

Investigating Marital Relationship in Infertility: A Systematic Review of Quantitative Studies

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Abstract

Background: Infertility is a complex issue that affects individuals and groups, and also it has serious implications for the mental and social well-being of those involved. The aim of this review was to assess marital relationship in the context of infertility, using data from infertile individuals or both couples.

Methods: A literature search was undertaken using multiple databases (Medline, PsycInfo and Scopus) to identify and synthesize all relevant literature published from 1990 to 2011. All studies in the systematic review were confirmed using specific inclusion criteria; the methodological quality of these studies were examined according to a checklist.

Results: Of the potential 794 articles, 18 studies were included in the final analysis, of which 6 were graded as high quality and 12 as moderate. The results indicated male factor infertility did not have a negative marital impact. In addition, infertile male participants expressed higher marital satisfaction than their wives. Infertile females had significantly less stable marital relationship compared to fertile females, which was associated with their socio-demographics and treatment experience. For infertile couples, the infertile subjects or their partners' marital relationship was affected by either member's infertility, experience specifically coping strategies. Moreover other factors such as sexual satisfaction, age of the infertile couples, education level, and congruency of couples' perceptions of infertility were associated with the quality of marital relationship.

Conclusion: Although the review can provide an outline of marital relationship in infertility, future studies should focus on the perspective from both infertile couple, across a range of different infertility types, including extended sample sizes and longitudinal study designs. In addition, more consideration should be given to qualitative study.

Keywords: Female, Infertile couples, Infertility, Male, Marital relationship.

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Introduction

Infertility is medically defined as the inability to conceive after a year or more of regular, unprotected sexual intercourse (1). With an estimated prevalence, 8–12% of couples around the world experience difficulty conceiving a child (2). Although the extent of infertility varies considerably among countries, infertility has been recognized as a public health issue worldwide by the World Health Organization (WHO), and has

the potential to threaten the stability of individuals, relationships and communities (3, 4).

Research has proved the quality of marital relationship is a significant predictor of overall happiness and well-being, while poor marital quality is associated with many family and community problems (5–7). Infertility has been associated with marital problems and conflicts, and has serious implications for the mental and social well-

being of those involved. This can be problematic as the marital relationship is seen as the most important source of support in the context of infertility treatment (1, 8). Furthermore, the WHO guidelines concerning the psycho-social aspects of infertility, clearly state that the task of medical staff goes beyond diagnosis and clinical interventions and should include attention to the psychological aspects of fertility disorders and that attention should be paid to enhance the quality of life of infertile couples (9). Therefore, it is necessary to have better understanding of marital relationship in infertility, and an examination of its associated factors. Referring to the quality of marital relationship, it has frequently been described by marital benefit, marital distress, marital satisfaction and marital adjustment (10–13). Though, there were some studies (14–16) assessing the quality of marital relationship in infertility, but they did not have valid outcome due to weak and simple items used as quantitative measures, making it difficult to make comparison and draw general conclusion. In addition, while there were some studies with standard measures about marital relationship in infertility, the reported results were unclear and conflicting. Some research suggested that infertile individuals (both infertile males and females) experienced greater dissatisfaction with themselves, their marriages, and infertility-related stress and its treatment had a negative effect on the relationship both directly or indirectly (17,18).

Other authors indicated infertility might be stressful, but their shared condition made closer mutual support in the couple's thoughts and feelings, thus had positive effect on their relationship (19–21). Findings from earlier studies on marital relationship in infertile individuals, showed a significant correlation between stressful life events and marital quality (22). In addition, family studies indicated there was difference between the male's and female's perceptions of the aspects of marital relationship (23, 24). Moreover, the individual's marital relation was related to other characteristics such as socio-economic status (25), personality (26), mental health (27), communication (28) and duration of marriage (29). For both the infertile males and females, their marital relationship could be influenced by the above factors directly or indirectly. The reason for the latter finding was due to infertility as a mutual condition, and both partners shared the experience of childlessness (30). However, considering the

interactions between couples that may be more important for marital quality than social or personal traits (31), the change in marital relationship in infertile couples should be given more attention to the couple's interaction patterns on relationship, not only analyze discrepant or congruent views in managing infertility stress. On the other hand, husbands' and wives' marital quality have been found to be significantly and positively correlated with (32), which suggested partner's marital quality should be discussed to explore its considerable effect on the other side.

