hand, many research studies indicate a significant deterioration in the functioning of different areas of the marital relationship (Burns & Covington, 2006). There are many studies suggesting that fertility-problem stress may have a harmful influence on the marital functioning and life quality of infertile couples (Dunkel-Schetter & Lobel, 1991; Elstein, in Benazon et al., 1992; Rosenfeld, in Andrews et al., 1991). It has been indicated that infertility can result in higher levels of marital dissatisfaction (Bringhetti, Martinelli, Ardenti, & La Sala, 1997; Daniluk, 1988; Hirsch & Hirsch, 1989; Link & Darling, 1986; Verhaak, in Schmidt et al., 2005), marital difficulties, distress and higher marital conflict (Berg & Wilson, 1991; Connolly et al., 1992; McEwan et al., 1987). A negative impact on marital adjustment has also been found by some studies (Bell; Lalos, Lalos, Jacobssen, & Van Schoultz; Link & Darling; all cited in Ulbrich et al., 1990).

Ulbrich et al. (1990) assessed the marital adjustment of 103 couples undergoing infertility treatment (any type of treatment) using the Dyadic Adjustment Scale (Spanier, 1976). The Fertility Problem Inventory (Newton et al., 1999) was used to measure infertility-related stress. The results revealed that an acceptance of a childless lifestyle was significantly related to better

marital adjustment for husbands. Higher infertility-related stress levels had a detrimental influence on marital adjustment for both husbands and wives. Women experienced significantly higher levels of infertility-related stress than their male counterparts, while their stress scores were inversely related to satisfaction, consensus and affectional expression.

Newton et al. (1999) conducted a study (n = 1 153 women; n = 1 149 men) in which participants completed the Fertility Problem Inventory (FPI), measuring infertility-related stress. The authors found a significant correlation between the FPI and marital adjustment, as measured by the Dyadic Adjustment Scale (DAS). Men and women who scored high on the Global stress scale showed lower levels of marital adjustment. Also, the Relationship and Sexual Concern subscales of the FPI predicted difficulties with marital adjustment better than all other subscales of the FPI (Newton et al., 1999).

A longitudinal study was conducted to examine the influence of infertility on marital functioning over time (Benazon et al., 1992). A total of 165 couples completed questionnaires that assessed stress, sexual satisfaction, and marital adjustment. Stress was measured with the Psychological State of Stress questionnaire (PSS) (Lemyre & Tessier, 1988); sexual satisfaction with the Index of Sexual Satisfaction (ISS) (Hudson, Harrison, & Crosscup, 1981); and marital adjustment with the Dyadic Adjustment Scale (DAS) (Spanier, 1976). The participants were divided into groups that achieved pregnancy during the study and those that failed to achieve pregnancy. The results indicated that stress levels in the group that failed to fall pregnant increased significantly, while marital functioning decreased significantly. Moreover, marital distress increased in couples who did not achieve pregnancy.

Monga et al. (2004) examined the hypothesis that infertility might be associated with a deterioration in quality of life and an increase in marital discord and sexual dysfunction. Couples receiving infertility treatment were administered the Quality of Well-Being Scale (QWB) (Kaplan, Ganiats, Rosen, Sieber, & Anderson, 1995) to measure quality of life, and the Locke-Wallace Marital Adjustment Test (LWMAS) (Locke & Wallace, 1959) to measure marital adjustment. The Brief Index of Sexual Functioning for Women (BSIF-W) (Rosen, Taylor, Leiblum, & Bachman, 1993) and the International Index of Erectile Function (IIEF-5) (Rosen et al., 1997) for men were administered to measure the sexual relationship. A control group of couples presenting for elective sterilisation was used. The results showed that 83% of all couples felt pressure from society to have children. Marital adjustment was significantly lower ($p = .01$) for women in the infertile couples compared to women in the control group. No difference in marital adjustment was found in infertile men compared to the control group. Women showed a

trend toward lower quality of life, yet once again no difference in quality of life was reported for the infertile men.

Finally, many research studies have found improved marital satisfaction and marital communication during the experience of infertility: some studies suggest that couples may become closer and their marriages strengthened by infertility (Daniluk, 2001; Greil, Leitko, & Porter, 1988; Schmidt, 1996; Tjornhoj-Thomsen, 1999; Van Keep & Schmidt-Elmendorf, in Benazon et al., 1992). Some studies of couples receiving IVF treatment showed that infertile participants reported similar or increased marital adjustment and satisfaction when compared to the control group (Hearn et al.; Mazure & Greenfeld; Weaver et al.; all cited in Monga et al., 2004).

Schmidt et al. (2005) have proposed the concept of "marital benefit" – the experience that infertility has strengthened the marriage and brought partners closer together. These authors conducted a prospective cohort design study (N = 2250). Research questions developed by the authors were used to investigate marital benefit, communication, and the coping strategies of participants. The same constructs were measured at the beginning of fertility treatment and at a 12-month follow-up. The results indicated that 25.9% of the women and 21.1% of the men experienced high marital benefit (defined as a positive influence of infertility and not as a rating of satisfaction with the marriage). The authors of this study concluded that many infertile individuals and couples experience a positive influence of infertility on their marital relationships.

Daniluk (2001) conducted a qualitative study among infertile couples who had decided to take a break from trying to conceive. These couples reported that they had an increased ability to acknowledge all the positive aspects of their lives after having gone through the experience of infertility. The participants reported that the experience forced them to talk about life and their emotions concerning infertility. They also learned, as a couple, how to cope with and manage stressful situations. The majority of the couples in similar qualitative studies reported that infertility had made their marriages stronger and had increased their mutual connection as a couple (Daniluk, 2001; Greil et al., 1988; Schmidt, 1996; Tjornhoj-Thomson, 1999). In a study by Hjelmstedt et al. (1999), both men and women reported that their relationship had improved during their experience of infertility, and that the reason for this improvement was that infertility resulted in a closer relationship with higher emotional intimacy. Few quantitative studies have examined the concept of marital benefit.

3.4 Conclusion

This chapter provided a comprehensive overview of the existing literature on all the key constructs that are applicable to the present research. The large prevalence and significance of infertility as a potential life stressor was highlighted. Furthermore, numerous studies reported a deterioration in specific aspects of the marital relationship of couples experiencing high levels of infertility-related stress: decreased quality of communication, more problems in the sexual relationship, a detrimental effect on perceived intimacy and overall marital adjustment (Greil, 1997; Lalos; Mahlstedt; Möller & Fallstrom; Wirtberg; all cited in Holter et al., 2006; Newton, Sherrard, & Glavac, 1999; Schmidt et al., 2005). It was also shown, among others, that a high level of congruence in spouses' perceptions of infertility-related stress can protect the marital relationship. Such an overview of the literature, which often suggests the potentially devastating impact of infertility-related stress on the marital well-being of couples, emphasises the great importance of a better understanding of infertility, infertility-related stress and its mediating factors when trying to improve the psychological management of infertility and, ultimately the lives of couples and individuals experiencing infertility.

Chapter Four covers the research methodology that was employed in the present study.

CHAPTER 4

METHODOLOGY

4.1 Introduction

As discussed in Chapter Three, the experience of infertility and the accompanying infertility-related stress have been proposed to influence the marital relationship of infertile couples in numerous possible ways, with many studies indicating a deterioration in different aspects of the marital relationship, including marital adjustment, communication and sexual activity (Benazon et al., 1992; Burns & Covington, 2006; Eunpu, 1995; Lalos, Lalos, Jacobssen, & Van Schoultz, cited in Ulbrich et al., 1990; Link & Darling, 1986). The present study primarily examined the nature of the relationship between the level of infertility-related stress, as experienced by infertile couples at the onset of different types of infertility treatment,[1] and four specific aspects of the marital relationship.[2] The research constructs that were measured in the study were thus: infertility-related stress, quality of communication, satisfaction with the sexual relationship, perceived intimacy, and marital adjustment.

This chapter will cover the research methodology employed in the study: a formulation of the research problem and questions; an overview of the research design; the identification of participants and the demographic characteristics of the sample; an elaboration of the measuring instruments; a description of the procedures for data collection; ethical considerations; and, finally, the methods of data analysis.

4.2 Problem formulation and research questions

Research studies on the potential influence of infertility and infertility-related stress on the marital relationship of infertile couples have shown divergent results. Furthermore, very few studies have addressed whether the different medical types of infertility treatment may vary in their level of stressfulness, and whether the marital relationship of couples may differ at the onset of different treatment cycles. The purpose of this study was thus to address and explore these uncertainties in the field of infertility research and to provide a baseline profile of the marital relationship of couples experiencing infertility. The main research questions of the present study are:

---

[1] Different types of infertility treatment: ovulation induction (OI), intrauterine insemination (IUI), in vitro fertilisation (IVF) and/or intra-cytoplasmic sperm injection (ICSI). For a detailed description see Chapter 1.

[2] Specific aspects of the marital relationship: quality of communication, satisfaction with the sexual relationship, perceived intimacy, and marital adjustment.

(i) What is the nature of the relationship between the level of infertility-related stress, experienced by the husbands and wives in infertile couples, and the quality of communication in the marriage?

(ii) What is the nature of the relationship between the level of infertility-related stress, experienced by the husbands and wives in infertile couples, and the level of satisfaction with the sexual relationship?

(iii) What is the nature of the relationship between the level of infertility-related stress, experienced by the husbands and wives in infertile couples, and the level of perceived intimacy in the marriage?

(iv) What is the nature of the relationship between the level of infertility-related stress, experienced by the husbands and wives in infertile couples, and the level of marital adjustment?

(v) Are there significant differences in the quality of marital communication between infertile couples at the onset of different types of infertility treatment, and a pregnant control group?

(vi) Are there significant differences in the level of satisfaction with the sexual relationship between infertile couples at the onset of different types of infertility treatment, and a pregnant control group?

(vii) Are there significant differences in the level of perceived intimacy between infertile couples at the onset of different types of infertility treatment, and a pregnant control group?

(viii) Are there significant differences in the level of marital adjustment between infertile couples at the onset of different types of infertility treatment, and a pregnant control group?

(ix) Are there significant differences in the level of infertility-related stress between three groups of infertile couples at the onset of different types of infertility treatment?

(x) What is the nature of the relationship between the level of congruence between husbands and wives in their experience of infertility-related stress, and specific aspects of the marital relationship?

4.3 Research design

This baseline study made use of a quantitative, cross-sectional survey design. Once-off assessments were made of four research groups by means of the administration of research questionnaires. The four groups consist of three groups at the onset of different types of infertility treatment (hereafter referred to as treatment groups) and one pregnant control group:

(i) infertile couples at the onset of ovulation induction (OI), (ii) infertile couples at the onset of intrauterine insemination (IUI), (iii) infertile couples at the onset of in vitro fertilisation (IVF) or intra-cytoplasmic sperm injection (ICSI), and (iv) couples presenting for normal pregnancies. It should be noted that the reference to a control and treatment groups should not be confused with an experimental design. The present study followed an exploratory, quasi-experimental research design. The present study was a collaborative research project: while this part of the joint research study focuses on the marital relationship at family level, the other project focuses on the potential influence of infertility at the individual level. The same participants took part in both studies, thus data collection was conducted simultaneously. The quantitative measuring instruments used in the present study will be described comprehensively in Section 5.5 below.

4.4 Participants

4.4.1 Sampling strategy

A purposive sampling strategy was used to obtain a sample of infertility patients, serving as the treatment group, and a sample of pregnant patients, representing the fertile control group. Purposive sampling is a non-probability sampling strategy in which participants from a pre-specified group are purposively sought out and sampled (Trochim, 2000). Thus, participants have to meet the inclusion criteria for being in the sample. Potential participants were approached at two infertility clinics in the Western Cape, South Africa.

4.4.2 Inclusion criteria

For the three treatment groups the inclusion criteria were as follows: (i) the couple had to be at the onset of either ovulation induction (OI), intrauterine insemination (IUI), in vitro fertilisation (IVF), or intra-cytoplasmic sperm injection (ICSI) treatment at the infertility clinic, (ii) the couple had to be married, and (iii) the couple had to be heterosexual. The inclusion criteria for the pregnant control group were: (i) the couple had never made use of infertility treatment before and was presenting for a normal pregnancy, (ii) the couple had to be married, and (iii) the couple had to be heterosexual.

4.4.3 Demographic profile of participants

Response analysis revealed that, of the 204 potential participants who were approached for participation in this study, 116 agreed to participate (57% response rate). Table 1 provides a summary of the response rate for the treatment and control groups. It should be noted that, whilst it appears that the males' response rates are higher than the females' response rates, this is not necessarily the case. The reason is that predominantly wives were contacted to participate and not husbands. For this reason it might appear that the males' response rates are higher than the

females', yet the majority of the wives who were contacted took part in the study, while their male counterparts declined participation.

Table 1

Response Rate of Participants: Treatment and Control Groups (N = 116)

	Total sample			***Response rate (%)***		
	Women	*Men*	*Total*	*Women*	*Men*	*Total*
Treatment group (total)						
Handed out/E-mailed	145	30	175			
Received, completed fully	63	25	88	43 %	83 %	50 %
Withdrew	82	5	87			
Treatment group (breakdown)						
Treatment group (OI)						
Received, completed fully	19	8	27	N/A	N/A	N/A
Treatment group (IUI)						
Received, completed fully	26	11	37	N/A	N/A	N/A
Treatment group (IVF/ICSI)						
Received, completed fully	18	6	24	N/A	N/A	N/A
Control group						
Handed out/E-mailed	59	10	69			
Received, completed fully	21	7	28	36 %	70 %	41 %
Withdrew	40	1	41			

Note. Sample included 84 women and 32 men.

It can be seen in Table 1 that the total response rate was very low (thus a high attrition rate). The reasons provided for not participating were predominantly lack of time (especially from the men's viewpoints), with an additional sentiment being expressed that having to answer questions about one's fertility problem may be uncomfortable and may lead to undesirable emotions and pain that could otherwise be avoided. Some participants felt that their infertility was a very personal and private experience not to be shared with anyone, regardless of the assurance that the present study was anonymous.

A breakdown of the number of participants in each group is provided in Table 1. The total sample of the present study consisted of 116 participants (N = 116). In the pregnant control group, 28 participants (males and females counted together) completed the research measures. In the three treatment groups combined, 88 participants completed the research questionnaires: 27 participants in the OI group, 37 participants in the IUI group, and 24 participants in the IVF/ICSI group (males and females counted together).

The mean ages of the participants are shown in Table 2.

Table 2

Basic Demographic Information of Participants (N = 116)

Variables	Women n = 84	Men n = 32
Mean age	33	36
Standard deviation	4.12	4.83
Age range	25-42	29-46

As illustrated in Table 2, the mean age of the women (n = 84) in the study was 33 years (range 25 to 42, SD 4.12) and the mean age of the men (n = 32) was 36 years (range 29 to 46, SD 4.83). As would be expected due to the advanced nature of IVF treatment and the fact that the OI and IUI treatments has to be used before being able to move on to IVF treatment, a significant difference ($p < .05$) was found in the mean age between the IVF group and control group [$F (3, 80) = 3.2482$, $p = .03$]. An increase in mean age was found for women undergoing IVF treatment ($\bar{x} = 35$, $p < .05$) when compared to women in the control group ($\bar{x} = 31$).

With regard to the status of the relationship of the participants (N = 116), 95% of the women were married, the present marriage being their first marriage; 2% of women were married, having been married previously; and the remaining 2% of the women were in an intimate relationship and living together. Of the men in the total sample, 97% reported being married, it being their first marriage, while the remaining 3% were married, having been married previously. Additional demographic information, such as type of work (full-time, part-time, flexi hours, homemaker or other) and type of qualification (high school, diploma or degree), was collected and is summarised in Table 3.

Table 3

Additional Demographic Information of Participants (N = 116)

	Women (n = 84)		Men (n = 32)	
	Number	**Percentage (%)**	**Number**	**Percentage (%)**
Nature of work				
Full-time	57	68	29	91
Part-time	17	20	2	6
Homemaker	8	10	None	None
Flexi hours	2	2	None	None
Other	0	None	1	3
Qualification				
High school	12	14	6	19
Diploma	32	38	8	25
Degree	40	48	18	56
Ethnic group				
White	79	94	31	97
Coloured	5	6	1	3
Black	None	None	None	None
Other	None	None	None	None
Home language				
Afrikaans	73	87	24	75
English	8	10	7	22
Afrikaans/English	3	4	None	None
German	None	None	1	3
Other	None	None	None	None

As can be seen in Table 3, the majority of women in the study (68%) are employed full-time, while 20% work part-time and 10% are homemakers. The majority of men in the study (91%) are employed full-time. Approximately half of the women in the study (48%) obtained a degree at a tertiary institution, while 38% are in possession of a diploma and 12% completed high school. Of the men in the study, more than half are in possession of a degree (56%), while 25% have a diploma and 19% completed high school. The majority of the women (94%) and men (97%) were White, while the remainder of the sample consisted of Coloured participants. The majority of women (87%) and men (75%) were Afrikaans-speaking, while the remainder of the sample was English-speaking. The sample thus represents a highly educated, predominantly White and Afrikaans-speaking group of participants. This homogeneous sample can perhaps be

ascribed to expensive infertility treatments being more accessible to couples from a higher socio-economic background.

Important demographic data on the infertility status of the participants – namely the mean length of the marriage, the mean duration of infertility, and a breakdown of infertility into either primary or secondary infertility – are reported for the women (n = 84) in the control group and all three treatment groups (OI, IUI and IVF/ICSI) separately. Primary infertility is diagnosed when a couple has no children, either from a present or previous relationship or marriage. When diagnosed with secondary infertility, the individual or couple has a child or children, either from a present or previous relationship or marriage. These data can be viewed in Table 4.

Table 4

Additional Demographic Information of Female Participants (n = 84)

	Women (n = 84)				
Variables	Control (n = 19)	OI (n = 20)	IUI (n = 27)	IVF/ICSI (n = 18)	Total treatment %
Mean length of marriage (years)	5.01	5.74	6.30	10.19	N/A
Standard deviation	2.73	4.11	3.68	6.33	N/A
Mean duration of infertility (months)	N/A	21.00	38.50	52.50	N/A
Standard deviation	N/A	16.66	24.71	36.42	N/A
Primary infertility (%)	N/A	67 %	84 %	78 %	76 %
Secondary infertility (%)	N/A	33 %	16 %	22 %	24 %

Note. Only the results for the women (n = 84) are reported.

It is important to note that, as seen in Table 4, only the demographic results for females in the study (n = 84) are reported. This is done in order to prevent duplication of data, because all the males (n = 32) in this study are husbands of a subset of 32 women in the sample. The mean length of the marriage, mean duration of infertility and primary or secondary infertility status are the same for a husband and wife, due to its shared nature. Thus, if the men's scores for these demographic variables were included, an inaccurate view would have been obtained. The mean length of marriage for the women in the control group and each treatment group can be seen in Table 4. As would be expected, a significant difference ($p < .01$) was found in the mean length of the marriage between the IVF participants and the OI, IUI and control participants [$F (3, 79) = 5.30$]. The IVF participants showed a significantly higher mean length of marriage (10 years)

than the other three groups (control group five years, OI and IUI groups both six years). The mean duration of infertility for the IVF group ($\bar{x}$ = 52.50, SE = 9.10) was significantly higher ($p < .01$) than the mean duration of infertility for the OI group ($\bar{x}$ = 21, SE = 4.30) and IUI group (x = 38.50, SE = 5.04, F (2,52) = 5.29460). Furthermore, it can be seen in Table 4 that the majority of the participants had been diagnosed with primary infertility (76% of the women), and that the remaining 24% of the participants had secondary infertility.

4.5 Measuring instruments

The following measuring instruments were administered in order to measure specific aspects of the marital relationship: the Fertility Problem Inventory (FPI), the Communication subscale of the Enriching and Nurturing Relationship Issues, Communication and Happiness (ENRICH) Scale, the Dyadic Adjustment Scale (DAS), the Index of Sexual Satisfaction (ISS), and the Personal Assessment of Intimacy in Intimate Relationships (PAIR) Scale.[3] The Afrikaans translations of all these research questionnaires were done professionally, using the back-translation method. The questionnaires were available to the participants in either English or Afrikaans, according to their language of preference. These questionnaires will be discussed in this section. Please note that a comparison of the standardised reliabilities of all the measuring instruments and reliabilities as obtained in the present sample is presented in Table 5 (page 52).

4.5.1 The Fertility Problem Inventory (See Appendix A)

The Fertility Problem Inventory (FPI), developed by Newton et al. (1999), was employed to assess the **level of perceived infertility-related stress** each spouse in the couple is experiencing individually. The FPI measures distress, beliefs and attitudes related to infertility. This 46-item, infertility-specific inventory is scored using a six-point Likert scale (Strongly disagree = 1, Disagree = 2, Disagree somewhat = 3, Agree somewhat = 4, Agree = 5, Strongly agree = 6). In the context of the present study, the FPI was administered only to the treatment groups, as it is an infertility-specific inventory and thus was not applicable to the pregnant control group.

The FPI measures both global infertility-related stress and psychological stress (a global stress score is calculated by summing all 46 items), as well as five types of specific infertility-related stresses (measured by five subscales): Social concern, Sexual concern, Relationship concern, Rejection of a childfree lifestyle, and the Need for parenthood. Higher scores on the social

[3] A discussion of measuring instruments and the results of the study will be done in the following sequence consistently: FPI (levels of infertility-related stress/congruence between partners' experiences of infertility-related stress), ENRICH (quality of marital communication), ISS (levels of satisfaction with sexual relationship), PAIR (intimacy in the marriage/relationship), and DAS (level of marital/relationship adjustment).

concern subscale are indicative of a higher sensitivity to societal comments, reminders and questions about infertility, feelings of isolation or alienation from family and/or peers, and finding social activities difficult due to infertility (Peterson et al., 2003). A high score on the sexual concern subscale suggests decreased enjoyment of sexual relations, diminished sexual self-esteem, and feelings of pressure to schedule sex. Higher scores on the relationship concern subscale are indicative of troubles with openly discussing infertility with one's spouse, and uncertainty about the future of the relationship or marriage. A high score on the rejection of a childfree lifestyle subscale indicates a view that one's future happiness or success is dependent on having a child (or another child) and that one experiences difficulty in perceiving other roles as fulfilling. Lastly, higher scores on the need for parenthood subscale suggest a close identification with parenthood and a view of parenthood as a necessary and main goal of life (Peterson et al., 2003). Subscale scores are derived by summing the raw scores for the items in each subscale. All five subscale scores can be summed to give a total score that provides a global indication of perceived infertility-related stress (Newton et al., 1999). Higher scores on both the individual subscales and on the global scale correlate with higher levels of infertility-related stress (Newton et al., 1999).

Previous research has demonstrated that the five subscales and the global scale of the FPI show moderate to high internal consistency, as can be seen from the following reliability (Cronbach's alpha) scores: Social concern (.87), Sexual concern (.77), Relationship concern (.82), Rejection of a childfree lifestyle (.80), Need for parenthood (.84), and Global stress (.93) (Newton et al., 1999). Test-retest reliability statistics for the global stress scale, after a 30-day interval, are very good: for women, Cronbach's alpha = .83, and for men Cronbach's alpha = .84. The FPI shows good convergent validity with the Dyadic Adjustment Scale (Newton et al., 1999), a scale that was also employed in the present study. In this study, the Cronbach's alphas suggest moderate to high internal consistency: Social concern (.79), Sexual concern (.81), Relationship concern (.83), Rejection of a childfree lifestyle (.86), Need for parenthood (.76), and Global stress (.75).

Apart from measuring the level of infertility-related stress as experienced by the participants, the **congruence between the partners' experiences of infertility-related stress** can also be determined by using the FPI scores. In this study, congruence refers to a couple's level of agreement regarding their perceptions of the severity of infertility-related stress. A couple with high congruence in their experience of infertility-related stress will thus perceive the severity of the stressor similarly, whereas in a couple with little congruence one member might perceive the stressor more intensely than his or her partner. Couple differences regarding these perceptions allow for the assessment of the relationship between couple congruence and individual outcomes

of marital satisfaction, communication, intimacy and adjustment. Congruence in the experience of infertility-related stress can be calculated as follows. A difference score on the FPI is calculated for each couple: each female's global and subscale scores are then subtracted from her male partner's global and subscale scores and the difference is converted to an absolute value (Larsen & Olson, in Peterson et al., 2003). This absolute value is an indication of the level of congruence between the partners, with higher difference scores indicating lower congruence and vice versa.

4.5.2 The Enriching and Nurturing Relationship Issues, Communication and Happiness Scale: Communication Subscale (See Appendix A)

The Enriching and Nurturing Relationship Issues, Communication and Happiness (ENRICH) scale consists of twelve subscales dealing with different areas of the marital relationship (developed by Olson, Fournier, & Druckman, 1983). Each subscale consists of ten items measured on a five-point Likert scale (Strongly disagree = 1, Disagree = 2, Undecided = 3, Agree = 4, Strongly agree = 5). In the present study, the communication subscale of ENRICH was employed to assess the **quality of communication** as perceived by each spouse in the marriage. This ten-item subscale is designed to assess the feelings, attitudes and beliefs of each individual concerning communication in the marital relationship. Higher scores on the communication subscale of ENRICH indicate higher satisfaction with the communication in the marital relationship, while lower scores indicate less satisfaction with the quality and type of communication in the marital relationship (Olson et al., 1983a).

Previous research has shown that the communication subscale has a very high test-retest reliability of .90 and a high internal consistency (Cronbach's alpha = .82) (Fowers & Olson, 1989). Furthermore, this subscale shows a significant correlation with the Locke-Wallace Marital Adjustment Scale (Fowers & Olson, 1989). In this study, the Cronbach's alpha for the communication subscale indicates high internal consistency (.87).

4.5.3 The Index of Sexual Satisfaction (See Appendix A)

The revised version of the Index of Sexual Satisfaction (ISS), developed by Hudson, Harrison, & Crosscup (1981) was utilised to measure the **satisfaction of each individual in the couple with their sexual relationship**. The ISS evaluates problems with sexual satisfaction and the level of satisfaction with the expression of affection and sexuality in the marital relationship. The ISS is a 25-item scale measured on a seven-point Likert scale (Never = 1, Very rarely = 2, A little of the time = 3, Some of the time = 4, A good part of the time = 5, Most of the time = 6, Always = 7). Higher scores on the ISS indicate a greater magnitude or severity of problems and thus less

satisfaction with the sexual relationship, while lower scores indicate fewer problems and thus better satisfaction with the sexual relationship (Fischer & Corcoran, 2007).

In previous studies the ISS has shown excellent internal consistency with a Cronbach's alpha coefficient of .92 (Fischer & Corcoran, 2007). The measure also shows excellent short-term stability and has a two-hour test-retest correlation of .94 (Fischer & Corcoran, 2007). The ISS has been shown to have excellent construct validity – it correlates poorly with measures with which it should not correlate, while it correlates highly with various measures with which it should correlate, such as measures of marital satisfaction. The concurrent validity of the ISS is also excellent, as it correlates significantly with the Index of Marital Satisfaction and the Locke-Wallace Marital Adjustment Scale (Fischer & Corcoran, 2007). In this study, excellent internal consistency was found, with a Cronbach's alpha of .93.

4.5.4 The Personal Assessment of Intimacy in Relationships (See Appendix A)

The Personal Assessment of Intimacy in Relationships (PAIR), developed by Schaefer and Olson (1981), was used to assess **the level of intimacy in the marital relationship** as perceived by each member of the couple. PAIR consists of five subscales focusing on different types of intimacy, while a global score for perceived intimacy can also be obtained by summing all items. The five types of intimacy in intimate dyadic relationships as measured by the subscales of PAIR are emotional, social, sexual, recreational and intellectual intimacy. Definitions of the five types of intimacy are as follows (Olson, in Schaefer & Olson, 1981). Emotional intimacy refers to feelings of closeness and being able to share feelings and thoughts freely in a non-defensive environment in which there is supportiveness and understanding. Social intimacy can be defined as having common friends and a supportive social network. Sexual intimacy refers to receiving and sharing affection, physical touch and closeness, and/or sexual activity. Recreational intimacy can be described as shared experiences of outside interests, such as mutual participation in sporting events and/or hobbies. Intellectual intimacy refers to the experience of sharing ideas (Olson, in Schaefer & Olson, 1981). A conventionality scale is also included in the PAIR inventory (Edmonds; Edmonds, Withers, & Dibatista; all cited in Greeff & Malherbe, 2001). Marital conventionality is defined as the extent to which married couples assess their marriage in terms of social acceptability (Edmonds et al., cited in Greeff & Malherbe, 2001). A higher conventionality score indicates that the individual has answered questions in a socially desirable way – thus indicating that an individual is pretending to be good (faking), with a tendency to idealise the relationship.

A five-point Likert scale is used to measure the level of intimacy (Strongly Disagree = 0, Disagree = 1, Neutral = 2, Agree = 3, Strongly Agree = 4). PAIR is a 72-item instrument, divided into two 36-item scales. One set of the 36 items measures the perceived (actual) level of intimacy, and the other measures the expected (ideal) level. The difference between the perceived and expected descriptions of intimacy provides an indirect assessment of satisfaction in each of these areas and thus illustrates the extent to which the individual is satisfied with his/her current relationship. For the purpose of the present study, however, only the perceived (actual) level of intimacy was measured, since a direct measurement of marital satisfaction was obtained with the Dyadic Adjustment Scale (DAS). Higher scores on the PAIR measurement indicate a higher level of perceived intimacy in the marital relationship, and vice versa (Fischer & Corcoran, 2007).

PAIR shows good internal consistency, as suggested by previous studies. The Cronbach's alpha reliability scores of each subscale are as follows: Emotional intimacy (.75), Sexual intimacy (.77), Social intimacy (.71), Recreational intimacy (.70), Intellectual intimacy (.70), Conventionality (.80), and Global intimacy (.70). In this study, fair to excellent internal consistency was found: Emotional intimacy (.78), Sexual intimacy (.83), Social intimacy (.61), Recreational intimacy (.77), Intellectual intimacy (.76), and Global intimacy (.87). The conventionality subscale has a Cronbach's alpha of .81.

4.5.5 The Dyadic Adjustment Scale (See Appendix A)

In order to assess each spouse's perception of **marital or dyadic adjustment**, the Dyadic Adjustment Scale (DAS) was administered. This 32-item scale, developed by Spanier (1976), measures the quality of adjustment to marriage and similar dyadic relationships, and is also a general measure of overall marital satisfaction (Fischer & Corcoran, 2007). Dyadic adjustment can be defined as a process that moves along a continuum – this process of adjustment can be evaluated according to its relationship to good or poor adjustment (Spanier, 1976). According to this definition, adjustment is an ever-changing process that can be assessed at any point in time on a continuum ranging from well adjusted to maladjusted (Spanier, 1976). Four subscale scores can be obtained with the DAS, as well as a global score of dyadic adjustment. The four subscales, empirically verified as aspects of dyadic adjustment, are: dyadic satisfaction – satisfaction with the dyadic relationship (DS); dyadic consensus – consensus on matters of importance to dyadic functioning (Dcon); dyadic cohesion – level of cohesion between partners (Dcoh); and affectional expression – extent to which affection and emotions are expressed (AE). A combination of Likert-type and Yes or No scale responses is incorporated in the subscales.

Total scores of 100 or above, thus higher scores, indicate well-adjusted marital relationships (Fischer & Corcoran, 2007).

The DAS is viewed by many as one of the most effective measures of marital adjustment (Peterson et al., 2006) and has been used widely in the marital literature (Benazon et al., 1992; Ulbrich et al., 1990). The DAS shows good content, criterion-related and construct validity (Spanier, in Levin et al., 1997). The measure demonstrates high internal consistency: Cronbach's alpha = .96 for the global scale of dyadic adjustment (Fischer & Corcoran, 2007; Spanier, 1976; Stuart, in Peterson et al., 2006). In previous studies the subscales showed fair to excellent internal consistency with the following Cronbach's alphas: Dyadic satisfaction (.94), Dyadic consensus (.90), Dyadic cohesion (.81), and Affectional expression (.73) (Spanier, 1976). In this sample, moderate to high internal consistency was found: Dyadic satisfaction (.81), Dyadic consensus (.89), Dyadic cohesion (.77), Affectional expression (.64), and Global adjustment (.71). The concurrent and predictive validity of the DAS have been proven by many studies and lower scores on the DAS are associated with a higher probability for poor communication and higher levels of depression (Stuart, in Peterson et al., 2006). The DAS correlates excellently with the FPI, a measuring instrument that is also used in this study (Newton et al., 1999).

4.5.6 Biographical questionnaire (See Appendix A)

A self-report biographical questionnaire was designed by the researcher and administered to obtain important biographical information of each individual partner/participant, namely age, gender, level of education, socio-economic status and length of the couple's marriage. The questionnaire also measured socio-demographic information that directly concerns the infertility of the couple, using the following questions: (i) Does the male or female have previous children (either from the present or from a previous marriage(s)/relationship(s)?; (ii) If there have been previous children, how many and were they conceived naturally, conceived through assisted reproduction, fostered or adopted?; (iii) If there have been previous children, are they staying with the infertile couple? This biographical questionnaire was adapted for use with the fertile control group as well.

Table 5 provides a summary of the number of items, the meaning of the scores and the Cronbach reliabilities of all research questionnaires that were utilised in the present study.

Table 5

Summary of Questionnaires Utilised in the Present Study: Internal Reliabilities

Questionnaire	Number of items	High score indicates	Cronbach's alpha	
			Previous studies	Present study
1. FPI infertility-related stress scale (global)	46	High level of stress	.93	.75
Social concern subscale	10		.87	.79
Sexual concern subscale	8		.77	.81
Relationship concern subscale	10		.82	.83
Rejection of childfree lifestyle subscale	8		.80	.86
Need for parenthood subscale	10		.84	.76
Global infertility-related stress scale	46		.93	.75
2. ENRICH communication subscale	10	High level of satisfaction with communication	.82	.87
3. DAS marital adjustment scale (global)	32	High level of marital adjustment	.96	.71
Dyadic satisfaction subscale	10		.94	.81
Dyadic consensus subscale	13		.90	.89
Dyadic cohesion subscale	5		.81	.77
Affectional expression subscale	4		.73	.64
Global dyadic adjustment scale	32		.96	.71
4. ISS sexual satisfaction scale	25	Low level of satisfaction with sexual relationship	.92	.93
5. PAIR intimacy scale (global)	36	High level of perceived intimacy	.70	.87
Emotional intimacy subscale	6		.75	.78
Sexual intimacy subscale	6		.77	.83
Social intimacy subscale	6		.71	.61
Recreational intimacy subscale	6		.70	.77
Intellectual intimacy subscale	6		.70	.76
Conventionality subscale	6		.80	.81
Global intimacy scale	36		.70	.87

4.6 Procedure

Ethical clearance for the present study was obtained from Research Sub-Committee A at the University of Stellenbosch. Two infertility specialists in the Western Cape, one in Stellenbosch and the other in Cape Town, gave the researchers permission to approach patients at the respective medical facilities for participation in the study. Both infertility services offer modern infertility treatment, ranging from ovulation induction to more advanced assisted reproductive techniques. Before the commencement of data collection, both researchers (this is a collaborative study) met with the infertility specialists to discuss the research proposal and practical issues regarding the data collection process

4.6.1 Practical data collection

The majority of data was collected at an infertility clinic in Stellenbosch. The procedure for data collection at this infertility clinic followed the following pattern. The researchers sought out eligible patients on the medical database for inclusion in the treatment and control groups respectively. After eligible participants had been identified, they were contacted telephonically to inform them of the research project and to enquire whether they would be interested in participating. The wives of couples receiving infertility treatment were generally contacted, as it was easier to reach them. They would then inform their husbands about the study. This is a limitation of the present study – it is possible that more men might have been recruited if they had been contacted directly. In some cases, potential participants were not informed of the study telephonically, but in person when they were at the clinic for an appointment with the infertility specialist.

It should be noted that two main groups of infertile participants emerged during the data collection phase. The first group was new patients who were presenting at the infertility clinic for the first time and who where starting treatment on ovulation induction. These patients were approached and informed about the study at their first or second meeting with the infertility specialist. The second group was patients who had already undergone infertility treatment (different possible types of treatment) at the clinic, and for whom medical files on their infertility treatment history were already available. Thus, the second group were patients undergoing either IUI, IVF or ICSI treatment. The patients in this group were mostly contacted telephonically, although a few of them were approached personally when they were at the clinic for appointments.

The data collection procedure at the Cape Town clinic was similar to the one at the clinic in Stellenbosch, with the only difference being that the sisters at the clinic in Cape Town assisted in the data collection process. The sisters identified potential participants and provided the researchers with the contact details of couples who were interested in participating in the study. The researchers then followed the same process as described above. In some cases, the researchers informed potential participants at the Cape Town clinic about the study in person.

If patients agreed to participate, they were asked to indicate which method they preferred for receiving the questionnaires. The three options available to them were either to collect the questionnaires at the clinic in Cape Town when they had appointments with the infertility specialist, or to have them e-mailed or posted to them. Ideally the researcher would have preferred to meet with the participants and have them complete the questionnaires at the respective medical facilities – this was also the initial method of collection planned in the proposal of the present study. Unfortunately this was not convenient for most of the participants, and adjustments had to be made. The majority of the participants preferred e-mail communication, as they did not have time to come to the medical offices during the day due to work obligations. In most cases, the researchers had to send reminders to the participants to return the completed questionnaires via e-mail. The majority of the participants completed the questionnaires electronically and e-mailed the saved attachments, while some faxed or scanned the completed questionnaires to the researcher.

A standard e-mail with all the research questionnaires attached was sent out to the participants. Clear guidelines to assist in the answering of the questionnaires were included. The standard e-mail also included a copy of the informed consent form and the rights of the research participants. The relevant questionnaires were attached for the control and treatment groups respectively. All the questionnaires were available in Afrikaans (back-translation technique was used) and English and communication was conducted in the home language of the participant. In the instances where patients did not have readily available Internet access, the questionnaires were posted to their home or work addresses. A small minority of the participants preferred to collect the questionnaires at the medical offices. In these instances, copies of the questionnaires were given to the participants in person and an appointment was made with them to return the completed questionnaires to the researcher, usually at their next appointment with the infertility specialist. A Microsoft Excel sheet was used to keep record of the progress of the data collection process and to facilitate with the tracking and following up of participants throughout the data collection process. It was revised as necessary for the control and treatment groups respectively, and strict confidentiality was maintained.

4.6.2 Ethical considerations

4.6.2.1 Informed consent

It was emphasised to all the participants, either telephonically or in person, that participation was voluntary and that the information the patient shared would be kept confidential and anonymous at all times. Written consent for participation was obtained immediately from all patients who agreed to participate. The informed consent form (See Appendix B) elaborated on the confidentiality measures that would be taken and clearly stated the right of the research participants to withdraw from the study at any time or to refuse to answer questions without suffering any negative consequences. All the participants were handed a copy of the signed informed consent form. The consent form was available in Afrikaans and English.

4.6.2.2 Confidentiality and anonymity

Confidentiality and anonymity were maintained as follows. Each participant was requested to choose and indicate a code name on the biographical questionnaire, from which a list was drawn up to indicate which participant corresponded to which code name. This list and the research questionnaires were kept in strict confidence at the infertility clinic in Stellenbosch. Data was accessible only to members of the research team. Computer data was saved under password-protected files at all times. Furthermore, it was clarified to the participants that the data would only be discussed in terms of groups of participants and average scores on the questionnaires in relation to comparable groups of participants and average scores. Thus, no piece of information collected in the course of the research would in any way be traceable to a particular person or couple.

4.7 Data analysis

4.7.1 Scoring of questionnaires

Once a sufficient number of completed data sets were collected for comparisons to be made between groups, all the data was entered into a Microsoft Excel spreadsheet, since the Statistica statistical analysis programme was used for data analysis purposes (StatSoft, Inc., 2005). Firstly, however, all the questionnaires, including the biographical data, were checked for completeness. This was done throughout the data collection process and incomplete results were followed up with the participants where possible. A double check was also done before commencing with the data input and scoring.

For the scoring of the biographical data, the answers given by the participants were converted to numbers in order to simplify the process of entering data into a Microsoft Excel spreadsheet, as

well as to assist in the statistical analysis of the data. The data of the remaining questionnaires were entered into the Excel spreadsheet according to the formulae established by the respective developers of the questionnaires. The scoring of the Fertility Problem Inventory was done by allocating a number between one and six for each response. The responses to the questions of the communication subscale of the Enriching and Nurturing Relationship Issues, Communication and Happiness Scale were scored by allocating a number from one to five. The Dyadic Adjustment Scale consists of four subscales: dyadic satisfaction, dyadic cohesion, dyadic consensus, and affectional expression. A combination of Likert-type scales and Yes or No responses are used for the DAS. The Index of Sexual Satisfaction was scored by allocating a number of one to seven for each response. Finally, for the Personal Assessment of Intimacy in Relationships Scale, numbers from zero to four were allocated to each response to the questions. After all the data was entered into the Excel spreadsheet, the necessary reverse scoring and processing of data (as indicated by the developers of each respective measure) were completed. Once all the data was entered and processed, the researcher was ready to undertake the statistical analyses of the data.

4.7.2 Statistical Analyses

The statistical package, Statistica (StatSoft, Inc., 2005), was used to analyse the recorded quantitative data. Descriptive results for the present study were obtained by calculating percentages and frequencies, producing sample characteristics that described different aspects, such as the participants' mean age and age range, gender, percentage of primary versus secondary infertility status, and the mean duration of infertility. Additional descriptive results were also obtained, such as socio-economic status, home language, nature of work and ethnic group.

During the overview phase of the data, appropriate tests for normality were performed on the data and it was found to comply with the necessary assumptions of normality. Parametric statistical methods were therefore used in the analysis of the present data. As the current research research questions were non-directional in nature, statistical tests were performed at the two-tailed level.

Reliability calculations (factorial analyses of variance) were conducted to obtain the Cronbach's alphas for each measurement scale used in the present study. Furthermore, Pearson correlation coefficients were calculated to determine the inter-correlations of all the measurement scales. In order to examine the primary research aim, Pearson correlation coefficients were calculated to determine whether there was any significant relationship between the level of infertility-related

stress and the specific aspects of the marital relationship that was measured; that is the quality of communication in the marriage, the level of satisfaction with the sexual relationship, the level of intimacy in the marriage, and the level of marital adjustment. Furthermore, Pearson correlation coefficients were calculated for all possible combinations of the relevant stress and marital relationship variables, not merely for those combinations suggested by the research questions. This was done because all the variables are potentially inter-correlated due to the interdependent nature of the marital relationship variables. Multiple regression analyses were conducted.

In order to examine another research aim, namely whether significant differences exist in specific aspects of the marital relationship between the control group and any of the three treatment groups, a series of analyses of variance (ANOVA) were conducted. ANOVAs were also calculated in order to determine whether significant differences existed in the level of infertility-related stress between the pregnant control group and the treatment groups. In addition, repeated measures ANOVA were calculated to determine whether there were gender differences in both the level of infertility-related stress and specific aspects of the marital relationship.

4.8 Conclusion

The World Health Organization (WHO) has acknowledged the magnitude and significance of infertility as a health issue of global concern, especially in developing countries (Burns & Covington, 2006). The present study aims to provide a baseline profile of the marital relationship of infertile couples, while examining the nature of the relationship between infertility-related stress and specific aspects of the marital relationship. As demonstrated in this chapter, a number of quantitative measures were employed to measure these research constructs. The limitations of the methodology used in the present study are discussed in Chapter Six and recommendations are made for improved scientific rigour. The limitations of the current methodology should be used as a guideline for future studies. It is imperative that future studies continue investigating the impact of infertility-related stress in couples' lives and marital relationships, whether this impact is positive or negative.

The results of the data analyses are presented in Chapter Five.

CHAPTER 5

RESULTS

5.1 Introduction

The research aims and questions of the present study, as well as the measuring instruments used to assess the aims and questions, were discussed in Chapter Four. This chapter will present all the research results. Firstly, and related to the primary aim of the present study, the statistical analysis of the data obtained from the self-report questionnaires revealed how infertility-related stress and four marital relationship variables were correlated. Pearson correlation coefficients and multiple regression results will be presented. Secondly, findings related to the secondary research aims will be presented. The secondary aims examined whether there were significant differences in specific aspects of the marital relationship[1] of infertile husbands and wives at the onset of different types of infertility treatment,[2] and a pregnant control group. In addition, the question was asked whether there were significant differences in the level of infertility-related stress between the treatment groups at the onset of different types of infertility treatment. The results of factorial analyses of variance will also be presented.

5.2 Primary aim

The primary aim of the present research study was to examine the nature of the relationship between the level of perceived infertility-related stress experienced by husbands and wives undergoing infertility treatment, and four specific aspects of the marital relationship.

5.2.1 Pearson correlations

Pearson correlation coefficients were calculated in order to examine the nature of the relationship between infertility-related stress and four specific aspects of the marital relationship (please refer back to research questions (i) to (iv), p. 40). These correlations were calculated for the three treatment groups at the onset of infertility treatment, with both men and women included (n = 88). Due to the infertility-specific nature of the infertility-related stress measure it is only applicable to individuals or couples experiencing infertility, therefore the pregnant control group did not complete this measure. Analyses were conducted using the total group of participants at the onset of infertility treatment, thus the groups at the onset of ovulation induction (OI), intrauterine insemination (IUI), and in vitro fertilization (IVF) or intra-cytoplasmic sperm injection (ICSI) combined.

---

[1] Specific aspects of the marital relationship: quality of communication, satisfaction with the sexual relationship, perceived intimacy, and marital adjustment.

[2] Different types of infertility treatment: ovulation induction (OI), intrauterine insemination (IUI), in vitro fertilisation (IVF) and/or intra-cytoplasmic sperm injection (ICSI). For a detailed description see Chapter 1.

5.2.1.1 Infertility-related stress (FPI) and quality of marital communication (ENRICH subscale)

A Pearson correlation test statistic was calculated to assess the relationship between the level of infertility-related stress as measured by the FPI, and the quality of marital communication as measured by the communication subscale of the Enriching and Nurturing Relationship Issues, Communication and Happiness Scale (ENRICH). Figure 2 shows the distribution of the scores obtained on the two measures.

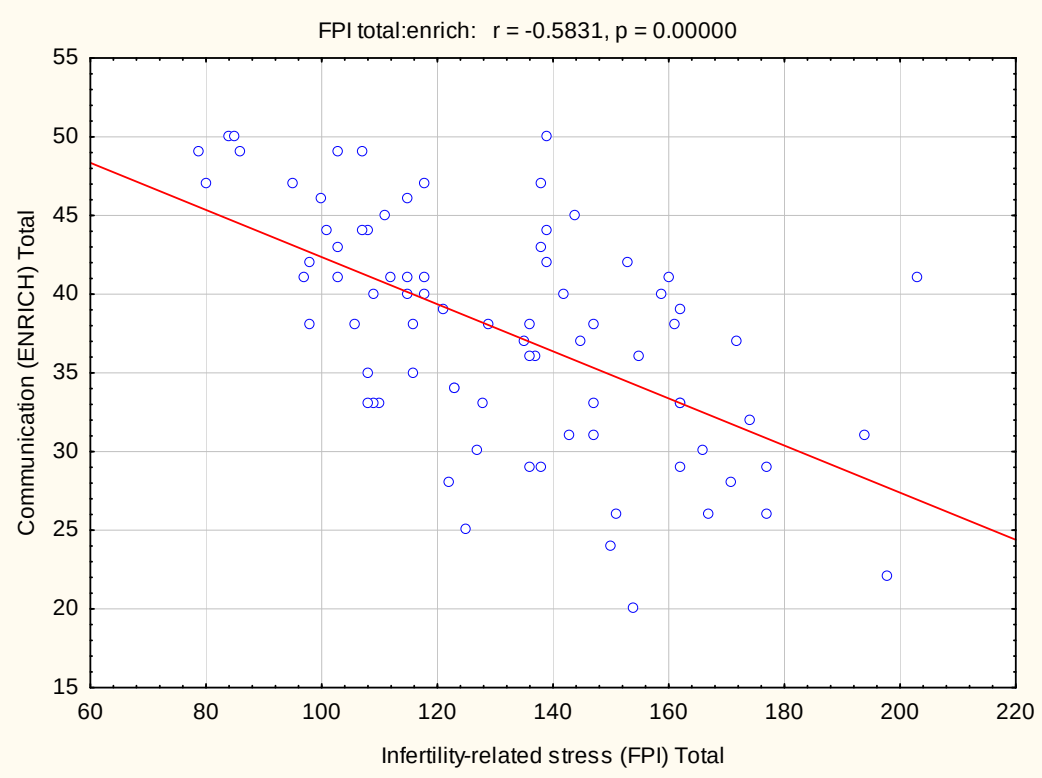


Figure 2. Scatterplot showing the relationship between the FPI infertility-related stress and the ENRICH communication subscale total scores.

As can be seen in Figure 2, a significant negative correlation was found between infertility-related stress and the quality of marital communication ($r = -0.5831$, $p < .001$). Higher scores on the FPI indicate higher levels of infertility-related stress (Newton et al., 1999), while higher scores on the ENRICH communication subscale are indicative of increased quality of marital communication (Olson et al., 1983a). The significant negative correlation between infertility-related stress and marital communication thus suggests that higher levels of infertility-related stress (higher scores on the FPI) are associated with a decreased quality of marital communication (lower scores on ENRICH), and vice versa.

5.2.1.2 Infertility-related stress (FPI) and satisfaction with the sexual relationship (ISS)

A Pearson correlation test statistic was calculated to assess the relationship between the level of infertility-related stress as measured by the FPI, and the level of satisfaction with the sexual relationship as measured by the Index for Sexual Satisfaction (ISS). Figure 3 shows the distribution of the scores obtained on the two measures.