In order to have a clear understanding of marital relationship in infertility, it is necessary to examine the determinants that might be involved differently affect marital relationship. Currently, no systematic review of this kind is available. The aim of this systematic review is to summarise the published findings on marital relationship and infertile subjects, specifically the original data were based on standardized instruments in infertile males, infertile females or both infertile couples.

Methods

Inclusion criteria: To be included in the review, the selected articles had to meet the following criteria: (1) Peer-reviewed articles published in English between 1990 and 2011; (2) The primary or secondary objective was to assess marital relationship in the context of infertility; (3) The study participants comprised of infertile individuals, or infertile couples comprised infertile subjects and their partners. All participants were not in marital separation; (4) A relevant, validated instrument was used to assess marital relationship. Furthermore, studies needed to report original data. Thus, reviews, editorials, debates, letters, case reports, non-peer-reviewed articles, meeting abstracts and brief communications were excluded.

Search strategy: In this study, a systematic literature review was conducted using the following electronic databases as the most appropriate resources to identify published studies: MedLine (Ovid), PsycInfo (Ovid) and Scopus. The search was compiled using keywords and phrases separated by the Boolean word "OR": Marital Relationship "OR" Marital Quality "OR" Marital Satisfaction "OR" Marital Adjustment "OR" Marital Distress in combination with Infert* "OR" Childless* in the title, abstract, or keywords. Since some studies linked with marital relationship are explored in the context of clinical treatment, we in-

cluded the following terms too: In-vitro Fertilization (IVF) “OR” Intra-cytoplasmic Sperm Injection (ICSI) “OR” Assisted Reproduction (AR). In addition, citations from these articles which appeared particularly relevant were also sought. Many of the searches generated duplicate articles, or articles which were unrelated to the study, these were not considered in the review. In the process of extraction, one of the investigators reviewed both the title of the citation and the abstract to determine its suitability for inclusion.

Extraction of data: Firstly, the titles and abstracts following with the search strategy were evaluated for the selection of eligible studies. Some studies were excluded at this stage as they were scarce of evidence with regard to the inclusion criteria. Secondly, the full-text of selected studies were further evaluated to decide whether they fulfilled the inclusion criteria.

Quality assessment: The quality of the included studies was assessed using the criteria checklist (Table 1), which was derived from some systematic review studies (33–38), and adjusted to fit the

research questions. The criteria for evaluating the quality of studies included in our study were: the quality of the measure instrument, the profile of study participants, study design and main results. The criteria checklist comprised 16 items; each item was scored with one point if the study met a criterion, and a score of zero if the study had an insufficient or no description of the item. The total maximum score was sixteen. Studies scoring 75% or more of the maximum attainable score (≥ 12 points) were considered to be of “high quality”. Studies scoring between 50 and 75% (between 8 and 12 points) were rated as “moderate quality”, and scores lower than 50% (≤ 7 points) were considered as “low-quality” studies.

Results

Studies extracted: As can be seen in figure 1, the initial search in the online databases identified 910 citations, comprising 65 articles from Med-Line (Ovid), 329 from PsycInfo (Ovid) and 516 from Scopus. 116 articles were excluded due to the extraction of duplicates. After applying the

Table 1. List of criteria for assessing the quality of studies on marital relationship in the infertile and/or their spouse/partners