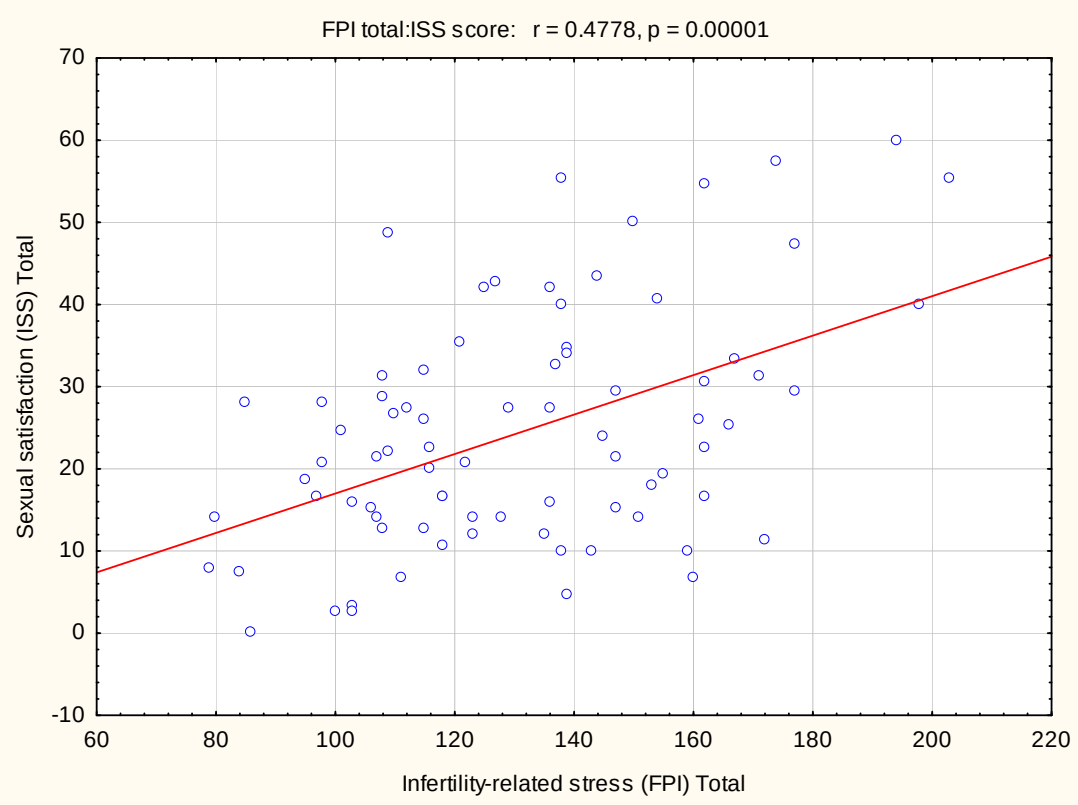


Figure 3. Scatterplot showing the relationship between the FPI infertility-related stress and the ISS sexual satisfaction total scores.

As can be seen in Figure 3, a significant positive correlation was found at the 1% level between infertility-related stress and satisfaction with the sexual relationship ($r = 0.4778$, $p < .001$). Higher scores on the FPI indicate higher levels of infertility-related stress (Newton et al., 1999), while it should be noted that higher scores on the ISS are indicative of more problems in the sexual relationship and thus less satisfaction with the sexual relationship (Hudson, Harrison, & Crosscup, 1981). The significant positive relationship thus indicates that higher levels of infertility-related stress (higher scores on the FPI) in the present study are associated with decreased satisfaction with the sexual relationship (higher scores on the ISS), and vice versa.

5.2.1.3 Infertility-related stress (FPI) and perceived intimacy (PAIR)

A Pearson correlation test statistic was calculated to examine the relationship between the level of infertility-related stress as measured by the FPI, and the level of perceived intimacy as measured by the Personal Assessment of Intimacy in Relationships Scale (PAIR). Figure 4 shows the distribution of the scores obtained on the two measures.

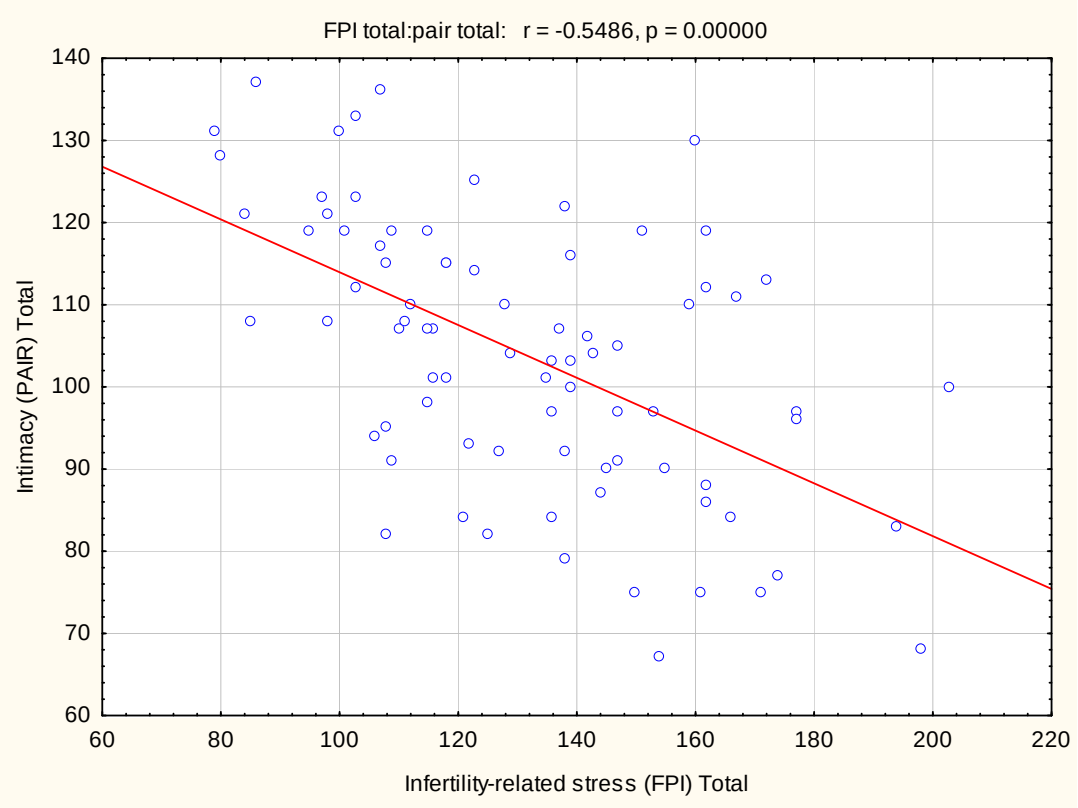


Figure 4. Scatterplot showing the relationship between the FPI infertility-related stress and the PAIR intimacy total scores.

As shown in Figure 4, a significant negative correlation was found between the level of infertility-related stress and the perceived level of intimacy in the marital relationship ($r = -0.5486$, $p < .001$). As mentioned, higher scores on the FPI indicate higher levels of infertility-related stress (Newton et al., 1999), while higher scores on the PAIR Inventory are indicative of higher levels of intimacy as perceived by the husbands and wives at the onset of infertility treatment. The interpretation can thus be made that higher levels of infertility-related stress (higher scores on the FPI) are associated with lower levels of intimacy in the marriage (lower scores on PAIR), and vice versa.

5.2.1.4 Infertility-related stress (FPI) and marital adjustment (DAS)

A Pearson correlation test statistic was calculated to assess the relationship between the level of infertility-related stress, as measured by the Fertility Problem Inventory (FPI), and marital adjustment, as measured by the Dyadic Adjustment Scale (DAS). Figure 5 shows the distribution of the scores obtained on the two measures.

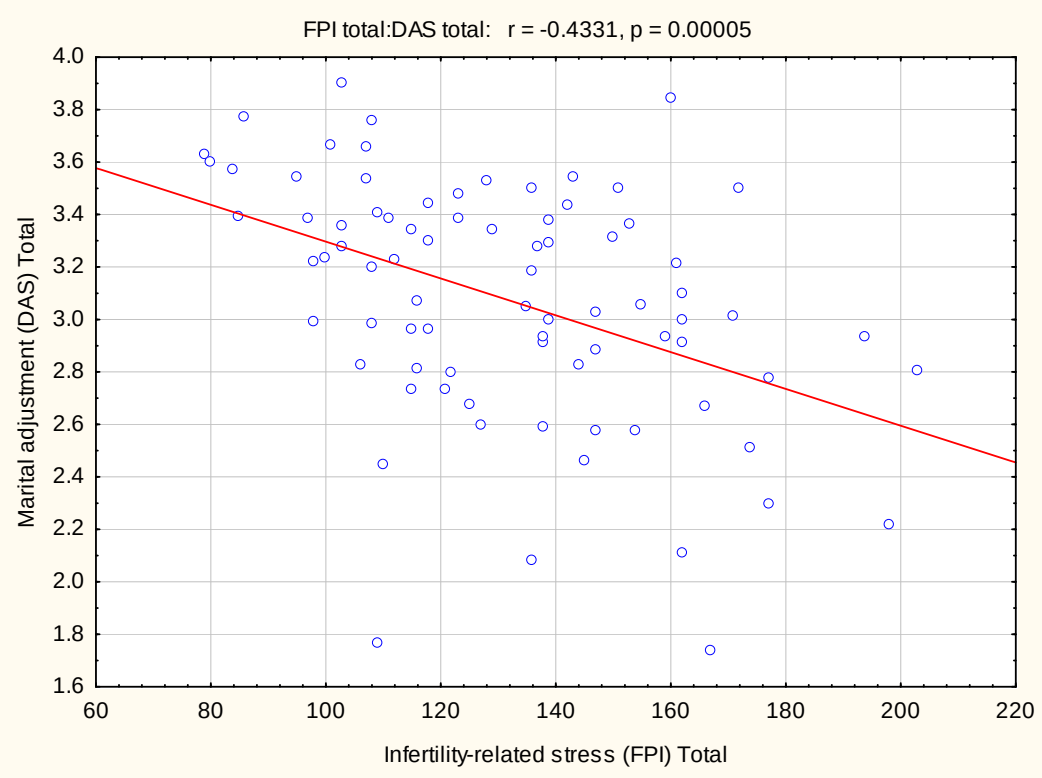


Figure 5. Scatterplot showing the relationship between the FPI infertility-related stress and the DAS marital adjustment total scores.

As can be seen in Figure 5, a significant negative correlation was found at the 1% level between infertility-related stress and marital adjustment ($r = -0.4331$, $p < .001$). Higher scores on the FPI indicate higher levels of infertility-related stress (Newton et al., 1999), while higher total scores on the DAS indicate better overall marital adjustment (Spanier, 1976). The interpretation can thus be made, from the significant negative correlation, that higher levels of infertility-related stress (higher scores on the FPI) in the present study are associated with lower levels of marital adjustment (lower scores on DAS), and vice versa.

5.2.2 Additional Pearson correlations

In order to see how all the research variables are correlated, Pearson correlations were calculated for all the remaining combinations of research variables measuring specific aspects of the marital relationship. The correlations were calculated for the groups at the onset of all infertility treatments, with both men and women being included (n = 88). The results found are presented in this section.

5.2.2.1 Marital adjustment (DAS) and quality of communication (ENRICH subscale)

The Pearson correlation measured between marital adjustment and the quality of communication in the marital relationship is presented in Figure 6.

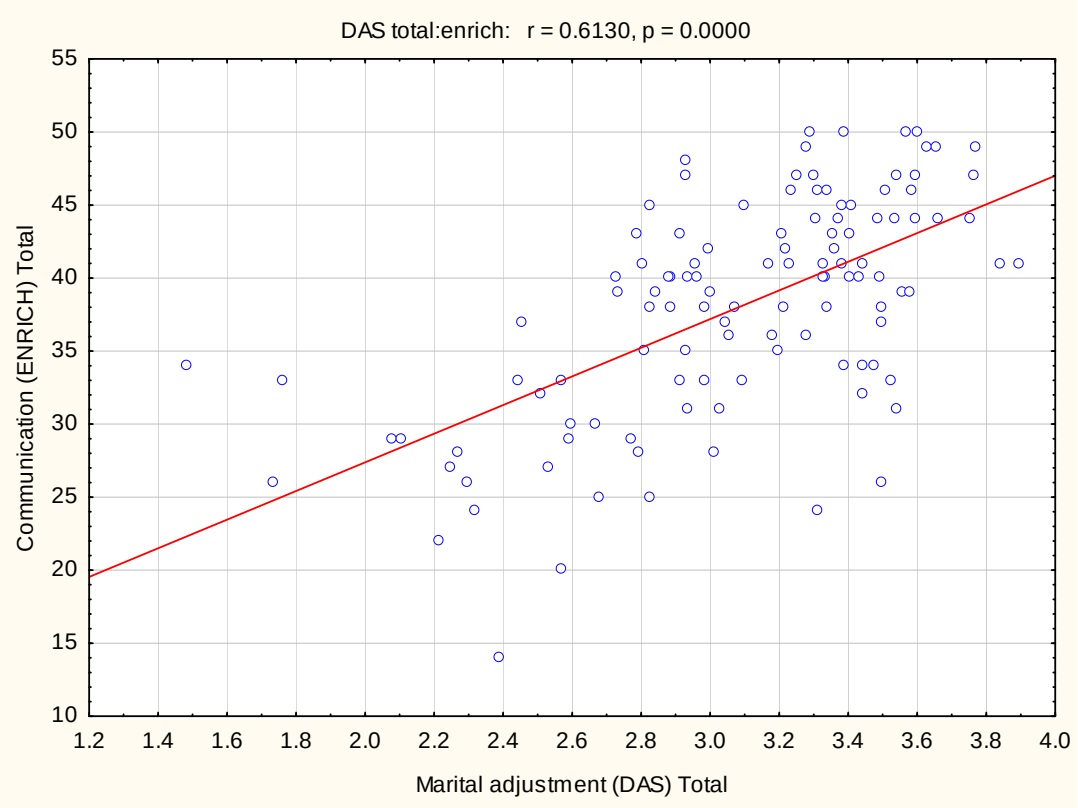


Figure 6. Scatterplot showing the relationship between the DAS marital adjustment and the ENRICH communication subscale total scores.

As seen in Figure 6, a significant positive correlation was found between the level of marital adjustment and the quality of communication in the marriage ($r = 0.6130$, $p < .001$). This finding suggests that higher levels of marital adjustment (higher scores on the DAS) are associated with increased marital communication (higher scores on ENRICH), and vice versa.

5.2.2.2 Marital adjustment (DAS) and satisfaction with the sexual relationship (ISS)

The Pearson correlation between the level of marital adjustment and the level of satisfaction with the sexual relationship is presented in Figure 7.

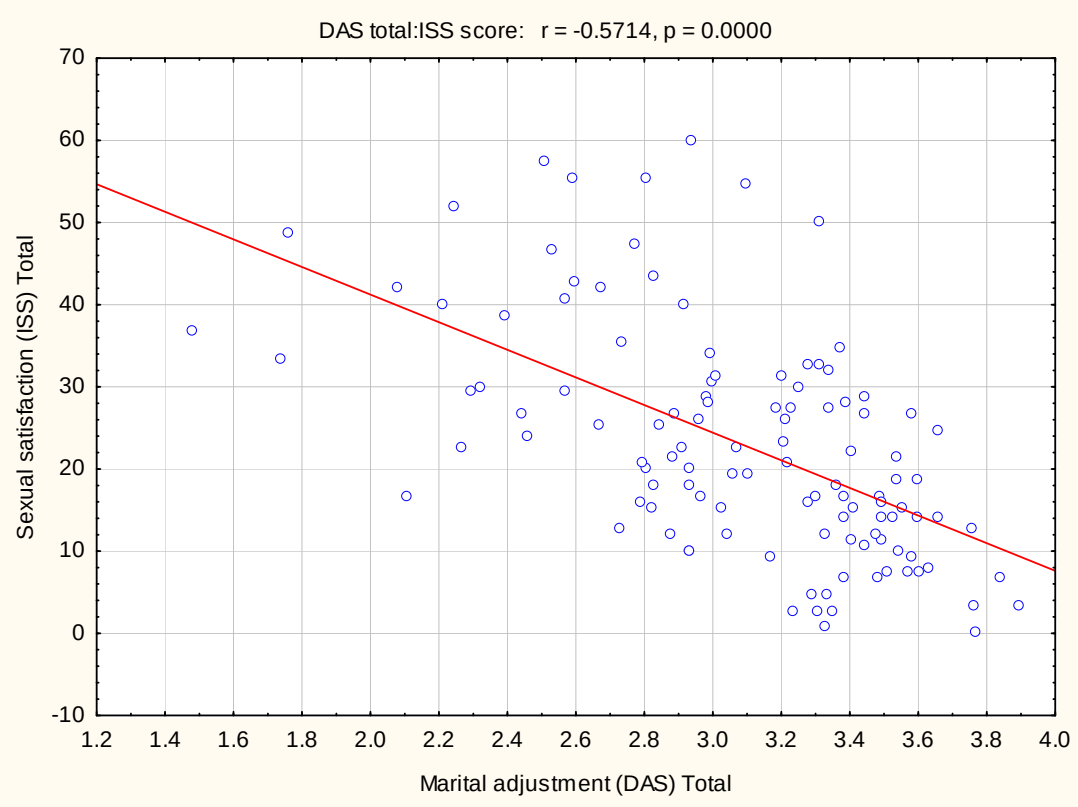


Figure 7. Scatterplot showing the relationship between the DAS marital adjustment and the ISS sexual satisfaction total scores.

As can be seen in Figure 7, there is a significant negative correlation between the level of marital adjustment and the level of satisfaction with the sexual relationship ($r = -0.5714$, $p < .001$). Once again it should be noted that higher scores on the ISS are indicative of more problems in the sexual relationship – thus decreased satisfaction with the sexual relationship. The negative correlation between these two variables thus indicates that higher levels of marital adjustment (higher scores on DAS) are associated with a decrease in problems and thus more satisfaction with the sexual relationship (lower scores on ISS), and vice versa.

5.2.2.3 Marital adjustment (DAS) and perceived intimacy (PAIR)

The Pearson correlation between the level of marital adjustment and the level of perceived intimacy is presented in Figure 8.

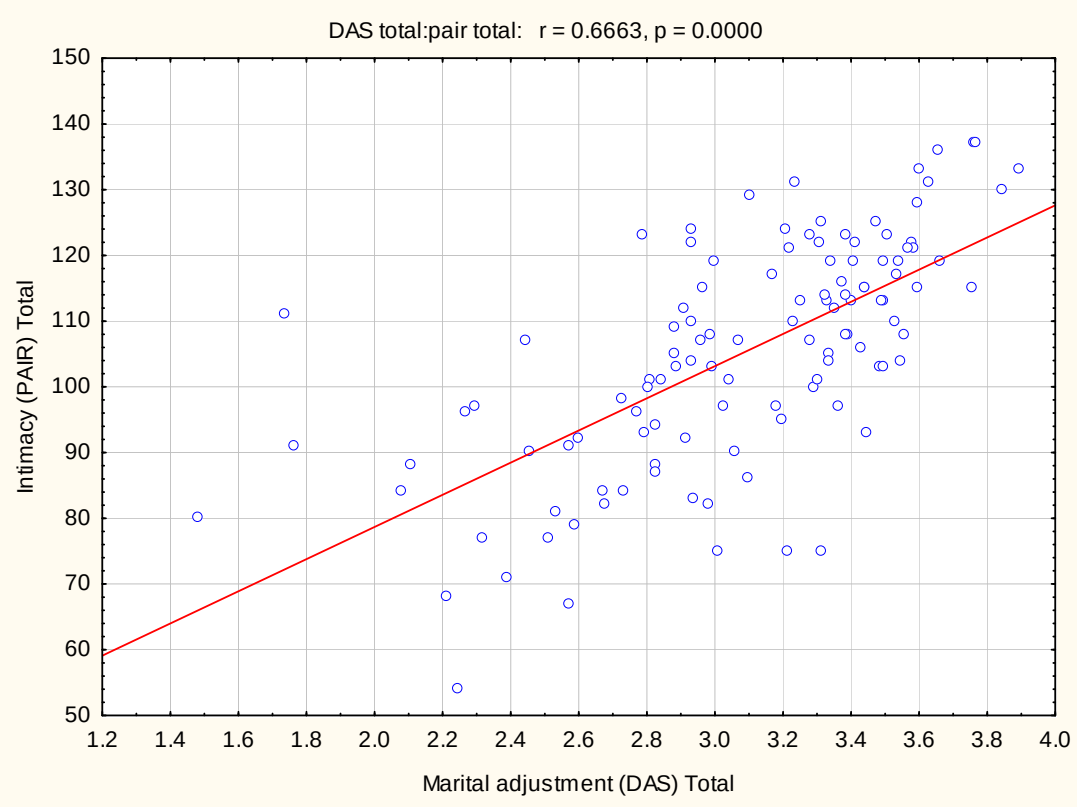


Figure 8. Scatterplot showing the relationship between the DAS marital adjustment and the PAIR intimacy total scores.

Marital adjustment and perceived intimacy were significantly positively correlated ($r = 0.6663$, $p < .001$). This correlation, which can be seen in Figure 8, suggests that higher levels of marital adjustment (higher scores on the DAS) are associated with increased levels of intimacy (higher scores on PAIR), and vice versa.

5.2.2.4 Satisfaction with the sexual relationship (ISS) and quality of communication (ENRICH subscale)

The Pearson correlation between the level of satisfaction with the sexual relationship and the quality of communication in the marriage is presented in Figure 9.

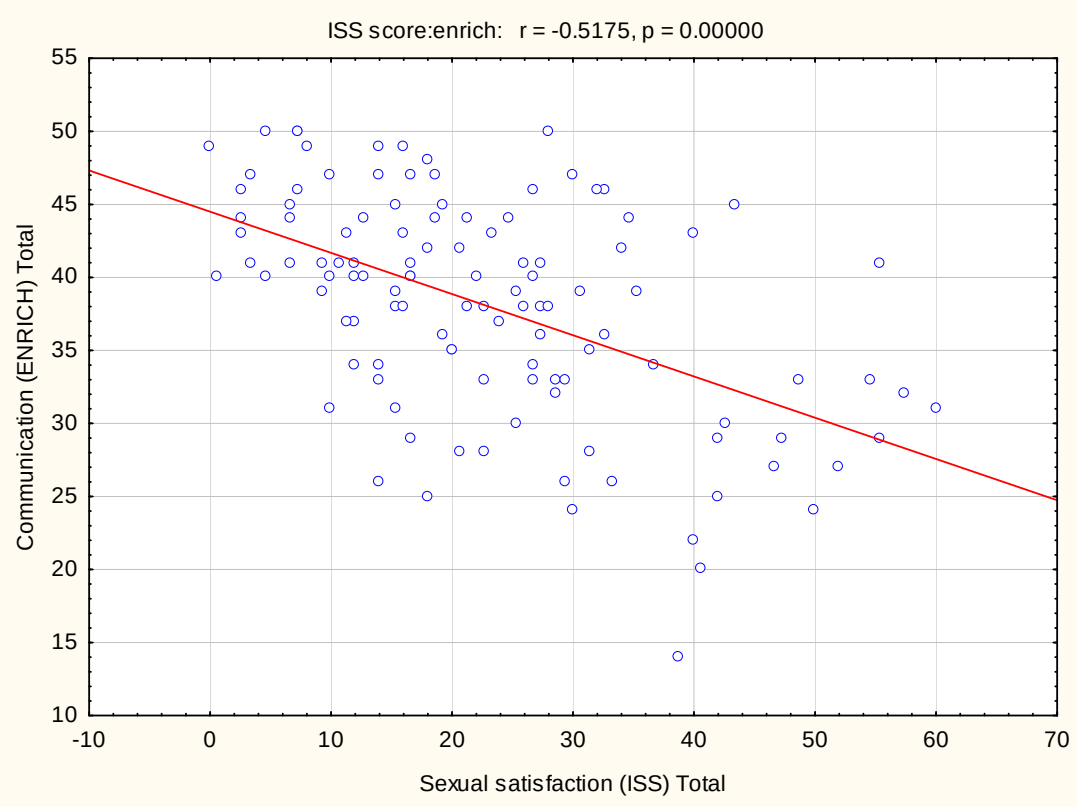


Figure 9. Scatterplot showing the relationship between the ISS sexual satisfaction and the ENRICH communication subscale total scores.

As seen in Figure 9, a significant negative correlation was found between the level of satisfaction with the sexual relationship and the quality of communication in the marriage ($r = -0.5175$, $p < .001$). It should be noted that higher scores on the ISS are indicative of more problems in the sexual relationship – thus decreased satisfaction with the sexual relationship. The negative correlation between these two variables thus indicates that lower levels of satisfaction with the sexual relationship (higher scores on ISS) are associated with decreased quality of communication in the marriage (lower scores on ENRICH), and vice versa.

5.2.2.5 Quality of communication (ENRICH) and perceived intimacy (PAIR)

The Pearson correlation between the quality of communication and perceived intimacy is presented in Figure 10.

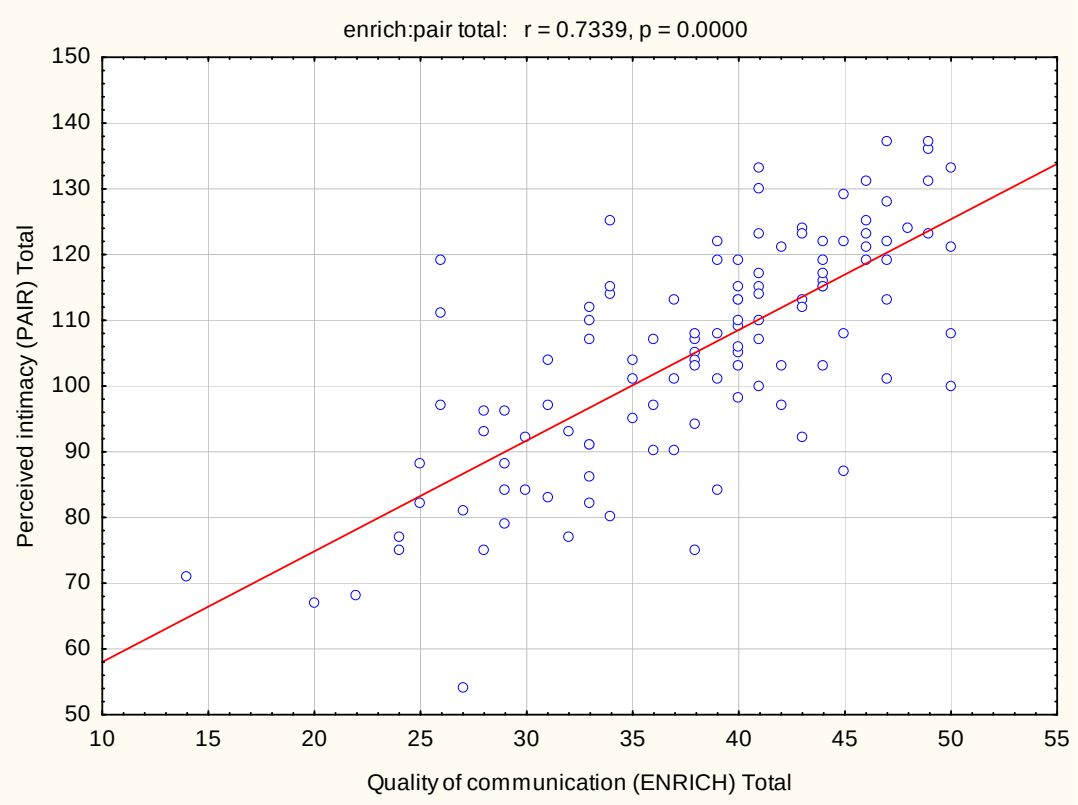


Figure 10. Scatterplot showing the relationship between the ENRICH quality of communication subscale and the PAIR intimacy total scores.

As seen in Figure 10, a significant positive correlation was found between the quality of communication and perceived intimacy ($r = 0.7339$, $p < .001$). Better quality of communication (higher scores on the ENRICH subscale) are thus associated with increased intimacy in the marriage (higher scores on PAIR), and vice versa.

5.2.2.6 Satisfaction with the sexual relationship (ISS) and perceived intimacy (PAIR)

The Pearson correlation measured between the level of satisfaction with the sexual relationship and perceived intimacy is presented in Figure 11.

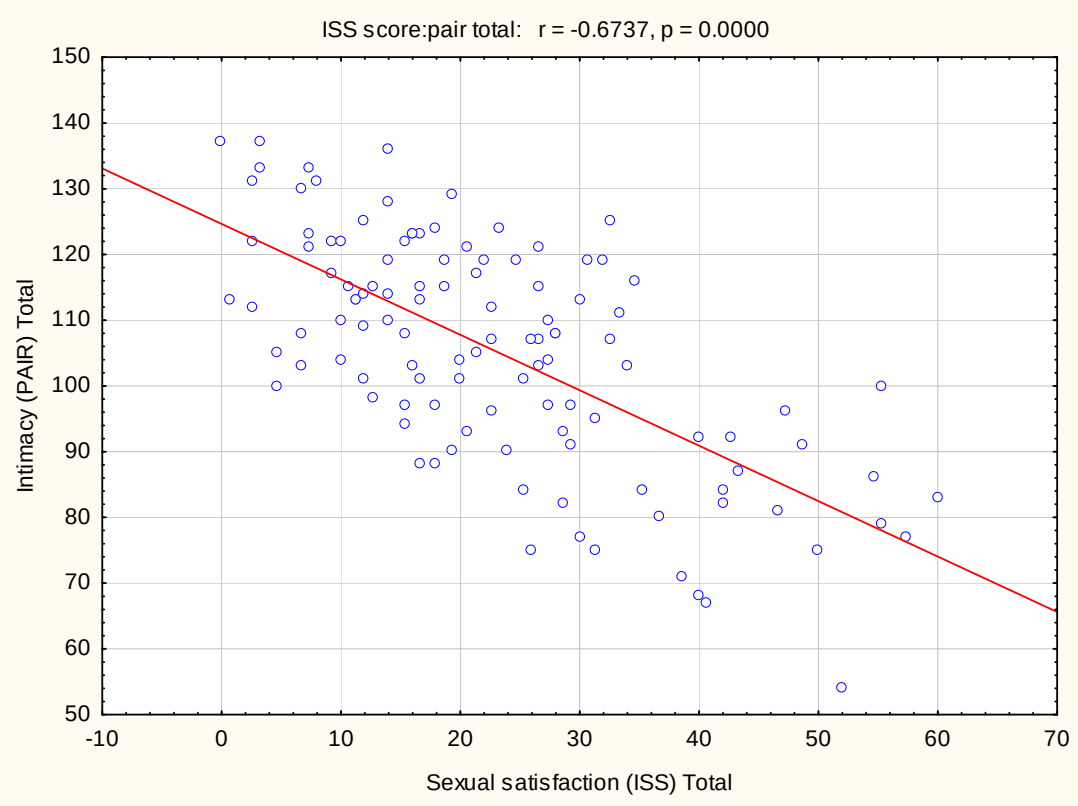


Figure 11. Scatterplot showing the relationship between the ISS sexual satisfaction and the PAIR intimacy total scores.

As indicated in Figure 11, the level of satisfaction with the sexual relationship was significantly negatively correlated with the level of perceived intimacy in the marriage ($r = -0.6737$, $p < .001$). It should be noted that higher scores on the ISS are indicative of more problems in the sexual relationship – thus decreased satisfaction with the sexual relationship. The negative correlation between these two variables thus indicate that lower levels of sexual satisfaction (higher scores on the ISS indicate more problems with the sexual relationship) are associated with decreased levels of perceived intimacy (lower scores on PAIR), and vice versa.

Table 6 provides a summary of the correlations presented above.

Table 6

Correlation Matrix of all Research Variables: Infertility-related Stress, Marital Adjustment, Quality of Communication, Satisfaction with the Sexual Relationship, and Perceived Intimacy

	Infertility-related stress	Marital adjustment	Quality of communication	Sexual satisfaction	Perceived intimacy
Infertility-related stress	.				
Marital adjustment	-0.4331	.			
Quality of communication	-0.5831	0.6130	.		
Sexual satisfaction	0.4778	-0.5714	-0.5175	.	
Perceived intimacy	-0.5486	0.6663	0.7339	-0.6737	.

Note. All p-values are significant at $p < .001$.

5.2.3 Multiple regression results

The primary aim of the present study was to examine how infertility-related stress as the independent variable is correlated with four specific aspects of the marital relationship. Multiple regression analyses were conducted in order to further examine whether other combinations of research variables might reveal interesting results other than those found by merely examining the correlation of infertility-related stress with specific aspects of the marital relationship on its own. It should be noted, however, that the problem of multicollinearity arises due to the high inter-correlations between all the research variables (as reported in the previous section). The impact of multicollinearity will be described further on in the thesis. The results of the multiple regression analyses should thus be interpreted with caution.

Numerous regression analyses can be done, yet the scope of the present study has to be taken into consideration. For this reason, a model was developed that suggests the most possible pattern of relationships between variables. The existing body of literature on infertility and aspects of the marital relationship was used as a guideline to develop the model. It should be noted, however, that the model was developed by the researcher and has not been used in previous studies. Furthermore, the model may suggest the use of structural equation modelling, yet such an advanced statistical technique is outside the scope of the present study and only multiple regressions were calculated. Figure 12 is a graphical representation of the model.

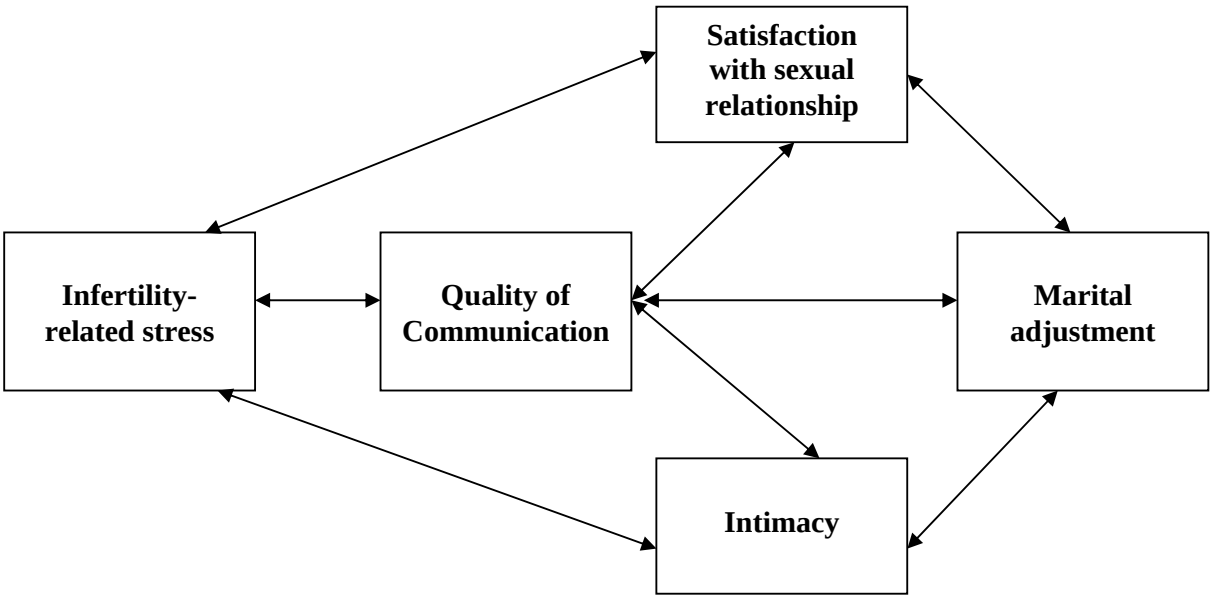


Figure 12. Diagram presenting a model of possible relationships between all research variables.

A clarification of the model presented in Figure 12 will now be given. Infertility-related stress is viewed as the main predictor of the specific aspects of the marital relationship that are measured in the present study: quality of communication, satisfaction with the sexual relationship, level of perceived intimacy and level of marital adjustment. General stress has been found to have a significant impact on all aspects of individuals' lives, and one would therefore expect infertility-related stress to have an impact as well. Thus, taking previous research studies into consideration (Andrews et al., 1992; Newton et al., 1999; Ulbrich et al., 1990), it is hypothesised that infertility-related stress may influence communication, satisfaction with the sexual relationship, intimacy and, ultimately, marital adjustment or overall satisfaction with the marital relationship.

Quality of communication, however, can also be considered a predictor of satisfaction with the sexual relationship, intimacy and, ultimately, marital adjustment. Good communication skills are of the important aspects needed for a healthy relationship and/or marriage and one would therefore hypothesise that quality of communication will significantly influence all other aspects of a relationship and/or marriage. Gerrity (2001) emphasises that communication between the partners in an infertile couples is crucial, as the spouse becomes a primary, if not only, source of social support. Communication may potentially also influence the level of infertility-related stress experienced by spouses, but the scope of the present study does not allow for all possible interrelationships to be investigated.

Furthermore, the variables measuring satisfaction with the sexual relationship and perceived intimacy can also be viewed as predictor variables of overall marital adjustment. These two variables are viewed as secondary predictor variables, however, with infertility-related stress and quality of communication seen as the main predictor variables. Infertility-related stress, quality of communication, satisfaction with the sexual relationship and perceived intimacy are thus all viewed as potentially predicting overall marital adjustment (or overall satisfaction with the marital relationship). It should be noted that the arrows in Figure 12 may be reversed, using marital adjustment as the main predictor variable of the other research variables, but for the purpose of the present study the model will be used as presented and no further calculations will be conducted.

From this model in Figure 12, six multiple regression models were developed and tested. The results of these multiple regressions are presented in the following section.

5.2.3.1 Multiple regression model 1

The first model (see Figure 12) is a multiple regression model that tested the level of infertility-related stress and the quality of marital communication as predictor variables, and satisfaction with the sexual relationship as dependent or outcome variable.

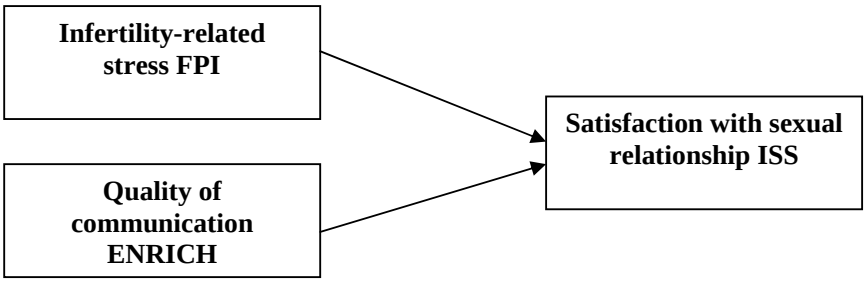


Figure 13. Regression model 1

Table 7 illustrates the regression results for model 1.

Table 7.

Summary Statistics for Regression Model 1

Regression summary for dependent variable: ISS total R = .54 R^2 = .30 Adjusted R^2 = .28 F(2,77) = 16.26 p <. 001 Std. error of estimate: 12.16						
Model 1	**b***	**Standard error of b***	**b**	**Standard error of b**	**t(77)**	**p-value**
ENRICH Communication	-0.32	0.12	-0.63	0.23	-2.74	.01
FPI Infertility-related stress	0.29	0.12	0.15	0.06	2.45	.02

By looking at the adjusted R squared value (R^2 = .28), it can be seen that the two independent variables, infertility-related stress and quality of communication, account for approximately 28% of the variance in the scores for the level of satisfaction with the sexual relationship. The p-values listed in the last column of Table 7 indicate that the β values used to describe this model differ significantly from zero ($p < .05$), therefore indicating the importance of including the abovementioned independent variables in this multiple regression model. The F-statistic for regression model 1 was 16.26 and significant ($p < .001$). In this regression model, the standardised beta coefficient for ENRICH (measuring quality of communication) is 0.32, with $t(77) = -.2.74$, and for the FPI (measuring level of infertility-related stress) it is 0.29, with $t(77) = 2.45$, all $p < .05$. Both the quality of communication and the level of infertility-related stress are thus significant predictors of satisfaction with the sexual relationship, with communication marginally more significant than level of infertility-related stress.

5.2.3.2 Multiple regression model 2

The second model (see Figure 13) is also a multiple regression model, which tested to what extent the level of infertility-related stress and quality of communication between marriage partners as predictor variables may influence perceived intimacy in the marriage.

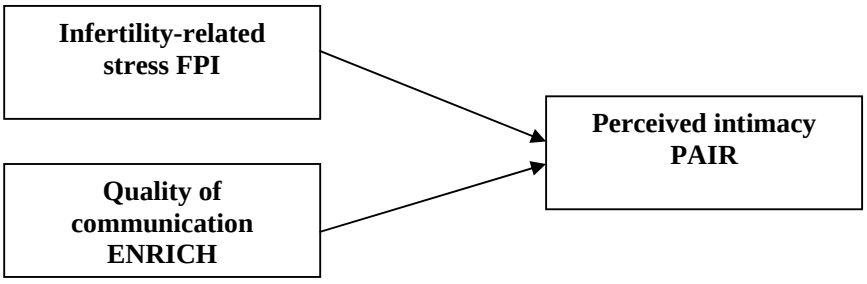


Figure 14. Regression model 2

Table 8 presents the regression results for model 2.

Table 8.

Summary Statistics for Regression Model 2

Regression summary for dependent variable: PAIR total						
R = .69 R^2 = .48 Adjusted R^2 = .46						
F(2,78) = 35.67 p < .001 Std. error of estimate: 12.14						
Model 2	**b***	**Standard error of b***	**B**	**Standard error of b**	**t(78)**	**p-value**
ENRICH Communication	0.52	0.10	1.18	0.23	5.14	.00
FPI Infertility-related stress	-0.25	0.10	-0.14	0.06	-2.45	.02

By looking at the adjusted R squared value (R^2 = .46), it can be seen that the two independent variables, quality of communication and infertility-related stress, account for approximately 46% of the variance in the intimacy scores. The p-values listed in the last column of Table 8 indicate that the β values used to describe this model differ significantly from zero ($p < .05$), thus showing that these two independent variable significantly predict perceived intimacy. In this regression model the F-statistic was 35.67 and significant ($p < .001$). The standardised beta coefficient for ENRICH (measuring quality of communication) is 0.52, with $t(78) = 5.14$, and for the FPI (measuring level of infertility-related stress) it is -0.25, with $t(78) = -2.45$, all $p < .05$. Both the quality of communication and infertility-related stress are thus significant predictors of perceived intimacy, with communication as a predictor marginally more significant than level of infertility-related stress.

5.2.3.3 Multiple regression model 3

The third model (see Figure 14) is a multiple regression model that tested the level of infertility-related stress and quality of communication in the marriage as predictor variables, and marital adjustment (or overall satisfaction with the marital relationship) as dependent variable.

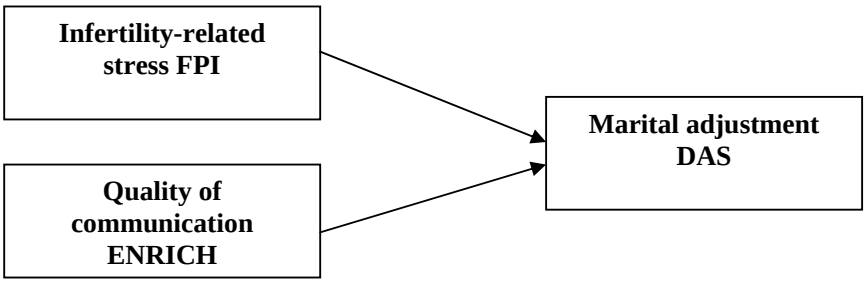


Figure 15. Regression model 3

The results for regression model 3 can be viewed in Table 9.

Table 9.

Summary Statistics for Regression Model 3

Regression summary for dependent variable: DAS Total						
R = .60 R^2 = .36 Adjusted R^2= .35						
F(2,78) = 22.21 p < .001 Std. error of estimate: .37						
Model 3	**b***	**Standard error of b***	**B**	**Standard error of b**	**t(78)**	**p-value**
ENRICH Communication	0.52	0.11	0.03	0.01	4.63	.00
FPI Infertility-related stress	-0.13	0.11	-0.00	0.00	-1.19	.24

The adjusted R squared value ($R^2 = .35$) indicates that the two independent variables, infertility-related stress and quality of communication, explain approximately 35% of the variance in marital adjustment. The p-values listed in the last column of Table 9 indicate that only the β value used to describe quality of communication differ significantly from zero ($p < .05$), thus showing that infertility-related stress is not a significant predictor of marital adjustment when combined with quality of marital communication in this regression model. The F-statistic was 22.21 and significant ($p < .001$). In this regression model, the standardised beta coefficient for ENRICH (measuring quality of communication) is 0.52, with $t(78) = 4.63$, $p < .01$. The standardised beta coefficient for FPI (measuring level of infertility-related stress) was insignificant at $p > .05$. In this model, only quality of communication is thus a significant predictor of marital adjustment, with level of infertility-related stress not a significant predictor. This finding might be due to the high inter-correlations of all research variables and the resulting effects of multicollinearity.

In models 1 to 3, quality of communication was added as a predictor variable together with infertility-related stress.

5.2.3.4 Multiple regression model 4

The fourth model (see Figure 15) is a multiple regression model with infertility-related stress, quality of communication and satisfaction with the sexual relationship as predictor variables, and overall marital adjustment (or satisfaction with the marital relationship) as dependent variable.

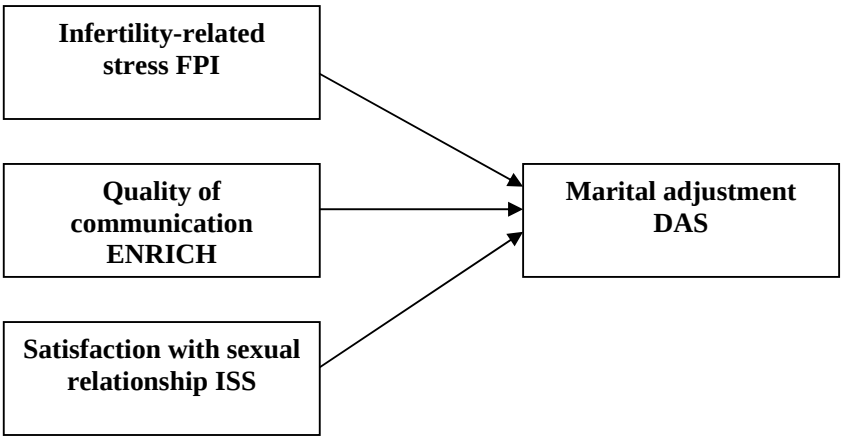


Figure 16. Regression model 4

The regression results for model 4 can be viewed in Table 10.

Table 10

Summary Statistics for Regression Model 4.

Regression summary for dependent variable: DAS total						
R = .67 R^2 = .44 Adjusted R^2 = .42						
F(3,76) = 20.22 p <. 001 Std. error of estimate: .35						
Model 4	**b***	**Standard error of b***	**b**	**Standard error of b**	**t(76)**	**p-value**
FPI Infertility-related stress	-0.04	0.11	-0.00	0.00	-0.39	.70
ENRICH Communication	0.40	0.11	0.03	0.01	3.63	.00
ISS Sexual satisfaction	-0.34	0.10	-0.01	0.00	-3.31	.00

By looking at the adjusted R squared value (R^2 = .42), it is shown that model 4 explains 42% of the variance in the level of marital adjustment. The p-values listed in the last column of Table 10 indicate that the β values used to describe quality of communication and satisfaction with the sexual relationship differ significantly from zero ($p < .05$). The F-statistic was 20.22 and significant ($p < .001$). In this regression model, the standardised beta coefficient for ENRICH (measuring quality of communication) is 0.40, with $t(76) = 3.63$, $p < .01$, and for the ISS (measuring satisfaction with the sexual relationship) it is -.0.34, with $t(76) = -3.31$, $p < .01$. The standardised beta coefficient for FPI was insignificant at $p > .05$. In this model, only quality of communication and level of satisfaction with the sexual relationship are thus significant predictors of marital adjustment, with level of infertility-related stress not a significant predictor. As mentioned, this finding might be due to the high inter-correlations between all the research variables and the resulting effects of multicollinearity.

5.2.3.5 Multiple regression model 5

The fifth model is a multiple regression model (see Figure 16) that tested to which extent infertility-related stress, quality of communication and perceived intimacy as predictor variables might influence overall marital adjustment (or satisfaction with the marital relationship) as dependent variable.

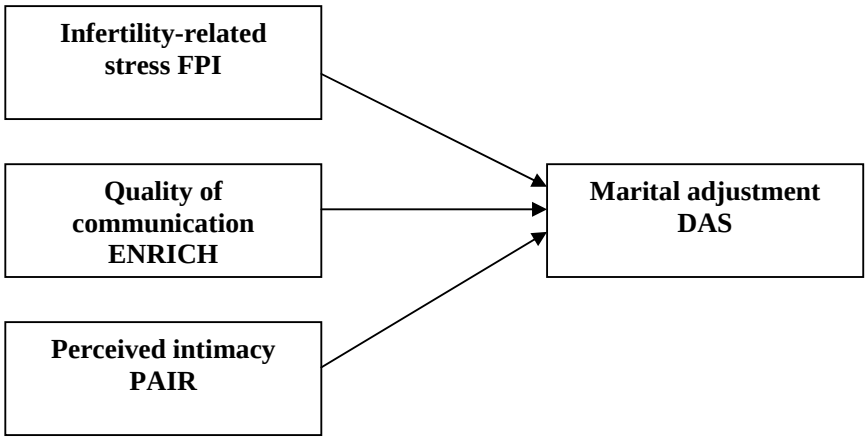


Figure 17. Regression model 5

The regression results for model 5 can be viewed in Table 11.

Table 11.

Summary Statistics for Regression Model 5.

Regression summary for dependent variable: DAS total

$R = .67$ $R^2 = .45$ Adjusted $R^2 = .43$

$F(3,77) = 21.24$ $p < .001$ Std. error of estimate: .35

Model 5	b*	Standard error of b*	b	Standard error of b	t(77)	p-value
FPI Infertility-related stress	-0.03	0.11	-0.00	0.00	-0.28	.78
ENRICH Communication	0.30	0.12	0.02	0.01	2.50	.01
PAIR Perceived intimacy	0.42	0.12	0.01	0.00	3.56	.00

The adjusted R^2 of .43 indicates that model 5 explains 43% of the variance in the level of marital adjustment. The F-statistic was 21.24 and significant ($p < .001$). In this regression model, the standardised beta coefficient for ENRICH (measuring quality of communication) is 0.30, with $t(77) = 2.50$, $p < .01$, and for the PAIR (measuring perceived intimacy) it is 0.42, with $t(77) = 3.56$, $p < .001$. The standardised beta coefficient for the FPI (measuring level of infertility-related stress) was insignificant at $p > .05$. In this model, only quality of communication and perceived intimacy are thus significant predictors of marital adjustment, with level of infertility-related stress not a significant predictor, $p > .05$. This finding might be due to the high inter-correlations of all research variables and the resulting effects of multicollinearity.