Positive if
Marital relationship assessment
A. a psychometrical questionnaire is used
B. a primary objective of the study is to examine the marital relationship
C. standardized or valid self-report measurements are used to assess the marital relationship in the infertile and/or their spouse/partners
Study participants
D. a description is included of at least two socio-demographic variables (<i>e.g.</i> , age, sex, economical status, educational status, <i>etc.</i>)
E. a description is present of at least two clinical variables (<i>e.g.</i> , type of infertility, duration of infertility, treatment method(s), <i>etc.</i>)
F. inclusion and/or exclusion criteria are provided
G. the study describes predictors or influencing factors by using correlation analysis, multivariate analyses or structural equation models
H. participation rates for the infertile groups and/or their spouses/partners are described (defined as the percentage of eligible patients who gave their informed consent) and these rates exceed 70%
I. information is given about the ratio between non-responders versus responders
Study design
J. the study size is consisting of at least 50 patients
K. the collection of data is prospectively gathered
L. the design is longitudinal (more than 1 year)
M. the process of data collection is described (<i>e.g.</i> , interview or self-report, <i>etc.</i>)
N. the follow-up period is at least 6 months
O. the loss to follow-up is described and is less than < 20%
Results
P. the results are compared between two groups or more (<i>e.g.</i> , healthy population, groups with different treatment stages, different types of infertility, or treatment types) and/or results are compared with at least two points in time (<i>e.g.</i> , pre- versus post-treatment)

*The criteria checklist was based on an established criteria for systematic review reported in the literature (15-20)