Compared to model 3, models 4 and 5 tested whether one additional predictor variable (perceived intimacy) could improve a prediction of marital adjustment with only two predictor variables (infertility-related stress and quality of communication).

5.2.3.6 Multiple regression model 6

The sixth model (see Figure 17) is a multiple regression model with infertility-related stress, quality of communication, perceived intimacy, and satisfaction with the sexual relationship as predictor variables, and marital adjustment (or satisfaction with the marital relationship) as dependent variable.

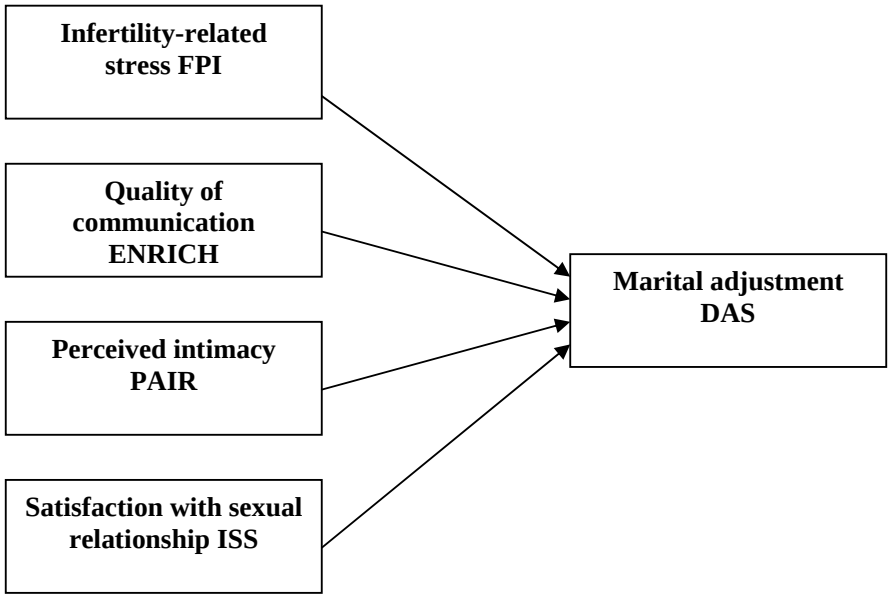


Figure 18. Regression model 6

The regression results for model 6 can be viewed in Table 12.

Table 12.

Summary Statistics for Regression Model 6.

Regression summary for dependent variable: DAS total R = .69 R² = .48 Adjusted R² = .45 F(4,75) = 17.22 p<.00 Std. error of estimate: .34						
Model 6	**B***	**Standard error of b***	**b**	**Standard error of b**	**t(77)**	**p-value**
FPI Infertility-related stress	-0.01	0.11	-0.00	0.00	-0.05	.96
ENRICH Communication	0.29	0.12	0.02	0.01	2.42	.02
ISS Sexual satisfaction	-0.22	0.11	-0.01	0.00	-1.89	.06
PAIR Perceived intimacy	0.30	0.13	0.01	0.00	2.24	.03

The value of R was .69 and R^2 was .48. The adjusted R^2 of .45 indicates that model 6 explains 45% of variance in the level of marital adjustment. The F-statistic was 17.22 and significant ($p < .001$). In this regression model, the standardised beta coefficient for ENRICH (measuring quality of communication) is 0.29, with $t(75) = 2.42$, $p < .01$, and for PAIR (measuring perceived intimacy) it is 0.30, with $t(75) = 2.24$, $p < .05$. The standardised beta coefficients for the ISS (measuring satisfaction with the sexual relationship) and FPI (measuring the level of infertility-related stress) were insignificant at $p > .05$. In this model, only quality of communication and perceived intimacy are thus significant predictors of marital adjustment, with level of infertility-related stress and satisfaction with the sexual relationship not significant predictors, $p > .05$. This finding might be due to multicollinearity. Models 2, 4, 5 and 6 thus explain the most variance in the prediction of their respective dependent variables.

5.3 Secondary aim

5.3.1 Differences between groups for specific aspects of the marital relationship

ANOVAs were conducted to determine whether there were significant differences in the four specific aspects of the marital relationship that were measured in the present study between all research groups, men and women included, thus between the control group (n = 28) and each of the three treatment groups (combined n = 88). The four specific aspects are: quality of communication in the relationship/marriage, satisfaction with the sexual relationship, perceived intimacy, and marital adjustment. ANOVAs will be reported in the following section.

5.3.1.1 Differences in the quality of communication between groups

A subscale of the Enriching and Nurturing Couples Relationship Scale (ENRICH) (Olson et al., 1983a) was used to measure the quality of communication in the relationship. No significant interaction effect was found between group and gender on the measure of quality of communication, with $F(3,27) = 0.15$, $p > .05$. The results of the group means are shown in Table 13.

Table 13.

Differences Between Groups: Communication (ENRICH Subscale)

Variable	Group	Mean	SE	F	p	n
Communication	Control[3]	40.13	1.69	0.95	.42	28
	OI[4]	36.13	1.69			27
	IUI[5]	37.84	1.48			37
	IVF/ICSI[6]	37.68	1.87			24

Note. F-statistic insignificant at $p > .05$. ANOVAs calculated for men and women.

As illustrated in Table 13, no significant differences were found between groups on the measure of communication (all p's > .05).

[3] Control group refers to the pregnant group.
[4] OI refers to ovulation induction.
[5] IUI refers to intrauterine insemination.
[6] IVF refers to in vitro fertilisation. ICSI refers to intra-cytoplasmic sperm injection.

5.3.1.2 Differences in the level of satisfaction with the sexual relationship between groups

The Index of Sexual Satisfaction (ISS) (Hudson, Harrison, & Crosscup, 1981) was used to measure each spouse's satisfaction with the sexual relationship. No significant interaction effect was found between group and gender on the sexual satisfaction measure, with $F(3, 27) = 0.27$, $p > .05$. The results of the group means are shown in Table 14.

Table 14.

Differences Between Groups: Satisfaction With the Sexual Relationship (ISS)

Variable	Group	Mean	SE	F	p	n
Sexual satisfaction	Control	16.95	3.07	2.55	.06	28
	OI	24.70	3.12			26
	IUI	20.86	2.68			37
	IVF/ICSI	28.80	3.36			24

Note. F-statistic insignificant at $p > .05$. ANOVAs calculated for men and women.

As summarised in Table 14, no significant differences were found in the level of sexual satisfaction between groups. It can be noted, however, that the p-value is borderline significant and thus approaching the critical 5% level with $p = .06133$. A trend indicating differences may have been found had the sample size of the present study been larger.

5.3.1.3 Differences in the level of perceived intimacy between groups

The Personal Assessment of Intimacy in Relationships (PAIR) Inventory (Schaefer & Olson, 1981) was used to measure the level of perceived intimacy as reported by each spouse in the couple relationship. No significant interaction effect was found between group and gender for any of the five subscales of intimacy that measure different types of intimacy (all $p > .05$). Accordingly, no significant interaction effect was found between group and gender for the global scale that provides an indication of the overall level of perceived intimacy. The results of the group means are presented in Table 15.

Table 15.

Differences Between Groups: Perceived Intimacy (PAIR)

Variable	Group	Mean	SE	F	p	n
1. Emotional intimacy	Control	19.22	.83	1.88	.14	28
	OI	16.67	.83			27
	IUI	18.04	.73			37
	IVF/ICSI	17.01	.91			24
2. Social intimacy	Control	16.52	.70	1.54	.66	28
	OI	15.93	.70			27
	IUI	16.70	.61			37
	IVF/ICSI	17.23	.77			24
3. Sexual intimacy	Control	19.45	.89	1.06	.37	28
	OI	17.49	.89			27
	IUI	18.74	.78			37
	IVF/ICSI	17.65	.99			24
4. Recreational intimacy	Control	18.11	.3	1.27	.29	28
	OI	16.68	.83			27
	IUI	17.51	.73			37
	IVF/ICSI	15.90	.91			24
5. Intellectual intimacy	Control	18.50	.80	1.25	.30	28
	OI	16.33	.80			27
	IUI	17.60	.70			37
	IVF/ICSI	17.38	.88			24
6. Global score: intimacy	Control	110.13	3.83	1.40	.25	28
	OI	99.72	3.83			27
	IUI	106.08	3.35			37
	IVF/ICSI	102.30	4.19			24

Note. All F-values are insignificant at $p > .05$. ANOVAs calculated for men and women.

As can be seen in Table 15, there are no significant differences between groups in the level of perceived intimacy.

5.3.1.4 Differences in the level of marital adjustment between groups

The Dyadic Adjustment scale (DAS) (Spanier, 1976) was used to measure the level of marital adjustment in the marriage. There was no significant interaction effect between group and gender on any of the four subscales and the global scale of the marital adjustment measure, all $p > .05$. The group means can be viewed in Table 16.

Table 16.

Differences Between Groups: Marital Adjustment (DAS)

Variable	Group	Mean	SE	F	p	n
1. Dyadic satisfaction	Control	.86	.019	.64	.59	28
	OI	.83	.019			27
	IUI	.86	.017			37
	IVF/ICSI	.86	.021			24
2. Dyadic consensus	Control	.81	.027	.80	.50	28
	OI	.77	.027			27
	IUI	.81	.023			37
	IVF/ICSI	.81	.030			24
3. Dyadic cohesion	Control	.76	.033	.94	.42	28
	OI	.74	.033			27
	IUI	.70	.029			37
	IVF/ICSI	.69	.036			24
4. Affectional expression	Control	.72	.057	.47	.71	28
	OI	.68	.057			27
	IUI	.77	.050			37
	IVF/ICSI	.70	.062			24
5. Global score: Marital adjustment	Control	3.16	.11	.30	.83	28
	OI	3.04	.11			27
	IUI	3.13	.09			37
	IVF/ICSI	3.07	.12			24

Note. All F-values insignificant at $p > .05$. ANOVAs calculated for men and women.

As can be seen in Table 16, no significant differences were found between the control and the treatment groups on the global scale or any of subscales of the marital adjustment scale.

5.3.2 Differences in the level of infertility-related stress between treatment groups

The Fertility Problem Inventory (FPI) (Newton et al., 1999), a fertility-specific scale, was used to measure the level of infertility-related stress experienced by infertile couples. The FPI uses five subscales to measure five types of infertility-related stress, while the subscale scores can be summed to give a global stress score. The present study examined whether there were significant differences in the level of infertility-related stress between infertile couples at the onset of different types of infertility treatment. ANOVAs were conducted to determine whether there were any significant differences in the global stress levels of the three treatment groups. The treatment groups were: (i) ovulation induction (OI), (ii) intrauterine insemination (IUI), and (iii) in vitro fertilisation (IVF) and/or intra-cytoplasmic sperm injection (ICSI).

Fixed effect tests were calculated for all the subscales of the FPI to determine whether there was any significant interaction between group and gender, as this would have influenced the interpretation of the statistical results. As illustrated in Table 17 below, no interaction effects were found between group and gender on any of the subscales of the FPI.

Table 17.

Factorial Analysis of Variance: Fixed Effect Tests for Interaction Between Group and Gender

Source: group*gender	F	p
Social concern	.79	.47
Sexual concern	.20	.82
Relationship concern	.97	.40
Rejection of a childfree relationship	.89	.43
Need for parenthood	1.07	.37

Note. All F-values insignificant at $p > .05$. ANOVAs calculated for men and women.

ANOVAs were conducted to determine whether there were any significant differences in the infertility-related stress levels of the three treatment groups at the onset of different types of infertility treatment. The results of the group means are presented in Table 18.

Table 18

ANOVAs: Differences in Infertility-related Stress Between Treatment Groups

Variable	Group	Mean	SE	F	p	n
1. Social concern	OI	24.25	1.75	.52	.60	26
	IUI	25.53	1.59			36
	IVF/ICSI	26.91	1.94			24
2. Sexual concern	OI	21.26	1.66	1.18	.31	26
	IUI	20.03	1.45			37
	IVF/ICSI	23.64	1.85			23
3. Relationship concern	OI	26.18	1.96	1.93	.15	24
	IUI	21.96	1.67			36
	IVF/ICSI	26.39	2.08			24
4. Rejection of a childfree lifestyle	OI	26.13	1.75	.98	.38	23
	IUI	25.48	1.49			36
	IVF/ICSI	28.78	1.89			24
5. Need for parenthood	OI	36.24	1.72	1.19	.31	23
	IUI	32.95	1.46			36
	IVF/ICSI	35.41	1.85			24
6. Global infertility-related stress	OI	134.66	6.48	1.45	.24	23
	IUI	125.69	5.62			35
	IVF/ICSI	140.65	7.12			23

Note. All F-values insignificant at $p > .05$. ANOVAs calculated for men and women.

As can be seen in Table 18, no significant differences were found on the global measure of infertility-related stress, or in any of the subcales measuring different types of infertility-related stress, between any of the three groups of participants at the onset of different types of infertility treatment.

5.3.3 Relationship between the level of congruence of partners' experiences of infertility-related stress and specific aspects of the marital relationship

An additional research question was to determine the nature of the relationship between the level of congruence experienced by infertile couples and specific aspects of the marital relationship. Congruence refers to couples' levels of agreement regarding their perceptions of the severity of infertility-related stress (McCubbin et al., 1993). Couple differences regarding these perceptions allow for the assessment of the relationship between couple congruence and individual outcomes for marital satisfaction, communication, intimacy and adjustment. Congruence is calculated by obtaining a difference score on the FPI for each couple: each spouse's global and subscale scores are subtracted from their partner's global and subscale scores and the difference is converted to an absolute value (Larsen & Olson, in Peterson et al., 2003).

Very few men took part in the study, resulting in a very small group of husbands and wives whose FPI scores could be used for the calculation of congruence. It thus is impractical and of little use to calculate congruence for such a small group. However, the available data was analysed and congruence scores were obtained. Pearson correlation coefficients were calculated between the level of congruence and four specific aspects of the marital relationship: marital adjustment, quality of communication, satisfaction with the sexual relationship, and perceived intimacy. The results showed that all correlations were insignificant, all at $p > .05$.

5.4 Conclusion

After the analysis of the data, a number of significant results were found. In the examination of the primary aim, the level of infertility-related stress was shown to be highly significantly correlated with all four aspects of the marital relationship that were measured in the study: quality of communication, satisfaction with the sexual relationship, perceived intimacy, and marital adjustment. Pearson correlations further revealed highly significant inter-correlations between all of the research constructs. In the assessment of the secondary aim, no significant differences were found in specific aspects of the marital relationship between the treatment and control groups. In addition, no significant differences were found in the level of infertility-related stress between the three groups at the onset of different types of infertility treatment.

The results that were presented in this chapter are discussed in Chapter Six. The limitations of the present study and recommendations for future research are also covered.

CHAPTER 6

DISCUSSION AND CONCLUSION

6.1 Introduction

The primary aim of the present research was to examine the nature of the relationship between the level of perceived infertility-related stress experienced by husbands and wives in infertile couples, and four specific aspects of the marital relationship. The secondary aim of the study was, firstly, to assess whether there were significant differences in four specific aspects of the marital relationship between infertile couples at the onset of different types of infertility treatment, and a pregnant control group. In addition, calculations were conducted in order to determine whether there were significant differences in the level of perceived infertility-related stress between three groups of infertile couples at the onset of different types of infertility treatment. In this chapter, the results of the investigation of the aims of the study will be discussed. The discussion will be done consistent with the order in which the results were presented in Chapter Five. Thereafter, the limitations of the present study will be discussed and recommendations will be made for future research. Lastly, the implications of the findings of the present study will be presented.

6.2 Discussion

6.2.1 Primary aim

Four specific aspects of the marital relationship were chosen to be the focus of the present study: these are quality of communication, perceived intimacy, satisfaction with the sexual relationship, and marital adjustment. The relationship between the level of perceived infertility-related stress, as independent variable, and these four aspects of the marital relationship as dependent variables, was examined by calculating Pearson correlation coefficients.[1] There are many additional aspects of the marital relationship that can be investigated, yet only these four were chosen in relation to the scope of this study.

6.2.1.1 Infertility-related stress and quality of communication (see Figure 2)

In accordance with previous research that has found decreased marital communication as a result of infertility-related stress (Bringhenti et al., 1997; Leiblum et al., 1998; Monga et al., 2004; Newton et al., 1999; Slade et al., 1997), a highly significant ($p < .001$) negative correlation was found between level of infertility-related stress and quality of marital communication. This finding indicates that couples who are more stressed due to the experience of infertility (higher

[1] All correlations were calculated for the infertile treatment groups only (pregnant control group thus excluded).

scores on the FPI[2]) may experience poorer communication in their marriage (lower scores on ENRICH[3]), and vice versa. This finding is in contrast with other studies (Holter et al., 2006), which found increased marital communication during infertility, supporting the 'marital benefit' concept proposed by Schmidt et al. (2005). Research has shown that communication is critical in decreasing infertility-related stress and the depressive symptoms experienced by infertile couples (Stammer, Wischmann, & Verres, 2002; Peterson et al., 2006).

A possible explanation for this finding is that high levels of stress may impact negatively on communication in a marriage, rendering it less effective (Schroder et al., cited in Sillars & Parry, 1982). Schroder et al., cited in Sillars and Parry (1982), suggest that one reason why stress reduces the efficiency of communication is that high levels of stress reduce "the complexity of human information processing" (p. 202). This assumption is based on studies of conceptual complexity (Harvey et al.; Schroder et al.; both cited in Sillars & Parry, 1982): such research has suggested that an individual's ability to participate in complex and integrated thought decreases with high levels of stress (Driver; Schroder et al.; both cited in Sillars & Parry, 1982). Sillars and Parry (1982) found stress, cognition and communication to be closely related and emphasised that communication about conflict or a stressful situation may become unproductive and frustrating when individuals experience high levels of stress, due to the simplifying effects of stress on cognition.

Another aspect that should be considered is communication styles. If spouses have different communication styles, high levels of infertility-related stress may wreak havoc on the quality of communication in their marriage. Furthermore, an aspect that is directly related to the issue of communication and communication styles, is that partners in a marriage may use different coping skills when confronted with a stressor such as infertility. One example is that the husband may choose not to express his feelings when stressed (avoidance coping), whereas his wife may view talking as a way of relieving feelings of stress (expressive coping), or vice versa (Peterson, Pirritano, Christensen, & Schmidt, 2008). Meyers et al. (1995a) suggest that men prefer action to conversation, while women prefer conversation. A husband may choose to use autonomous coping skills (Ferber, 1995). Research has shown that men are more likely to use avoidance strategies to cope with infertility (Berghuis & Stanton, 2002). Avoidance can result in increased stress levels and depressive symptoms (Peterson et al., 2006). Incongruent coping mechanisms and communication skills may therefore impact negatively on the quality of communication in

[2] FPI: Fertility Problem Inventory.
[3] ENRICH: Enriching and Nurturing Relationship Issues, Communication and Happiness Scale: Communication Subscale.

the marriage. Of course, poor communication may also, in turn, result in higher levels of infertility-related stress, exacerbating the problems that infertile couples may experience.

Furthermore, it should be borne in mind that infertility is often experienced at an early stage in the couple's marriage and may be one of the first obstacles or problems the couple has to deal with. At such an early stage not all couples have necessarily developed adequate communication or conflict resolution skills (Mahlstedt, in Eunpu, 1995). Infertility is often described as the silent crisis: couples may avoid discussion of the problem because they are afraid of making their partner feel worse or because the individual is too "overwhelmed with pain" (Eunpu, 1995). Gender may also be a factor in different sharing styles. Women are often more likely to share and look for social support from friends and relatives, whereas men may be less prone to sharing their feelings due to their societal upbringing and gender socialisation (Baram et al., in Eunpu, 1995). When spouses have incongruent communication styles it may be very detrimental to their marriage and individual well-being: the wife/husband may feel that her/his spouse is abandoning her/him because of their unwillingness to confide, while this might make the spouse feel more anxious and confide even less, resulting in an endless and counterproductive cycle. As a result, both spouses may feel isolated when they need each other's support most (Mahlstedt; Williams et al., both cited in Eunpu, 1995). Also, because each partner is stressed, he or she might not have the resources left to look after his or her partner's needs (Andrews et al., 1999).

Often, infertile couples may also not talk to other people about their problems because they view infertility as a failure in themselves. From a family systems perspective, all information into and out of a family is regulated by boundaries (Fleming, 2003). Some couples may have established more permeable boundaries and will allow information to flow freely into and out of the marital subsystem, which will be beneficial in the case of infertility. Other couples may strictly regulate which information may be discussed with people outside their system: this may prevent them from obtaining valuable social support. Research suggests that women in infertile couples often use social support as a critical coping strategy in dealing with infertility-related stress (Jordan & Revenson, 1999; McDaniel et al., 1992). McDaniel et al. (1992) found that women who had a confiding relationship with their husbands adjusted better to infertility. If couples view the experience of infertility as something that is not to be discussed with other people, it may be detrimental to their individual and relationship well-being.

6.2.1.2 Infertility-related stress and satisfaction with the sexual relationship (see Figure 3)

In the present study, a highly significant ($p < .001$) positive correlation was found between the level of infertility-related stress and satisfaction with the sexual relationship. In the interpretation of this correlation, it should be taken into consideration that the scoring of the ISS,[4] which measures sexual satisfaction, is different from the other scales used in this study. While higher scores on the FPI suggest higher levels of infertility-related stress (negative outcome), higher scores on all the other scales are interpreted as a positive outcome, for example better marital adjustment, better communication and increased intimacy. In contrast, higher scores on the ISS are indicative of less satisfaction with the sexual relationship, or more problems with the sexual relationship. A positive correlation between level of infertility-related stress and satisfaction with the sexual relationship thus indicates that couples who have high levels of infertility-related stress (higher scores on the FPI) may be less satisfied with their sexual relationship (higher scores on the ISS), and vice versa. This finding is supported by previous research that found similar results, namely that infertility may be associated with decreased sexual self-esteem, less intercourse and decreased sexual satisfaction (Andrews et al., 1992; Battaglia, Graziano, & Fonti, in Hirsch & Hirsch, 1989; Monga et al., 2004; Ramezanzadeh et al., 2006; Verhaak, in Schmidt et al., 2005).

This finding could perhaps be explained by examining one possible route through which infertility-related stress may influence satisfaction with the sexual relationship. As was seen from the previous correlation, the level of infertility-related stress and the quality of communication were highly significantly ($p < .001$) correlated in the present sample, indicating that higher stress levels are associated with poorer communication. A combination of a high level of infertility-related stress and poor quality of communication, in turn, may be associated with less satisfaction with the sexual relationship. Problems in other areas of a relationship or marriage also often carry over into the sexual relationship. As with all aspects of a relationship, when there are problems in one area, other areas will possibly also be influenced in a detrimental manner. So, too, high levels of infertility-related stress and/or poor communication may manifest in the sexual relationship. Communication difficulties might result in spouses feeling distant and removed from each other emotionally, which might impact negatively on their sexual relationship.

In support of this possible explanation, a highly significant negative correlation ($p < .001$) was found between the level of satisfaction with the sexual relationship and quality of communication. Higher scores on the FPI indicate higher levels of infertility-related stress

[4] ISS: Index of Sexual Satisfaction.

(Newton et al., 1999), while higher scores on the ISS are indicative of less satisfaction and thus more problems with the sexual relationship (Hudson et al., 1981). In this light, this finding suggests that a lower level of satisfaction with the sexual relationship (higher scores on the ISS) is associated with decreased quality of communication (lower scores on ENRICH). As mentioned in the previous section, incongruent coping skills may also impact negatively on sexual satisfaction and other aspects of the marital relationship.

The finding that high levels of infertility-related stress in the present sample is associated with less satisfaction with the sexual relationship can possibly also be ascribed to the phenomenon that infertile couples often experience sex as becoming a chore and not pleasurable anymore, because they might feel that sex has become only a means to an end (Siebel & Taymor, in Andrews et al., 1991). The authors of another study have suggested that sexual expression in a couple undergoing infertility treatment may become forced and mechanical and lacking in spontaneity, which might lead to sexual difficulties (Siebel & Taymor, in Monga et al., 2004). In a study by Dennerstein and Morse (in Monga et al., 2004), 71% of infertile women said that infertility reduced their enjoyment of sex and led to their sexual life becoming too mechanical and purposeful.

6.2.1.3 Infertility-related stress and perceived intimacy (see Figure 4)

In the present study, a highly significant negative correlation was found between the level of infertility-related stress ($p < .001$) and the level of perceived intimacy. The interpretation can thus be made that higher levels of infertility-related stress (higher scores on the FPI) are associated with lower levels of intimacy in the marriage (lower scores on PAIR[5]), and vice versa.

A possible explanation for this finding can be that high levels of stress may impact negatively on communication (as shown, there was a significant correlation between the level of infertility-related stress and quality of communication in the present study), which in turn may impact negatively on sexual functioning and perceived intimacy in the relationship. Satisfaction with the sexual relationship and level of intimacy in a relationship or marriage are two variables that generally are interlinked, with changes in the one affecting the other. In support of this possible explanation, quality of communication and the level of intimacy were found to be significantly positively correlated ($p < .001$) in the present study – it is thus suggested that a higher quality of communication is associated with increased intimacy and vice versa. In further support of this possible explanation, it is interesting to note that, in the present study, a highly significant negative correlation ($p < .001$) was found between the level of satisfaction with the sexual

[5] PAIR: The Personal Assessment of Intimacy in Relationships Inventory.

relationship and perceived intimacy, indicating that higher levels of sexual satisfaction (lower scores on the ISS) may be associated with increased intimacy (higher scores on PAIR), and vice versa.

Intimacy may be seen as a variable that could have the potential to act as a buffer against the influence of stress on a husband's and wife's marital relationship. There are many research studies that have found intimacy to be associated with marital quality (Harper & Elliot; Tolstedt & Stokes; Waring, all cited in Harper et al., 2000). Intimacy is a core aspect of marital quality and a crucial aspect of interpersonal relationships (Dandeneau & Johnson, 1994; Merves-Okin et al., 1991; McAdams & Bryant, 1987; Waring et al., 1981). Similarly, there have been some studies that suggest a relationship between stress and intimacy (Cobb; Hobfoll & Leiberman, all cited in Harper et al., 2000). Elliot (in Harper et al., 2000) conducted a study in which life-event stress was measured in young married couples and found that intimacy served as a buffer between stress and marital quality.

There are few empirical studies of intimacy as a mediating factor of life-event stress. Weiss (1979) examined 171 single and married men for intimacy as a mediating factor and found that intimacy did act as a buffer to stress. He found, however, that there is a certain limit to the levels of stress that can be mediated. Krause and Borawski-Clark (1994) examined the effect of social support on stress. Their results showed that emotional support helped individuals to cope with certain types of stress.

6.2.1.4 Infertility-related stress and level of marital adjustment (see Figure 5)

A highly significant ($p < .001$) negative correlation was found between the level of infertility-related stress and the level of marital adjustment (which can also be referred to as the overall satisfaction with the marital relationship). This finding indicates that higher levels of stress due to the experience of infertility (higher scores on the FPI) are associated with decreased marital adjustment (lower scores on the DAS[6]), and vice versa. This finding is in agreement with much previous research (Benazon et al., 1992; Bringhetti et al., in Monga et al., 2004; Daniluk, 1988; Dunkel-Schetter & Lobel, 1991; Elstein, in Benazon et al., 1992; Hirsch & Hirsch, 1989; Lalos, Lalos, Jacobssen, & Van Schoultz, cited in Ulbrich et al., 1990; Link & Darling, 1986; Rosenfeld, in Andrews et al., 1991; Ulbrich et al., 1990; Verhaak, in Schmidt et al., 2005), which found high levels of infertility-related stress to negatively impact on marital adjustment.

[6] DAS: The Dyadic Adjustment Scale.

One possible explanation for this phenomenon lies in examining the route through which infertility-related stress might impact on the marital adjustment of infertile couples. High levels of stress may impact negatively on communication in a marriage, rendering it less effective (Schroder et al., cited in Sillars & Parry, 1982). High levels of infertility-related stress may thus be associated with poorer communication, which may in turn result in less marital adjustment due to misunderstandings resulting from the poor communication. Furthermore, partners in a marriage may use different coping skills when confronted with a stressor such as infertility. One example is that the husband may choose not to express his feelings when stressed (avoidance coping), whereas his wife may view talking as a way of relieving feelings of stress (expressive coping), or vice versa (Peterson et al., 2008). Incongruent coping mechanisms may impact negatively on the quality of communication in the marriage, which might in turn decrease the level of marital adjustment and overall satisfaction with the marital relationship, as neither partner's needs are being met sufficiently. Incongruent coping and communication skills may in turn lead to higher stress levels and even less marital satisfaction, resulting in an endless and counterproductive cycle.

Schroder et al. (cited in Sillars & Parry, 1982) suggests that one reason why stress may reduce the efficiency of communication is that high levels of stress reduce "the complexity of human information processing" (p. 202). Furthermore, communication is one of the key processes of well-adjusted family functioning (Olson, 2000; Olson, Russell, & Sprenkle, 1983b). In accordance with this possible explanation, a significant ($p < .001$) positive correlation was found between the level of marital adjustment and the quality of communication in the marriage in the present study. This suggests that better communication may lead to better overall marital adjustment, while poor communication may negatively impact the level of marital adjustment. The theory discussed in Chapter Five (p. 70, Figure 12) can be applied in this regard. The theory, as developed by the researcher, stated that, apart from the level of infertility-related stress, quality of communication should also be considered a predictor variable of satisfaction with the sexual relationship, intimacy and, ultimately, marital adjustment (see Figure 12, p. 70). Good communication skills are crucial for a healthy relationship and/or marriage, and one would therefore hypothesise that quality of communication will significantly influence all other aspects of a relationship and/or marriage.

Gerrity (2001) emphasises that couple communication among individuals experiencing infertility is crucial, due to the fact that the spouse becomes a primary, if not only, source of social support. Communication may therefore influence all aspects of the marital relationship, as well as the

level of infertility-related stress experienced by the spouses. For a more detailed discussion of the theory, please refer back to Chapter Five, p. 71.

6.2.2 Multiple regression results

Six multiple regression models were tested in the present study. These models can be viewed in Chapter Five, where the results are presented. Models 2, 4, 5 and 6 explained the most variance in their individual predictions of outcome measures, with all predicting more than 40% of the variance. The results for each model will be discussed briefly in the next section. All results for the multiple regressions should be interpreted with caution because of the effects of multicollinearity. All the research variables are highly significantly correlated with each other and the conclusions that can be drawn from the regression models are limited. The regressions are included only for interest's sake.

6.2.2.1 Regression model 1 (see Figure 13)

This model tested the level of infertility-related stress (FPI) and quality of communication (ENRICH) as predictor variables, and satisfaction with the sexual relationship (ISS) as dependent variable. The adjusted R^2 of .28 indicates that the variables quality of communication and level of infertility-related stress combined explain 28% of the variance in the level of satisfaction with the sexual relationship. Quality of communication (ENRICH) predicted satisfaction with the sexual relationship (ISS) marginally more than infertility-related stress (FPI). This finding is consistent with previous research that shows that infertility-related stress may influence the level of satisfaction with the sexual relationship (Andrews et al., 1992; Battaglia, Graziano, & Fonti, in Hirsch & Hirsch, 1989; Monga et al., 2004; Ramezanzadeh et al., 2006; Verhaak, in Schmidt et al., 2005). As mentioned, communication is a crucial aspect of any relationship and will most likely influence satisfaction with the sexual relationship.

6.2.2.2 Regression model 2 (see Figure 14)

The second model tested to what extent the level of infertility-related stress (FPI) and quality of communication (ENRICH subscale) predicted perceived intimacy (PAIR). This model explains 46% of the variance in the prediction of intimacy. It is interesting to note that, once again, the quality of communication (ENRICH) predicts the outcome measure, in this instance intimacy, marginally better that does infertility-related stress (FPI). The important impact of communication, in addition to infertility-related stress, is thus emphasised.

6.2.2.3 Regression model 3 (see Figure 15)

The third model tested the predictive power of the level of infertility-related stress (FPI) and the quality of marital communication (ENRICH) for the level of marital adjustment (DAS) as outcome measure. This combination of predictor variables explains 35% of the variance in the level of marital adjustment as outcome measure. In this model, the level of infertility-related stress (FPI) becomes insignificant as predictor variable. Only quality of communication (ENRICH) significantly predicts the level of marital adjustment. This finding has to be interpreted with caution, however, due the effects of multicollinearity. All the research variables are correlated significantly with each other. A significant correlation was found between infertility-related stress and marital adjustment ($p < .001$). The fact that infertility-related stress becomes insignificant when combined with quality of communication thus does not necessarily mean that it does not predict marital adjustment – a highly significant correlation was found between communication and marital adjustment and the effects of multicollinearity should thus be considered in this case.

6.2.2.4 Regression model 4 (see Figure 16)

The fourth model tested how the level of infertility-related stress (FPI), quality of communication (ENRICH) and satisfaction with the sexual relationship (ISS) predicted the level of marital adjustment (DAS). This combination of predictor variables explains 42% of the variance in the level of marital adjustment as outcome variable. Once again, it is interesting to note that the level of infertility-related stress becomes insignificant as a predictor of marital adjustment when it is combined with quality of communication (ENRICH) and level of satisfaction with the sexual relationship (ISS). The effects of multicollinearity should be taken into consideration – a highly significant correlation was found between infertility-related stress and marital adjustment. Quality of communication and the level of satisfaction with the sexual relationship are significant predictors of the level of marital adjustment ($p < .001$).

6.2.2.5 Regression model 5 (see Figure 17)

The fifth model tested to which extent infertility-related stress (FPI), quality of communication (ENRICH) and perceived intimacy (PAIR) predicted marital adjustment (DAS) as dependent variable. This combination of variables explains 43% of the variance in the level of marital adjustment. Infertility-related stress becomes insignificant as a predictor, with communication and intimacy significantly predicting the level of marital adjustment. The effects of multicollinearity should be considered.

6.2.2.6 Regression model 6 (see Figure 18)

The sixth model had infertility-related stress (FPI), quality of communication (ENRICH), perceived intimacy (PAIR) and satisfaction with the sexual relationship (ISS) as predictor variables, and marital adjustment as dependent variable. This model explains 45% of the variance in the level of marital adjustment. In this model, infertility-related stress and satisfaction with the sexual relationship are insignificant predictors of marital adjustment, while quality of communication and perceived intimacy are significant predictors ($p < .05$). It should be noted that for all six regression models, there are unknown factors that contribute and explain the remaining amount of variance in specific outcomes.

As can be seen from the multiple regression results, quality of marital communication emerged as a significant predictor of many aspects of the marital relationship, with the level of infertility-related stress that a couple is experiencing becoming insignificant in combination with other variables. As mentioned, these findings need to be interpreted with caution. Highly significant correlations were found between infertility-related stress as independent variable and all four aspects of the marital relationship (quality of communication, satisfaction with the sexual relationship, perceived intimacy and the level of marital adjustment). Thus, due to the high correlation between infertility-related stress (FPI) and quality of communication (ENRICH), infertility-related stress falls out of the regression when these two variables are entered together. Regression analysis assumes independent variables with no linear relationship between them. In this case, however, the independent variables were significantly correlated. There is a linear relationship between the two measures (FPI and ENRICH), therefore the problem of multicollinearity arises, as the individual influence of the correlated variables cannot be isolated effectively (Gujarati, 2003).

After discussing the significant correlations and the multiple regression analyses, the role and influence of communication, in addition to infertility-related stress, on specific aspects of the marital relationship became clear. Previous research shows that the effects of the experience of infertility among women and men vary greatly among individuals (Benyamini, Gozlan, & Kokia, 2005; Verhaak, Smeenk, Van Minnen, Kremer, & Kraimaat, 2005). Pasch, Dunkel-Schetter and Christensen (2002) suggest that the effect of infertility on marital relationships may be modified by factors such as coping skills, the quality of communication between partners, and the involvement of partners in infertility treatments. A high quality of communication is thus crucial, as it may act as mediating factor in reducing infertility-related stress and, in turn, positively affect satisfaction with the sexual relationship, perceived intimacy and overall marital satisfaction.

Sydsjö et al. (2005) found that skill in communication and decision making within the marital relationship is crucial in order for couples to manage stress and minimise the potential detrimental effects of the experience of infertility on their relationship. The authors of that study suggest that the stable level of marital adjustment in IVF couples in their sample may be attributed to the rules that couples have to adhere to in order to be accepted for IVF treatment at the Reproduction Medical Centre where the data was collected. These rules state that couples should have been in an ongoing, stable relationship for at least two years and that none of the patients may have any ongoing psychiatric condition or psychosocial difficulties. Also, opportunities were given for counselling or therapy before, during and after treatment.

Reporaki et al. (2007) suggest that many aspects of infertility may lead to a deterioration in the marital relationships of infertile couples, including personal reactions such as feelings of guilt (Van Balen & Trimbos-Kemper, 1994), lowered self-esteem (Abbey, Halman, & Andrews, 1992), feelings of inadequacy as a man or a woman (Lee et al., 2001), and interpersonal aspects such as deterioration of sex life (Van Balen & Trimbos-Kemper, 1994; Oddens, Den Tonkelaar, & Nieuwenhuyse, 1999) and communication (Wricht et al., 1991). All the research variables in the present study were highly correlated: this suggests that an imbalance in any one of the variables may upset the equilibrium in the other variables. Equilibrium is a concept used in family systems theory to explain how families always aim for a balance between the resources of the family and the challenges with which the family is confronted as they attempt to adapt to stressors (Fleming, 2003). In agreement with family systems theory, the findings of the present study suggest that, in examining the infertility experience and the marital relationship, the focus should not be on the separate components of the infertility experience, but on how all the separate components are connected, interdependent and interrelated with each other. Any fluctuation in one part of the system can affect other components of the system, and these can affect the initial component. A holistic view is needed in order to assist infertile couples to deal with their experiences in the best way possible and, ultimately, to enhance good overall marital adjustment.

6.2.3 Secondary aims

The secondary aims of the present study were to examine whether there were significant differences in four specific aspects of the marital relationship between infertile couples at the onset of different types of infertility treatment, and a pregnant control group. ANOVAs calculated in the present study indicated no significant differences in communication, satisfaction with the sexual relationship, intimacy and marital adjustment between infertile couples and the pregnant control group (see Tables 13 to 16). It also was examined whether there were significant differences in the level of perceived infertility-related stress between groups of infertile couples at the onset of different types of infertility treatment. Not much research was found that addressed these specific questions. Boivin et al. (1998) compared men undergoing ICSI and IVF treatment. Their results showed that ICSI patients reported marginally more distress on the days prior to retrieval compared to the IVF patients. However, the psychological reactions for the two groups were not significantly different and it was concluded that there was no need to approach these patients differently during treatment. Consistent with the findings of the study by Boivin et al. (1998), no significant differences were found in this study in the level of infertility-related stress between groups of infertile couples at the onset of different types of infertility treatment (see Table 18).

A possible explanation for why there were no significant differences between any of these variables may be due, firstly, to a sample size that was too small. Differences and trends might have emerged with a bigger sample. Secondly, there may be other, unknown, factors that play a role and that may protect the marriage of infertile couples, such as communication, good social support and congruent coping skills. Thirdly, it should be noted that the infertile groups in the present study were at the onset of different types of assisted reproductive treatment and had not yet been through the whole process of their respective treatment phases. This aspect may limit the statistical results. In support of this possible explanation, Hammarberg, Astbury, and Baker (2001) found that the effect of IVF treatment is dependent on the length of time spent on the IVF programme, the number of treatment cycles attempted and the outcome of the treatment. In addition, whether emotional stress is evaluated before, during or after IVF may also have an influence on the effect of IVF treatment. This might be true for other types of assisted reproductive treatment as well. Lastly, it should be taken into consideration that the final sample of participants might not be as representative as it should be, as many extremely stressed potential participants may have dropped out, resulting in the final sample possibly containing less stressed participants and not being representative of all infertile individuals.

6.2.3.1 Congruence in partners' experiences of infertility-related stress

When viewed from a family systems perspective, "much of individual experience is mediated by the reciprocal influences of family members on one another" (Catherall, 2004, p. 127). This concept of reciprocality can also be applied to couples dealing with infertility. Couple congruence is a concept developed by McCubbin et al. (1993). It can be defined as a general sense of agreement in a couple with regard to how they define stress and how they appraise the severity of the stressor. Peterson et al. (2003) concluded that high congruence between partners' perceptions of stress might act as a buffer against high infertility-related stress being experienced by couples.

For this reason, one of the aims of the present study was to calculate the level of congruence between partners' perceptions of infertility-related stress. Unfortunately, a limitation of the present study was that very few men completed the study, resulting in a very small group of husbands and wives whose infertility-related stress (FPI) scores could be used for the calculation of congruence. It thus became impractical and of little use to calculate congruence, although the available data was analysed and congruence scores were obtained. The results showed all the correlations to be insignificant, all $p > .05$. A discussion of congruence in the present study is thus not possible.

6.3 Limitations and recommendations

A limitation of the present study is that the sample size was too small. A bigger sample size would produce more statistical power. Furthermore, the majority of the sample consisted of married, well-educated, middle- to upper-class participants and the results can thus not be generalised to include infertile couples from other population groups and of different socio-economic status. Previous research has shown, however, that this demographic profile is characteristic of the profiles of many couples who undergo infertility treatment (Abbey et al.; Berg & Wilson; Leiblum; all cited in Daniluk & Tench, 2007). Unmarried, low-income infertile couples may feel the pressure of infertility to an even greater extent due to extra financial strain. Future research could investigate the effects of infertility among couples from a lower socio-economic income group.

The initial research design as set out in the proposal envisaged that the participants would complete all the research questionnaires in one session at the respective infertility clinics. As is the case with many research studies, however, this was not possible due to the participants' time, work and travel constraints. Most of the questionnaires were thus distributed and data collection was done via e-mail correspondence. This is a huge shortcoming, as the e-mail correspondence

led to a lower response rate than would have been the case had the participants completed the questionnaires at the clinics. The high attrition rate associated with mailed questionnaires, or questionnaires not completed in the presence of the researcher(s), has been emphasised by Hammarberg et al. (2001). This method of data collection is also problematic because women whose treatments are unsuccessful or who are more negative tend not to respond or to withdraw, resulting in an unrepresentative sample, as only the more positive women completed the study (Adler et al., in Hammarberg et al., 2001). Future research investigating infertility should avoid e-mail correspondence and preferably collect data in person, however difficult this is. Monetary rewards could be offered to participants.

The present study employed self-report questionnaires as measuring instruments. Self-report is always problematic because participants often distort reality and convey inadequate information (Hirsch & Hirsch, 1989). It is a commonly used research tool, however, and the advantages of using self-report questionnaires often outweigh the drawbacks. Standardised questionnaires can be of great value in research. It is suggested that future studies combine quantitative and qualitative components in an investigation of infertility and incorporate a mixed-method design. A qualitative component would enrich our understanding of how the experience of infertility affects infertile couples' marital relationships and infertility-related stress levels.

It should be emphasised and borne in mind that the present study is merely a baseline study that presents a profile of infertile couples at the given infertility clinics. However, infertility is an experience that, in most cases, persists over time and should not be measured at a single point in time, as was the case with the cross-sectional design of the present study. Due to this design, it is crucial to note that the conclusions and interpretations based on the results are highly limited and should only be seen as a baseline view of infertile couples' marital relationships. Caution should thus be applied in interpreting the results of the present study. A longitudinal design is ideally suited to a study of this nature and future infertility studies should employ such a design.

Furthermore, previous research has shown that, when only one partner is responsible for the infertility problem being experienced, the impact on the marriage is greater and more negative than when both partners have fertility problems (Snarey, Son, Kuehne, Hauser, & Vaillant, in Ulbrich et al., 1990). Future studies may include the origin of infertility, be it male factor, female factor or mixed factor infertility, as a research variable and examine how this may mediate infertility-related stress and the effects of the experience of infertility on the marital relationship. Such data was available in this study, but was not analysed due to the small sample sizes, which would have restricted the conclusions that could be drawn. In the present study it was aimed to

examine the type of infertility, primary versus secondary infertility, as a research variable and to see if specific aspects of the marital relationship might differ between couples experiencing primary infertility and couples experiencing secondary infertility. Once again, however, the sample sizes were too small to successfully examine this aspect. Future studies could include an investigation of the role of primary and secondary infertility.

6.4 Implications for marital interventions

The findings of the present study suggest that the stress experienced as a result of fertility problems may affect life quality negatively, via its potentially negative impact on aspects of the marital relationship of infertile couples (Andrews et al., 1992). Andrews et al. (1992) note that this finding has crucial implications for therapists assisting couples in coping with infertility-related stress.

On an interactional level, interventions aimed at improving individual and relationship health and well-being should focus on evaluating the coping, communication and conflict resolution skills of each partner in order to assist them in productive problem solving and conflict management. Congruence and a positive attitude towards and realistic perception of the experience are also positive attributes that can be focused on. As shown, these skills can act as mediating factors, buffering against the negative impact of infertility-related stress on aspects of the marital relationship. If couples have few or no communication and conflict resolution skills, they can be helped to develop good skills so as to deal with their problems (Eunpu, 1995). It is crucial that psychological interventions should focus on both partners in the infertile couple, regardless of which spouse is receiving the infertility treatment (Markestad et al., 1998).

A better understanding of gender role socialisation with regard to sharing, communicating pain and coping skills will be beneficial for the couple. For example, research has found that women generally experience more stress due to infertility treatment (Benazon et al., 1992) and view childbearing and motherhood as a more central part of their identity (Frank; McEwan, Costello, & Taylor; both cited in Benazon et al., 1992). Several research studies have shown that women experience infertility as more stressful than men (Henning & Strauss, 2002). Women view their marital and sexual relationships less positively than men after being diagnosed with infertility and during infertility treatment (Bringhenti et al., 1997; Leiblum et al., 1998; Newton et al., 1999; Monga et al., 2004; Slade et al., 1997). This gender difference in the experience of infertility should also be taken into consideration when developing psychological interventions.

The present study found that infertility-related stress might negatively influence couples' satisfaction with their sexual relationship. It is crucial, for research and clinical treatment

purposes, that couples at risk of developing sexual difficulties, which may in turn adversely affect marital functioning, should be identified at an early stage. It would be advantageous to monitor couples' relationships throughout their treatment process, as relationship problems have been found to arise only after a period of time, rather than early in the treatment process (Benazon et al., 1992). Assessments should be done of the couples' feelings and levels of stress after each unsuccessful treatment cycle in order to determine if the couple should continue treatment or take a break. Treatment can involve working on the sexual relationship continuously, making couples aware that their sexual relationship should not become only a means of procreation (Ohl et al., 2009), to avoid it becoming a chore and merely mechanical. Treatment should aim to help each partner feel adequate and to help them not to base their self-value on only one aspect of their identity – to emphasise that childbearing is societally valued, but not the only aspect of identity that should be focused on.

Lastly, research has shown that resilience in couples experiencing infertility has the potential to decrease the negative impact of infertility-related stress. The Infertility Resilience Model (Ridenour, Yorgason, & Peterson, 2009) has been proposed as a framework within which "various individual, couple, and external factors that influence resilience can be understood" (p. 34). The Resilience Model considers "developing strengths in the face of adversity" (Boss, in Ridenour et al., 2009, p. 35). This model can be useful for clinicians working with infertile couples.

6.5 Conclusion

The present study aimed to examine the nature of the relationship between the levels of infertility-related stress experienced by infertile couples and specific aspects of the marital relationship. It was also investigated whether significant differences could be found in specific aspects of the marital relationship between infertile treatment groups and a control group, and whether there were significant differences in the levels of infertility-related stress between three infertile treatment groups. Standardised questionnaires were utilised to measure the research constructs that were applied in the present study. The results of this study suggest that high levels of infertility-related stress, as well as poor communication skills, may impact negatively on the perceived intimacy, satisfaction with the sexual relationship and, ultimately, the overall level of marital satisfaction of infertile couples at the onset of different types of infertility treatment. This finding should serve as motivation for infertile couples, infertility specialists and psychologists to aim to adopt sound communication and coping skills in order to buffer against the potential negative effects that are often the result of infertility. Couples at risk of developing individual and relationship problems due to the experience of infertility should be identified at an early

stage in order to provide them with the necessary psychological and relationship counselling and practical advice (Benazon et al., 1992). Although this study reflected a number of limitations, many of the research findings are supported by theory and research. This study should be seen as an early exploration of infertility-related stress, specific aspects of the marital relationship and the interaction between all these aspects. Further exploration of the current research aims in studying the psychosocial impact of infertility is a promising avenue for future research.

REFERENCES

Abbey, A., Halman, L. J., & Andrews, F. M. (1992). Psychosocial, treatment, and demographic predictors of the stress associated with infertility. *Fertility and Sterility, 57*(1), 122-128.

Alemnji, G. A., & Thomas, K. D. (1997). Socio-biological status of Nigerian males with primary and secondary infertility. *East African Medical Journal, 74*(8), 519-522.

Anderheim, L., Holter, H., Bergh, C., & Möller, A. (2005). Does psychological stress affect the outcome of in vitro fertilization? *Human Reproduction, 20*(10), 2969-2975.

Andrews, F. M., Abbey, A., & Halman, L. J. (1991). Stress from infertility, marriage factors, and subjective well-being of wives and husbands. *Journal of Health and Social Behavior, 32*(3), 238-253.

Andrews, F. M., Abbey, A., & Halman, L. J. (1992). Is fertility-problem stress different? The dynamics of stress in fertile and infertile couples. *Fertility and Sterility, 57*(6), 1247-1253.

Andrews, L. B. (1984). *New conceptions*. New York: St. Martin's.

Andrews, L. B. (1999). *The clone age: Adventures in the new world of assisted reproductive technology.* New York: Henry Holt.

Armitage, C. J., & Conner, M. (2000). Social cognition models and health behaviour: A structured review. *Psychology and Health, 15*(2), 173-189.

Artificial insemination for infertility, Intrauterine insemination – IUI (n.d.). Retrieved August 11, 2009, from http://www.advancedfertility.com/insem.htm

Assisted reproductive technologies intracytoplasmic sperm injection (2008a). Retrieved August 11, 2009, from http://www.fertilitylifelines.com/fertilitytreatments/icsi.jsp

Assisted reproductive technologies in vitro fertilization (2008b). Retrieved August 11, 2009, from http://www.fertilitylifelines.com/fertilitytreatments/invitrofertilization.jsp

Atwood, J. D., & Dobkin, S. (1992). Storm clouds are coming: Ways to help couples reconstruct the crisis of infertility. *Contemporary Family Therapy, 14*(5), 385-403.

Barker, G. H. (1980). *Infertiliteit*. Pretoria: Femina Uitgewers.

Barker, P. (2007). *Basic family therapy.* Cornwall: Blackwell Publishing.

Becker, G., Castrillo, M., Jackson, R., & Nacthigall, R. D. (2006). Infertility among low-income Latinos. *Fertility and Sterility, 85*(4), 882-887.

Benazon, N., Wright, J., & Sabourin, S. (1992). Stress, sexual satisfaction, and marital adjustment in infertile couples. *Journal of Sex and Marital Therapy, 18*(4), 273-284.

Benyamini, Y., Gozlan, M., & Kokia, E. (2005). Variability in the difficulties experienced by women undergoing infertility treatments. *Fertility and Sterility, 83*(2), 275-283.

Berg, B. J., & Wilson, J. F. (1991). Psychosocial functioning across stages of treatment for infertility. *Journal of Behavioral Medicine, 14*(1), 11-26.

Berghuis, J. P., & Stanton, A. L. (2002). Adjustment to a dyadic stressor: A longitudinal study of coping and depressive symptoms in infertile couples over an insemination attempt. *Journal of Consulting and Clinical Psychology, 70*(2), 433-438.

Bhatti, L. I., Fikree, F. F., & Khan, A. (1999). The quest of infertile women in squatter settlements of Karachi, Pakistan: A qualitative study. *Social Science and Medicine, 49*(5), 637-649.

Boivin, J., Bunting, L., Collins, J. A., & Nygren, K. G. (2007). International estimates of infertility prevalence and treatment-seeking: potential need and demand for infertility medical care. *Human Reproduction 22*(6), 1506-1512.

Boivin, J., Shoog-Svanberg, A., Andersson, L., Hjelmstedt, A., Bergh, T., & Collins, A. (1998). Distress level in men undergoing intracytoplasmic sperm injection versus in-vitro fertilization. *Human Reproduction, 13*(5), 1403-1406.

Boivin, J., & Takefman, J. E. (1995). Stress level across stages of in vitro fertilization in subsequently pregnant and nonpregnant women. *Fertility and Sterility, 64*(4), 802-810.

Bradshaw, J. (1988). *Bradshaw on: The family – a revolutionary way of self-discovery.* Deerfield Beach: Health Communications.

Brand, H.J. (1979). *Psigomatiese spanning en infertiliteit.* Unpublished doctoral dissertation, University of Stellenbosch, South Africa.

Bringhenti, F., Martinelli, F., Ardenti, R., & La Sala, G. B. (1997). Psychological adjustment of infertile women entering IVF treatment: Differentiating aspects and influencing factors. *Acta Obstetricia et Gynecologica Scandinavica, 76*(5), 431-437.

Broderick, C. B. (1993). *Understanding family processes.* London: Sage Publications.

Broderick, C. B., & Smith, J. (1979). *Contemporary theories about the family.* New York: Free Press.

Burns, L. H. (1987). Infertility as boundary ambiguity: One theoretical perspective. *Family Process, 26*(3), 359-372.

Burns, L. H., & Covington, S. N. (2006). *Infertility counseling: A comprehensive handbook for clinicians* (2nd ed.). Cambridge: Cambridge University Press.

Catherall, D. R. (2004). *Handbook of stress, trauma, and the family.* New York: Brunner-Routledge.

Clarke, R. N., Klock, S. C., Geoghegan, A., & Travassos, D. E. (1999). Relationship between psychological stress and semen quality among in-vitro fertilization patients. *European Society of Human Reproduction and Embryology, 14*(3), 753-758.

Coëffin-Driol, C., & Giami, A. (2004). The impact of infertility and its treatment on sexual life and marital relationships: Review of the literature. *Gynécologie, Obstétrique & Fertilité, 32*(7-8), 624-637.

Collins, A., Freeman, E. W., Boxer, A. S., & Tureck, R. (1992). Perceptions of infertility and treatment stress in females as compared with males entering *in vitro* fertilization treatment. *Fertility and Sterility, 57*(2), 350-356.

Connolly, K. J., Edelmann, R. J., Cooke, I. D., & Robson, J. (1992). The impact of infertility on psychological functioning. *Journal of Psychosomatic Research, 36*(5), 459-468.

Cooper, B. C., Gerber, J. R., McGettrick, A. L., & Johnson, J. V. (2007). Perceived infertility-related stress correlates with in vitro fertilization outcome. *Fertility and Sterility, 88*(3), 714-717.

Cooper-Hilbert, B., & Hilbert, G. (1993). Infertile couples in crisis: What MFT's need to know. Workshop presented at the 51st Annual Conference of the American Association for Marriage and Family Therapy, Anaheim, CA.

Csemiczky, G., Landgren, B. M., & Collins, A. (2000). The influence of stress and state anxiety on the outcome of IVF-treatment: Psychological and endocrinological assessment of Swedish women entering IVF-treatment. *Acta Obstetricia et Gynecologica Scandinavica, 79*(2), 113-118.

Cwikel, J., Gidron, Y., & Sheiner, E. (2004). Psychological interactions with infertility among women. *European Journal of Obstetrics & Gynecology and Reproductive Biology, 117*(2), 126-131.

Daiter, E. (2008).Ovulation induction: Advanced infertility treatment. Retrieved August 11, 2009, from http://www.drericdaitermd.com/2008/02/ovulation-induction-advanced.html

Dandeneau, M. L., & Johnson, S. M. (1994). Facilitating intimacy: Interventions and effects. *Journal of Marital and Family Therapy, 20*(1), 17-33.

Daniluk, J. C. (1988). Infertility: Intrapersonal and interpersonal impact. *Fertility and Sterility, 49*(6), 982-990.

Daniluk, J. C. (2001). Reconstructing their lives: A longitudinal, qualitative analyses of the transition to biological childlessness for infertile couples. *Journal of Counseling and Development, 79*(4), 439-449.

Daniluk, J. C, & Tench, E. (2007). Long-term adjustment of infertile couples following unsuccessful medical intervention. *Journal of Counseling and Development, 85*(1), 89-100.

Day, R. D. (2005). *Relationship stress in couples: Situations involving infidelity, infertility, and imprisonment*. In P. C. McKenry & S. J. Price (eds.). *Families and change: Coping with stressful events and transitions* (3rd ed., pp. 333–354). Thousand Oaks, CA: Sage.

Demyttenaere, K., Bonte, L., Gheldof, M., Vervake, M., Meuleman, C., Vaderschuerem, D., et al. (1998). Coping style and depression level influence outcome of in vitro fertilization. *Fertility and Sterility, 69*(6), 1026-1033.

Domar, A. D., Zuttermeister, P. C., & Friedman, R. (1993). The psychological impact of infertility: A comparison with patients with other medical conditions. *Journal of Psychosomatic Obstetrics and Gynecology, 14*(Supplement), 45-52.

Dunkel-Schetter, C., & Lobel, M. (1991). *Psychological reactions to infertility*. In A. L. Stanton, & C. Dunkel-Schetter (eds.), *Infertility: Perspectives from stress and coping research*. New York: Plenum Press.

Dyer, S. J., Abrahams, N., Hoffman, M., & Van der Spuy, Z. M. (2002a). Infertility in South Africa: Women's reproductive health knowledge and treatment-seeking behaviour for involuntary childlessness. *Human Reproduction, 17*(6), 1657-1662.

Dyer, S. J., Abrahams, N., Hoffman, M., & Van der Spuy, Z. M. (2002b). 'Men leave me as I cannot have children': Women's experiences with involuntary childlessness. *Human Reproduction, 17*(6), 1663-1668.

Dyer, S. J., Abrahams, N., Mokoena, N. E., & Van der Spuy, Z. M. (2004). 'You are a man because you have children': Experiences, reproductive health knowledge and treatment-seeking behaviour among men suffering from couple infertility in South Africa. *Human Reproduction, 19*(4), 960-967.

Emslie, C., Grimshaw, J., & Templeton, A. (1993). Do clinical guidelines improve general practice management and referral of infertile couples? *British Medical Journal, 306*(6894), 1728-1731.

Engel, G. L. (1977). The need for a new medical model. *Science, 196*(4286), 129-136.

Eunpu, D. L. (1995). The impact of infertility and treatment guidelines for couples therapy. *The American Journal of Family Therapy, 23*(2), 115-127.

Fachinetti, F., Volpe, A., Matteo, M. L., Genazzani, A. R., & Artini, G. P. (1997). An increased vulnerability to stress is associated with a poor outcome of in vitro fertilization-embryo transfer treatment. *Fertility and Sterility, 67*(2), 309-314.

Ferber, G. M. (1995). An empathy-supporting approach to the treatment of infertile women. *Psychotherapy (Chicago, Ill.), 32*(3), 437–442.

Fischer, J., & Corcoran, K. (2007). *Measures for clinical practice and research* (4th ed.), Vol. 1: *Couples, families, and children.* New York: Oxford University Press.

Fleming, W. M. (2003). *Family systems theory.* An entry from Macmillan Reference USA's International Encyclopedia of Marriage and Family

Fowers, B. J., & Olson, D. H. (1989). ENRICH Marital Inventory: A discriminant validity and cross-validation assessment. *Journal of Marital and Family Therapy*, *15*(1), 65-79.

Gatchel, R. J., & Oordt, M. S. (2003). *Clinical health psychology and primary care: Practical advice and clinical guidance for successful collaboration*. Washington, DC: American Psychological Association.

Gerrits, T. (1997). Social and cultural aspects of infertility in Mozambique. *Patient Education and Counseling, 31*(1), 39-48.

Gerrity, D. A. (2001). A biopsychosocial theory of infertility. *The Family Journal, 9*(2), 151-158.

Golombok, S. (1992). Review: Psychological functioning in infertile patients. *Human Reproduction, 7*(2), 208-212.

Greeff, A. P., & Malherbe, H. L. (2001). Intimacy and marital satisfaction in spouses. *Journal of Sex and Marital Therapy, 27*(3), 247-257.

Greil, A. L. (1997). Infertility and psychological distress: A critical review of the literature. *Social Sciences and Medicine, 45*(11), 1679-1704.

Greil, A. L., Leitko, T. A., & Porter, K. L. (1988). Infertility: His and hers. *Gender Society, 2*(2), 172-199.

Greil, A. L., & Porter, K. L. (1990). Sex and intimacy among infertile couples. *Journal of Psychology and Human Sexuality, 2*(2), 117-138.

Guerra, D., Llobera, A., Veiga, A., & Barri, P. N. (1998). Psychiatric morbidity in couples attending a fertility service. *Human Reproduction, 13*(6), 1733-1736.

Gujarati, D. N. (2003). *Basic econometrics* (4th ed.). New York: McGraw-Hill.

Halligan, P. W., & Aylward, M. (Eds.) (2006). *The Power of belief: Psychosocial influence on illness, disability and medicine*. London: Oxford University Press.

Hammarberg, K., Astbury, J., & Baker, H. (2001). Women's experiences of IVF: A follow-up study. *Human Reproduction, 16*(2), 374-383.

Harlow, C. R., Fahy, U. M., Talbot, W. M., Wardle, P. G., & Hull, M. G. (1996). Stress and stress-related hormones during in-vitro fertilization treatment. *Human Reproduction, 11*(2), 274-279.

Harper, J. M., & Elliott, M. L. (1988). Can there be too much of a good thing? The relationship between desired level of intimacy and marital adjustment. *The American Journal of Family Therapy, 16*(4), 351-360.

Harper, J. M., Schaalje, B. G., & Sandberg, J. G. (2000). Daily hassles, intimacy, and marital quality in later life marriages. *American Journal of Family Therapy, 28*(1), 1-18.

Healy, D. L., Trounson, A. O., & Andersen, A. N. (1994). Female infertility, causes and treatment. *Lancet, 343*(8912), 1529-1544.

Henning, K., & Strauss, B. (2002). *Psychological and psychosomatic aspects of involuntary childlessness: State of research at the end of the 1990's.* In B. Strauss, (ed.), *Involuntary childlessness: Psychological assessment, counselling, and psychotherapy*. Kirkland: Hogrefe & Huber.

Hirsch, A. M., & Hirsch, S. M. (1989). The effect of infertility on marriage and self-concept. *Journal of Obstetric, Gynecologic, & Neonatal Nursing, 18*(1), 13-20.

Hjelmstedt, A., Andersson, L., Skoog-Svanberg, A., Bergh, T., Boivin, J., & Collins, A. (1999). Gender differences in psychological reactions to infertility among couples seeking IVF- and ICSI-treatment. *Acta Obstetrics Gynecology Scandinavia, 78*(1), 42-48.

Hjollund, N. H., Bonde, J. P., Brink Henriksen, T., Giwercman, A., Olsen, J., & the Danish First Planner Study Team. (2004). Reproductive effects of male psychologic stress. *Epidemiology, 15*(1), 21-27.

Holter, H., Anderheim, L., Bergh, C., & Möller, A. (2006). First IVF treatment – short-term impact on psychological well-being and the marital relationship. *Human Reproduction, 21*(12), 3295-3302.

Hudson, W. W., Harrison, D. F., & Crosscup, P. C. (1981). A short-from scale to measure sexual discord in dyadic relationships. *The Journal of Sex Research, 17*(2), 157-174.

Irwin, M., & Vedhara, K. (2005). *Human psychoneuroimmunology*. New York: Oxford University Press.

Jackson, D. D. (1965). The study of the family. *Family Processes, 4*(1), 1-20.

Jones, F., & Bright J. (2001). *Stress: Myth, theory and research.* London: Pearson Education Limited.

Jordan, C., & Revenson, T. A. (1999). Gender differences in coping with infertility: A meta-analysis. *Journal of Behavioral Medicine, 22*(4), 341-358.

Kaplan, R., Ganiats, T., Rosen, P., Sieber, W., & Anderson, J. (1995). Development of a self-administered Quality of Well-Being Usefulness scale (QWB-SA): Initial studies. *Quality of Life Research, 4*(5), 443.

Kenny, D. A., & Acitelli, L. K. (1994). Similarity in couples. *Journal of Family Psychology, 8*(4), 417-431.

Krause, N., & Borawski-Clark, E. (1994). Clarifying the functions of social support in later life. *Research on Aging, 16*(3), 251-279.

Kruger, T. F., Hulme, V. A., Van der Merwe, J. P., Viljoen, J., & Franken, D. R. (1990). Ondersoek en hantering van die infertiele egpaar in die algemene praktyk. *South African Journal of Continuing Medical Education, 8*(2), 115-120.

Lampman, C., & Dowling-Guyer, S. (1995). Attitudes toward voluntary and involuntary childlessness. *Basic and Applied Social Psychology, 17*(1&2), 213-222.

Lazarus, R. S., & Folkman, S. (1989). *Manual for the Hassle and Uplift Scales: Research Edition.* California, USA: Mind Garden.

Lee, T. Y., Sun, G. H., & Chao, S. C. (2001). The effect of an infertility diagnosis on the distress, marital and sexual satisfaction between husbands and wives in Taiwan. *Human Reproduction, 16*(8), 1762-1767.

Leiblum, S. R. (1997). *Infertility: Psychological issues and counselling strategies.* New York: John Wiley and Sons.

Leiblum, S. R., Aviv, A., & Hamer, R. (1998). Life after infertility treatment: A long-term investigation of marital and sexual function. *Human Reproduction, 13*(12), 3569-3574.

Leke, R. J. I., Oduma, J. A., Bassol-Mayagoitia, S., Bacha, A. M., & Grigor, K. M. (1993). Regional and geographical variations in infertility: Effects of environmental, cultural and socioeconomic factors. *Environmental Health Perspectives, 101*(2), 73-80.

Lemyre, L., & Tessier, R. (1988). Measurement of psychological stress: To feel stressed. *Canadian Journal of Behavioural Science, 20*(3), 302-321.

Levin, J. B., Sher, T. G., & Theodos, V. (1997). The effect of intracouple coping concordance on psychological and marital distress in infertility patients. *Journal of Clinical Psychology in Medical Settings, 4*(4), 361-372.

Link, P. W., & Darling, C. A. (1986). Couples undergoing treatment for infertility: Dimensions of life satisfaction. *Journal of Sex and Marital Therapy, 12*(1), 46-59.

Locke, H. J., & Wallace, K. M. (1959). Short marital adjustment and prediction tests: Their reliability and validity. *Marriage and Family Living, 21*(1), 251-255.

Mahlstedt, P. P., MacDuff, S., & Bernstein, J. (1987). Emotional factors and the *in vitro* fertilization and embryo transfer process. *Journal of Assisted Reproduction and Genetics, 4*(4), 232-236.

Markestad, C. L., Montgomery, L. M., & Bartsch, R. A. (1998). Infertility and length of medical treatment effects on psychological, marital, and sexual functioning. *International Journal of Rehabilitation and Health, 4*(4), 233-243.

Marshall, J. C., Eagleson, C. A., & McCartney, C. R. (2001). Hypothalamic dysfunction. *Molecular and Cellular Endocrinology, 183*(1-2), 29-32.

McAdams, D. P., & Bryant, F. B. (1987). Intimacy, motivation and subjective mental health in a nationwide sample. *Journal of Personality, 55*(3), 395-413.

McCubbin, H. I., Thompson, E., Thompson, A., & McCubbin, M. (1993). *Family schema, paradigms, and paradigm shifts.* In A. Turnbull, J. Patterson, S. Behr, D. Murphy, J. Marqquis, & M. Blue-Banning (eds.), *Cognitive coping, families, and disability* (pp. 239-255). Baltimore: P.H. Brookes.

McDaniel, S. H., Hepworth, J., & Doherty, W. (1992). Medical family therapy with couples facing infertility. *The American Journal of Family Therapy, 20*(2), 101-122.

McEwan, K. L., Costello, C. G., & Taylor, P. J. (1987) Adjustment to infertility. *Journal of Abnormal Psychology, 96*(2), 108-116.

Menning, B. E. (1980). The emotional needs of infertile couples. *Fertility and Sterility, 34*(4), 313-319.

Merari, D., Feldberg, D., Elizur, A., Goldman, J., & Modan, B. (1992). Psychological and hormonal changes in the course of in-vitro fertilization. *Journal of Assisted Reproduction and Genetics, 9*(2), 161-169.

Merves-Okin, L., Amidon, E., & Bernt, F. (1991). Perceptions of intimacy in marriage: A study of married couples. *The American Journal of Family Therapy, 19*(2), 110-118.

Meyers, M., Diamond, R., Kezur, D., Sharf, C., Weinshel, M., & Rait, D. S. (1995a). An infertility primer for family therapists: I. Medical, social, and psychological dimensions. *Family Process, 34*(2), 219-229.

Meyers, M., Weinshel, M., Scharf, C., Kezur, D., Diamond, R., & Rait, D. S. (1995b). An infertility primer for family therapists: II. Working with couples who struggle with infertility. *Family Process, 34*(2), 231-240.

Minuchin, S. (1974). *Families and family therapy.* Cambridge, MA: Harvard Press.

Minuchin, S., Rossman, B. L., & Baker, L. (1978). *Psychosomatic families: Anorexia nervosa in context.* Boston: Harvard University Press.

Möller, A., & Fällström, K. (1991). Psychological consequences of infertility. *Journal of Psychosomatic Obstetrics and Gynecology, 12*(1), 27-44.

Monga, M., Alexandrescu, B., Katz, S. E., Stein, M., & Ganiats, T. (2004). Impact of infertility on quality of life, marital adjustment, and sexual function. *Urology, 63*(1), 126-130.

Myers, L. B., & Wark, L. (1996). Psychotherapy for infertility: A cognitive-behavioral approach for couples. *The American Journal of Family Therapy, 24*(1), 9-20.

Newton, C. R., Sherrard, W., & Glavac, I. (1999). The Fertility Problem Inventory: Measuring perceived infertility-related stress. *Fertility and Sterility, 72*(1), 54-62.

Oddens, B. J., Den Tonkelaar, I., & Nieuwenhuyse, H. (1999). Psychosocial experiences in women facing fertility problems – comparative survey. *Human Reproduction,* 14(1), 255-261.

Ogden, J. (2000). *Health psychology: A textbook* (2nd ed.). Philadelphia: Open University Press.

Ohl, J., Reder, F., Fernandez, A., Bettahar-Lebugle, K., Rongières, C., & Nisand, I. (2009). Impact of infertility and assisted reproductive techniques on sexuality. *Gynécologie, Obstétrique & Fertilité, 37*(1), 25-32.

Olson, D. H. (2000). Circumplex model of marital and family systems. *Journal of Family Therapy, 22*(1), 144-167.

Olson, D. H., Fournier, D. G., & Druckman, J. M. (1983a). *Counselor's manual for PREPARE/ENRICH*. (Revised Edition). Minneapolis, MN: PREPARE/ENRICH, Inc.

Olson, D. H., Russell, C. S., & Sprenkle, D. H. (1983b). Circumplex model of marital and family systems: VI. Theoretical update. *Family Process, 22*(1), 69-83.

Pasch, L. A., Dunkel-Schetter, C., & Christensen, A. (2002). Differences between husbands' and wives' approach to infertility affect marital communication and adjustment. *Fertility and Sterility, 77*(6), 1241-1247.

Peterson, B. D., Newton, C. R., & Feingold, T. (2007). Anxiety and sexual stress in men and women undergoing infertility treatment. *Fertility and Sterility, 88*(4), 911-914.

Peterson, B. D., Newton, C. R., & Rosen, K. H. (2003). Examining congruence between partners' perceived infertility-related stress and its relationship to marital adjustment and depression in infertile couples. *Family Process, 42*(1), 59-70.

Peterson, B. D., Newton, C. R., Rosen, K. H., & Schulman, R. S. (2006). Coping processes of couples experiencing infertility. *Family Relations, 55*(2), 227-239.

Peterson, B. D., Pirritano, M., Christensen, U., & Schmidt, L. (2008). The impact of partner coping in couples experiencing infertility. *Human Reproduction 23*(5), 1128-1137.

Popovic, M. (2005). Intimacy and its relevance in human functioning. *Sexual and Relationship Therapy, 20*(1), 31-49.

Ramezanzadeh, F., Aghssa, M. M., Jafarabadi, M., & Zayeri, F. (2006). Alterations of sexual desire and satisfaction in male partners of infertile couples. *Fertility and Sterility, 85*(1), 139-143.

Raymond, J. G. (1991). Women as wombs. *Ms. Magazine,* 28-33.

Reporaki, L., Punamäki, R. L., Unkila-Kallio, L., & Vilska, S. (2007). Infertility treatment and marital relationships: A 1-year prospective study among successfully treated ART couples and their controls. *Human Reproduction, 22*(5), 1481-1492.

Ridenour, A. F., Yorgason, J. B., & Peterson, B. (2009). The Infertility Resilience Model: Assessing individual, couple, and external predictive factors. *Contemporary Family Therapy, 31*(1), 34-51.

Rosen, R. C., Riley, A., Wagner, G., Osterloh, I. H., Kirkpatrick, J., & Mishra, A. (1997). The International Index of Erectile Function (IIEF): A multidimensional scale for assessment of erectile dysfunction. *Urology, 49*(6), 822-930.

Rosen, R. C., Taylor, J. F., Leiblum, S. R., & Bachman, G. A. (1993). Prevalence of sexual dysfunction in women: Results of a survey study of 329 women in an outpatient gynecological clinic. *Journal of Sex and Marital Therapy, 19*(3), 171-188.

Savage, O. M. N. (1992). Artificial donor insemination in Yaounde: Some socio-cultural considerations. *Social Sciences and Medicine, 35*(7), 907-913.

Schaefer, M. R., & Olson, D. H. (1981). Assessing intimacy: The Pair Inventory. *Journal of Marital and Family Therapy, 7*(1), 47-60.

Schmidt, L. (1996). *Psychosocial consequences of infertility and treatment*. Copenhagen: FADL's Press.

Schmidt, L., Holstein, B., Christensen, U., & Boivin, J. (2005). Does infertility cause marital benefit? An epidemiological study of 2250 women and men in fertility treatment. *Patient Education and Counseling, 59*(3), 244-251.

Schumm, W. R., Nichols, C. W., Schectman, K. L., & Grigsby, C. C. (1983). Characteristics of responses to the Kansas Marital Satisfaction Scale by a sample of 84 married mothers. *Psychological Reports, 53*(2), 567-572.

Shiloh, S., Larom, S., & Ben-Rafael, Z. (1991). The meaning of treatments for infertility: Cognitive determinants and structure. *Journal of Applied Social Psychology, 21*(10), 855-874.

Sillars, A., & Parry, D. (1982). Stress, cognition, and communication in interpersonal conflicts. *Communication Research, 9*(1), 201-226.

Slade, P., Emery, J., & Lieberman, B. A. (1997). A prospective, longitudinal study of emotions and relationships in in-vitro fertilization treatment. *Human Reproduction, 12*(1), 183-190.

Smeenk, J. M. J., Verhaak, C. M., Eugster, A., Van Minnen, A., Zielhuis, G. A., & Braat, D. D. M. (2001). The effect of anxiety and depression on the outcome of in-vitro fertilization. *Human Reproduction, 16*(7), 1420-1423.

Snell, S. A., & Rosen, K. H. (1997). Parents of special needs children: Mastering the job of parenting. *Contemporary Family Therapy, 19*(3), 425-442.

Spanier, G. B. (1976). Measuring dyadic adjustment: New scales for assessing the quality of marriage and similar dyads. *Journal of Marriage and the Family*, *38*(1), 15-28.

Spector, A. R. (2004). Psychological issues and interventions with infertile patients. *Women & Therapy, 27*(3-4), 91-105.

Stammer, H., Wischmann, T., & Verres, R. (2002). Counseling and couple therapy for infertile couples. *Family Process, 41*(1), 111-122.

StatSoft, Inc. (2005). STATISTICA (data analysis software system), version 7.

Steinglass, P. (1987). A systems view of family interaction and psychopathology. In T. Jacob (Ed.), *Family interaction and psychopathology*. New York: Plenum Press.

Stewart, S., & Glazer, G. (1986). Expectations and coping of women undergoing in vitro fertilization. *Maternal-Child Nursing Journal, 15*(2), 103-113.

Sundby, J. (1997). Infertility in the Gambia: Traditional and modern health care. *Patient Education and Counseling, 31*(1), 29-37.

Sydsjö, G., Ekholm, K., Wadsby, M., Kjellberg, S., & Sydsjö, A. (2005). Relationships in couples after failed IVF treatment: A prospective follow-up study. *Human Reproduction, 20*(7), 1952-1957.

Tierney, L., McPhee, S. J., & Papadakis, M. A. (1999). *Current medical diagnosis and treatment.* East Norwalk, CT: Appleton & Lange.

Tjornhoj-Thomsen, T. (1999). *Genesis. Childlessness, kinship, and reproductive technology in Denmark.* Copenhagen: University of Copenhagen.

Trochim, W. M. K. (2000). *The research methods knowledge base* (2nd ed.). Cincinnati, OH: Atomic Dog Publishing.

Tucker-Ladd, C. E. (2000). *Psychological self-help, mental health net.* Retrieved August, 2009, from http://mentalhelp.net/psyhelp/html

Ulbrich, P. M., Coyle, A. T., & Llabre, M. M. (1990). Involuntary childlessness and marital adjustment: His and hers. *Journal of Sex and Marital Therapy, 16*(3), 147-158.

Van Balen, F., & Trimbos-Kemper, T. (1994). Factors influencing the well-being of long-term infertile couples. *Journal of Psychosomatic Obstetrics and Gynaecology, 15*(3), 157-164.

Verhaak, C. M., Smeenk, J. M. J., Van Minnen, A., Kremer, J. A. M., & Kraimaat, F. W. (2005). A longitudinal, prospective study on emotional adjustment before, during and after consecutive fertility treatment cycles. *Human Reproduction, 20*(8), 2253-2260.

Von Bertalanffy, L. (1968). *General systems theory.* New York: George Braziller.

Von Bertalanffy, L. (1975). *Perspectives on general systems theory: Scientific-philosophical studies.* New York: George Braziller.

Wait, J., Meyer, J., & Loxton, H. (2005). *Human development a psychosocial perspective.* Cape Town: Ebony Books.

Waring, E. M. (1981). Marital intimacy through self-disclosure. *The American Journal of Family Therapy, 9*(4), 33-42.

Waring, E., McElrath, D., Lefcoe, D., & Weisz, G. (1981). Dimensions of intimacy in marriage. *Psychiatry, 44*(2), 169-175.

Watkins, K. J., & Baldo, T. D. (2004). The infertility experience: Biopsychosocial effects and suggestions for counselors. *Journal of Counseling and Development, 82*(4), 394-420.

Weiss, L. J. (1979). Interpersonal intimacy and adaptation to stress throughout the adult life. *Dissertation Abstracts International, 39*(7), January, 3599-B.

Wessels, P. W., & Nel, J. T. (1988). Seleksie van behandelingsmetodes vir die infertiele egpaar. *Geneeskunde, 30*(4), 20-23.

Whitchurch, G., & Constantine, L. (1993). "Systems theory." In P. Boss, W. Doherty, R. LaRossa, W. Schumm, & S. Steinmetz (Eds.), *Sourcebook of family theories and methods: a contextual approach*. New York: Plenum Press.

White, M. B., Stahmann, R. F., & Furrow, J. L. (1994). Shorter may be better: A comparison of the Kansas Marital Satisfaction Scale and the Locke-Walace Marital Adjustment Test. *Family Perspective, 8*(1), 53-66.

Whiteford, L. M., & Gonzalez, L. (1995). Stigma: The hidden burden of infertility. *Social Science and Medicine, 40*(1), 27-36.

Williams, L., Bischoff, R., & Ludes, J. (1992) A biopsychosocial model for treating infertility. *Contemporary Family Therapy, 14*(4), 309-322.

Wricht, J., Dechesne, C., Sabourin, S., Bissonnette, F., Benoit, J., & Giarde, Y. (1991). Psychological distress and infertility: Men and women respond differently. *Fertility and Sterility, 55*(1), 100-108.

Wright, K. L. (2003). Defining infertility. *Network, 23*(2), 1-9. Retrieved April 23, 2008, from http://www.fhi.org/en/RH/Pubs/Network/v23-2/nt2321.htm

Yeboah, E. D., Wadhwani, J. M., & Wilson, J. B. (1992). Etiological factors of male infertility in Africa. *International Journal of Fertility, 37*(5), 300-307.

APPENDIX A

QUESTIONNAIRES

The following questionnaires were used:

- Biographical questionnaire: Infertility Treatment Group
- Biographical questionnaire: Control Group
- The Fertility Problem Inventory (FPI)
- The Enriching and Nurturing Relationship Issues, Communication and Happiness Scale (ENRICH): Communication Subscale
- The Index of Sexual Satisfaction (ISS)
- The Personal Assessment of Intimacy in Relationships (PAIR)
- The Dyadic Adjustment Scale (DAS)

BIOGRAPHICAL DETAILS: INFERTILITY TREATMENT GROUP

Respondent number _____ Code name _____

Please complete the following questions, or mark with an "X" where appropriate.

1 Relationship status

Married, first marriage	
Married, previously married	
Married, live separately	
In a relationship, live together	

2 How long have you been married/lived together, present marriage/relationship (years)? ☐

3.1 Do you have children from your present marriage/relationship? YES NO

Do you have children from a previous marriage/relationship? YES NO

3.2 If there are children from your present marriage/relationship, or a previous marriage(s)/relationship(s), please complete the tables below.

(i) Indicate each child's age and gender in the table(s) provided.

(ii) Also, list each child's relationship to you in the table(s) provided, according to the following options:

1: Natural birth, 2: Assisted reproduction, 3: Foster care, 4: Adoption

(iii) Indicate if the child(ren) live with you.

Present marriage/relationship						
Child	Age	Gender		Relation	Does child stay with you?	
1		M	F		YES	NO
2		M	F		YES	NO
3		M	F		YES	NO

Previous marriage(s)/relationship(s)						
Child	Age	Gender		Relation	Does child stay with you?	
1		M	F		YES	NO
2		M	F		YES	NO
3		M	F		YES	NO

4 If you had been using contraception, how long has it now been now since you had stopped using contraception?

_____ (years) _____ (months)

5 How do you classify your work?

Full time	
Part time	
Home maker	

Other _____

6 Highest educational qualification

Degree	Diploma	Completed high school	Partly completed high school	Completed primary school

7 How old are you? _____

8 Gender

Male	Female

9 Home language _____

10 Ethnic group

African	Asian	Coloured	White

Other (please specify) _____

11 What do you regard your socio-economic status to be within your current living environment?

Very low	Low	Average	High	Very high

BIOGRAPHICAL DETAILS: CONTROL GROUP

Respondent number _____ Code name _____

Please complete the following questions, or mark with an "X" where appropriate.

1 Relationship status

Married, first marriage	
Married, previously married	
Married, live separately	
In a relationship, live together	

2 How long have you been married/lived together, present marriage/relationship (years)? ____

3.1 Do you have children from your present marriage/relationship? YES NO

Do you have children from a previous marriage/relationship? YES NO

3.2 If there are children from your present marriage/relationship, or a previous marriage(s)/relationship(s), please complete the tables below.

(i) Indicate each child's age and gender in the table(s) provided.

(ii) Also, list each child's relationship to you in the table(s) provided, according to the following options:

1: Natural birth, 2: Assisted reproduction, 3: Foster care, 4: Adoption

(iii) Indicate if the child(ren) live with you.

Present marriage/relationship						
Child	Age	Gender		Relation	Does child stay with you?	
1		M	F		YES	NO
2		M	F		YES	NO
3		M	F		YES	NO

Previous marriage(s)/relationship(s)						
Child	Age	Gender		Relation	Does child stay with you?	
1		M	F		YES	NO
2		M	F		YES	NO
3		M	F		YES	NO

4 If you had been using contraception, how long after discontinuing its use did you fall pregnant?

_____ (years) _____ (months)

5 How do you classify your work?

Full time	
Part time	
Home maker	

Other _____

6 Highest educational qualification

Degree	Diploma	Completed high school	Partly completed high school	Completed primary school

7 How old are you? _____

8 Gender

Male	Female

9 Home language _____

10 Ethnic group

African	Asian	Coloured	White

Other (please specify) _____

11 What do you regard your socio-economic status to be within your current living environment?

Very low	Low	Average	High	Very high

THE FERTILITY PROBLEM INVENTORY (FPI)

Newton, Sherrard, and Glavac (1999)

The Fertility Problem Inventory is designed to measure your distress, beliefs, and attitudes related to infertility. Please answer as accurately as possible, according to the following guidelines. (Simply mark your choice for each item with an "X" on the tables provided).

1 = Strongly disagree
2 = Disagree
3 = Disagree somewhat
4 = Agree somewhat
5 = Agree
6 = Strongly agree

THE FERTILITY PROBLEM INVENTORY (FPI)

The Fertility Problem Inventory is designed to measure your distress, beliefs, and attitudes related to infertility. Please answer as accurately as possible. Simply mark your choice for each item with an "X".

		Strongly disagree 1	Disagree 2	Disagree somewhat 3	Agree somewhat 4	Agree 5	Strongly agree 6
1	It doesn't bother me when I'm asked questions about children.						
2	Family members don't seem to treat us any differently.						
3	The holidays are especially difficult for me.						
4	Family get-togethers are especially difficult for me.						
5	I can't help comparing myself with friends who have children.						
6	I still have lots in common with friends who have children.						
7	I find it hard to spend time with friends who have young children.						
8	When I see families with children I feel left out.						
9	I feel like friends or family are leaving us behind.						
10	It doesn't bother me when others talk about their children.						
11	I find I've lost enjoyment of sex because of the fertility problem.						
12	I feel just as attractive to my partner as before.						
13	I don't feel any different from other members of my sex.						
14	I feel like I've failed at sex.						
15	During sex, all I can think about is wanting a child (or another child).						
16	Having sex is difficult because I don't want another disappointment.						
17	If we miss a critical day to have sex, I can feel quite angry.						
18	Sometimes I feel so much pressure, that having sex becomes difficult.						
19	I can't show my partner how I feel because it will make him/her feel upset.						
20	My partner doesn't understand the way the fertility problem affects me.						
21	My partner and I work well together handling questions about our infertility.						
22	It bothers me that my partner reacts differently to the problem.						
23	My partner is quite disappointed with me.						

THE FERTILITY PROBLEM INVENTORY (FPI)

CONTINUED

		Strongly disagree 1	Disagree 2	Disagree somewhat 3	Agree somewhat 4	Agree 5	Strongly agree 6
24	My partner and I could talk more openly with each other about our fertility problem.						
25	I couldn't imagine us ever separating because of this.						
26	When we try to talk about our fertility problem, it seems to lead to an argument.						
27	Because of infertility, I worry that my partner and I are drifting apart.						
28	When we talk about our fertility problem, my partner seems comforted by my comments.						
29	Couples without a child are just as happy as those with children.						
30	I could see a number of advantages if we didn't have a child (or another child).						
31	I could visualize a happy life together, without a child (or another child).						
32	At times, I seriously wonder if I want a child (or another child).						
33	Not having a child (or another child) would allow me time to do other satisfying things.						
34	Having a child (or another child) is not necessary for my happiness.						
35	We could have a long, happy relationship without a child (or another child).						
36	There is a certain freedom without children that appeals to me.						
37	Pregnancy and childbirth are the two most important events in a couple's relationship.						
38	For me, being a parent is a more important goal than having a satisfying career.						
39	My marriage needs a child (or another child).						
40	It's hard to feel like a true adult until you have a child.						
41	A future without a child (or another child) would frighten me.						
42	I feel empty because of our fertility problem.						
43	Having a child (or another child) is not the major focus of my life.						
44	I have often felt that I was born to be a parent.						
45	As long as I can remember, I've wanted to be a parent.						
46	I will do just about anything to have a child (or another child).						

ENRICHING AND NURTURING RELATIONSHIP ISSUES, COMMUNICATION AND HAPPINESS SCALE (ENRICH)

Olson, Fournier, and Druckman (1983)

SUBSCALE: Quality of Marital Communication

		Strongly disagree	Disagree	Undecided	Agree	Strongly agree
1	I can express my true feelings to my partner.					
2	When we are having a problem, my partner often refuses to talk about it.					
3	My partner sometimes makes comments that put me down.					
4	I wish my partner were more willing to share his/her feelings with me.					
5	At times it is hard for me to ask my partner for what I want.					
6	Sometimes I have trouble believing everything my partner tells me.					
7	My partner often doesn't understand how I feel.					
8	I am very satisfied with how my partner and I talk with each other.					
9	It is difficult for me to share negative feelings with my partner.					
10	My partner is a very good listener.					

INDEX OF SEXUAL SATISFACTION (ISS)

Hudson (1993)

This questionnaire is designed to measure the degree of satisfaction you have in the sexual relationship with your partner. It is not a test, so there are no right or wrong answers. Answer each item as carefully and as accurately as you can by placing a number beside each one as follows. (Simply indicate your choice for each item with an "X" on the table provided).

1 = None of the time
2 = Very rarely
3 = A little of the time
4 = Some of the time
5 = A good part of the time
6 = Most of the time
7 = All of the time

		None of the time	Very rarely	A little of the time	Some of the time	A good part of the time	Most of the time	All of the time
1	I feel that my partner enjoys our sex life.							
2	Our sex life is very exciting.							
3	Sex is fun for my partner and me.							
4	Sex with my partner has become a chore for me.							
5	I feel that our sex is dirty and disgusting.							
6	Our sex life is monotonous.							
7	When we have sex it is too rushed and hurriedly completed.							
8	I feel that my sex life is lacking in quality.							
9	My partner is sexually very exciting.							
10	I enjoy the sex techniques that my partner likes or uses.							
11	I feel that my partner wants too much sex from me.							
12	I think that our sex is wonderful.							
13	My partner dwells on sex too much.							
14	I try to avoid sexual contact with my partner.							
15	My partner is too rough or brutal when we have sex.							
16	My partner is a wonderful sex mate.							
17	I feel that sex is a normal function of our relationship.							
18	My partner does not want sex when I do.							
19	I feel that our sex life really ads a lot to our relationship.							
20	My partner seems to avoid sexual contact with me.							

21	It is easy for me to get sexually excited by my partner.							
22	I feel that my partner is sexually pleased with me.							
23	My partner is very sensitive to my sexual needs and desires.							
24	My partner does not satisfy me sexually.							
25	I feel that my sex life is boring.							

PERSONAL ASSESSMENT OF INTIMACY IN RELATIONSHIPS (PAIR)

Schaefer and Olson (1981)

INSTRUCTIONS

This questionnaire is used to measure various types of "intimacy" or closeness in your relationship.
There are no right or wrong answers.
Indicate your reaction to each statement by making use of the following 5-point scale.

0 **Strongly disagree**	1 **Disagree**	2 **Neutral**	3 **Agree**	4 **Strongly agree**

Nr	**Statement**	**Response**
1	My partner listens to me when I need someone to talk to.	
2	We enjoy spending time with other couples.	
3	I am satisfied with the level of affection in our relationship.	
4	My partner helps me clarify my thoughts and feelings.	
5	We enjoy the same recreational activities.	
6	My partner has all of the qualities I've always wanted in a mate.	
7	I can state my feelings without him/her getting defensive.	
8	As a couple, we usually "keep to ourselves".	
9	I feel our level of affection is just routine.	
10	When having a serious discussion, it seems we have little in common.	
11	I share in few of my partner's interests.	
12	There are times when I do not feel a great deal of love and affection for my partner.	
13	I often feel distant from my partner.	
14	We have few friends in common.	
15	I am able to tell my partner when I want sexual intimacy.	
16	I feel "put-down" in a serious conversation with my partner.	
17	We like playing and having fun together.	
18	Every new thing I have learned about my partner has pleased me.	
19	My partner can really understand my hurts and joys.	
20	Having time together with friends is an important part of our shared activities.	

0 Strongly disagree	1 Disagree	2 Neutral	3 Agree	4 Strongly agree

21	Because of my partner's lack of caring, I "hold back" my sexual interest.	
22	I feel it is useless to discuss some things with my partner.	
23	We enjoy the out-of-doors together.	
24	My partner and I understand each other completely.	
25	I feel neglected at times by my partner.	
26	Many of my partner's closest friends are also my closest friends.	
27	Sexual expression is an essential part of our relationship.	
28	My partner seldom tries to change my ideas.	
29	We seldom find time to do fun things together.	
30	My partner has some negative traits that bother me.	
31	I sometimes feel lonely when we're together.	
32	My partner disapproves of some of my friends.	
33	My partner seems disinterested in sex.	
34	We have an endless number of things to talk about.	
35	We share few of the same interests.	
36	I have some needs that are not being met by my relationship.	

THE DYADIC ADJUSTMENT SCALE (DAS)

Spanier (1976)

1-15 Most persons have disagreements within their relationships. Please indicate with an "X" the appropriate extent of the agreement or disagreement between you and your partner for each item on the list below.

		Always agree	Almost always agree	Occasionally agree	Frequently disagree	Almost always disagree	Always disagree
1	Handling family finances						
2	Matters of recreation						
3	Religious matters						
4	Demonstration of affection						
5	Friends						
6	Sex relations						
7	Conventionality (correct or proper behaviour)						
8	Philosophy of life						
9	Ways of dealing with in-laws						
10	Aims, goals, and things believed important						
11	Amount of time spent together						
12	Making major decisions						
13	Household tasks						
14	Leisure time interests						
15	Career decisions						

16-22 Please indicate below approximately how often the following items occur between you and your partner, by marking your choice with an "X".

		All the time	**Most of the time**	**More often than not**	**Occasionally**	**Rarely**	***Never***
16	How often do you discuss or have you considered divorce, separation, or terminating the relationship?						
17	How often do you or your mate leave the house after a fight?						
18	In general, how often do you think things between you and your partner are going well?						
19	Do you confide in your mate?						
20	Do you ever regret that you married *(or lived together)?*						
21	How often do you and your partner quarrel?						
22	How often do you and your mate "get on each other's nerves"?						

23. Do you kiss your mate?

Never	Rarely	Occasionally	Almost every day	Every day
0	1	2	3	4

24. Do you and your mate engage in outside interests together?

None of them	Very few of them	Some of them	Most of them	All of them
0	1	2	3	4

25-28 How often would you say do the following events occur between you and your mate?

		Never	Less than once a month	Once or twice a month	Once a day	More often than once a day
25	Have a stimulating exchange of ideas					
26	Laugh together					
27	Calmly discuss something					
28	Work together on a project					

29-30 There are some things about which couples sometimes agree and sometimes disagree. Indicate if either item below caused differences of opinions or problems in your relationship during the past few weeks. (Circle yes or no)

29. Being too tired for sex **Yes No**
30. Not showing love **Yes No**

31. The numbers on the following line represent different degrees of happiness in your relationship. The middle point, "happy", represents the degree of happiness of most relationships. Please circle the number that best describes the degree of happiness, all things considered, of your relationship.

Extremely unhappy	Fairly unhappy	A little unhappy	Happy	Very happy	Extremely happy	Perfect
0	1	2	3	4	5	6

32. Please circle the number of *one* of the following statements that best describes how you feel about the future of your relationship.

5 I want desperately for my relationship to succeed, and *would go to almost any length* to see that it does.
4 I want very much for my relationship to succeed, and *will do all that I can* to see that it does.
3 I want very much for my relationship to succeed, and *will do my fair share* to see that it does.
2 It would be nice if my relationship succeeded, but *I can't do much more than I am doing* now to make it succeed.
1 It would be nice if it succeeded, but *I refuse to do any more than I am doing* now to keep the relationship going.
0 My relationship can never succeed, and there is *no more that I can do* to keep the relationship going.

APPENDIX B

STELLENBOSCH UNIVERSITY
INFORMED CONSENT FORM

Psychological profiles of infertility patients

Infertility-related stress and specific aspects of the marital relationship

Herewith we kindly request your participation in a research study conducted by Ms. L. van Waart and E. van der Merwe, under supervision of Professor A.P. Greeff, from the Department of Psychology at Stellenbosch University. In the following sections you will find an outline of the study.

1. PURPOSE OF THE STUDY

This study will explore the psychological aspects, both positive and negative, that are operative before the initial stage of a new clinical intervention of infertility. The study will also explore certain specific aspects of the marital relationship of couples experiencing infertility at the present time in their lives. We also aim to assess the levels of infertility-related stress that each partner in a couple experiences. Couples *at the onset of* different types of infertility treatment are approached for participation in the study. We hope this research will contribute to more effective psychological support during infertility treatment.

2. PROCEDURES

If you agree to participate in this study, we would ask you to do the following things:

1. We will make an appointment with you and your partner, in which you will be requested to *complete a number of questionnaires*.
2. The questionnaires will be completed before the start of a new cycle (i.e. before day one), in *a private* and comfortable room at either Wijnland Fertiliteit (Dr. Johannes van Waart) or Vincent Palotti Hospital, as is convenient for you.
3. You will fill out the questionnaires *independently from your partner*.

3. CONFIDENTIALITY

Confidentiality will be maintained as follows. You will not write your name or any identifying information on the research questionnaires. Each participant will be requested to choose a code name, from which a list will be drawn up to indicate which participant corresponds to which code name. This list and the research questionnaires will be kept in strict confidence at Dr. Johannes van Waart's practice. Data will only be accessible to members of the research team. Computer data will be saved under password-protected files.

The results of the research will be published in a thesis, yet data will only be discussed in terms of groups of participants and average scores on the questionnaires, in comparison with comparable groups of participants and average scores. Thus, no piece of information collected in the course of the research will be in any way traceable to a particular person or family. As soon as the researcher has completed the research, questionnaires will be destroyed together with the list of names and code names.

4. POTENTIAL RISKS AND DISCOMFORTS

We trust the questionnaires will be of interest and useful for everyone participating in this study. Some of the questions asked may, however, be highly personal and might invoke unpleasant feelings or memories. If you do experience discomfort, we have a list of support services available to you. Alternately, you may withdraw your consent at any time during the study.

5. PAYMENT FOR PARTICIPATION

No payment will be provided for participation in the research project.

6. RIGHTS OF RESEARCH PARTICIPANTS: PARTICIPATION AND WITHDRAWAL

You can choose whether to be in this study or not. You may withdraw your consent at any time and discontinue participation without negative consequences. You may also refuse to answer any questions you don't want to answer. If you withdraw from the study, you may request that all data that has been collected (including questionnaires and the interpretation thereof) be destroyed, which will be done. You are not waiving any legal claims, rights or remedies because of your participation in this research study. The investigator may withdraw you from this research project if circumstances arise which warrant doing so.

7. IDENTIFICATION OF RESEARCHERS

Ms. Elanza van der Merwe
Work Tel: 021 808 2857/2868
Office 103, Wilcocks building
Stellenbosch University
E-mail address: elanza@sun.ac.za

Ms. Lizanne van Waart
Cell phone: 082 576 1538
Office 303, Wilcocks building
Stellenbosch University
lizanne@vanwaart.co.za

Dr. Johannes van Waart Consultation Rooms
23 Saffraan Avenue
Stellenbosch
Telephone: 021 882 8476/7

Supervisor: Prof. A.P. Greeff
Department of Psychology
Stellenbosch University
Telephone: 021 808 3464

DECLARATION OF RESEARCH PARTICIPANT

I confirm that I have read this document and that I understand the contents thereof. I also declare that I have been given the opportunity to ask questions regarding the research and that these questions were answered to my satisfaction. I confirm that I can raise any questions and clear up uncertainties regarding the research project at any time with the researchers. I am aware of the possible risks, discomfort and advantages associated with participation.

I am aware that I have the right to withdraw at any time without prejudice and that I may refuse to answer questions which I do not want to answer.

I hereby give permission that the Department of Psychology make use of the results of the study for research purposes, on condition that the confidentiality of the data is maintained.

I hereby consent voluntarily to participate in the above-mentioned study. I have been given a copy of this form.

_____
Name of Participant

_____ _____
Signature of Participant **Date**

DECLARATION OF RESEARCHER

I declare that I explained the information given in this document to _____ [*name of the participant] [H*e/*she*] was encouraged and given ample time to ask me any questions.

_____ _____
Signature of Researcher **Date**