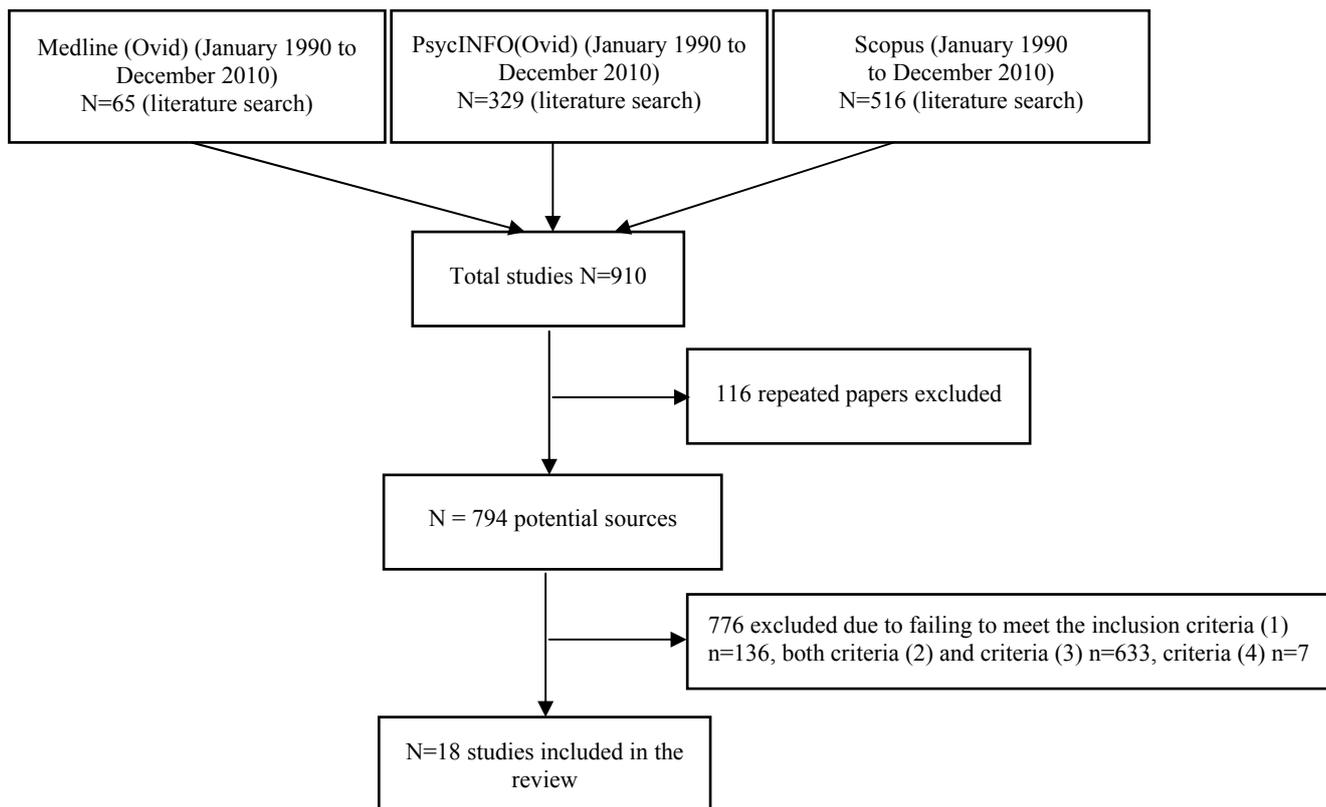


Figure 1. Flowchart of study selection progress

study inclusion criteria, the final number of articles eligible for inclusion was 18. The flowchart of study selection is shown in figure 1.

Characteristics of selected studies: Table 2 provided a summary of the 18 published studies that met the inclusion criteria. They included studies that investigated the status of marital relationship and its influence across different infertility types. The main results related to marital relationship were indicated. All studies had been conducted in a clinical setting, of which, thirteen studies (39–51) were cross-sectional, and five (52–56) were longitudinal. The sample sizes differed due to variations in research protocols. In the studies on infertile couples, the sample sizes ranged from 20 (43) to 525 (46); and in studies on infertile individuals, the sample sizes ranged from 18 (47) to 520 (48). Participants included those who sought medical attention and/or treatment for assisted reproduction. The instruments were reliable and valid for the assessment of marital relationship in all of the reviewed studies.

In total, all studies described at least two demographic variables and most described at least two clinical variables of interest. The most reported

demographic variables were age, ethnicity, economical status, education and duration of the marital relationship. Frequently represented clinical variables were type of infertility, type of treatment, time interval since diagnosis and time of medical attention.

Quality assessment of selected studies: Quality scores ranged from 8 (low quality) (47) to 15 (high quality) (56). Six studies (33%) were graded as high and twelve (67%) as moderate. Among these 18 studies, over half had some limitations in methodological quality, 12 (66%) studies could not meet the criteria H “Participation rates for the infertile groups and/or their spouses were described (defined as the percentage of eligible patients who gave informed consent) and they exceeded 70%”, 13 (72%) studies could not meet the criteria I “Information was given about the ratio of non-responders versus responders”, 13 (72%) studies could not meet the criteria K “The collection of data was prospectively gathered”, 13 (72%) studies could not meet the criteria L “The design was longitudinal (more than 1 year)”, 13 (72%) studies could not meet the criteria N “The follow-up period was at least 6 months”, 17 (94%)

Table 2. Studies examining marital relationship in infertility

Studies	Design	Sample characteristics/Country	Assessment	Key findings related to marital relationship
Ulbrich et al. (1990), (39)	Cross-sectional study	Convenient sampling: 103 married couples from Resolve and physicians. USA	Dyadic Adjustment Scale	Infertile couples are generally similar in the way of perceiving their marital adjustment, but they arrive at that view by different routes
Berg et al. (1991), (40)	Cross-sectional study	Convenient sampling: 104 married couples from Resolve and clinic, with primary infertility currently involved in treatment. USA	Locke-Wallace Marital Adjustment Test	1. Couples experienced normal levels of marital adjustment, and with no significant gender differences 2. Couples experienced a stable marital adjustment in the pursuing treatment in year 1 and year 2, but deteriorated after the third year
Pepe et al. (1991), (41)	Cross-sectional study	Convenient sampling: 40 female patients had been diagnosed with primary or secondary infertility. USA	Index of Marital Satisfaction	Infertility treatment was related to decreased marital satisfaction, but after the termination of treatment, the relationship returned to a level not significantly different from its pretreatment level
Benazon et al. (1992), (52)	A longitudinal study	Convenient sampling: During the 12 months of the study, all participants were categorized into two groups: 48 couples with pregnancy, 117 couples with nonpregnancy. Canada	Dyadic Adjustment Scale	1. Significant decreases in marital functioning were experienced by subjects as the treatment investigation progressed 2. Greater levels of marital distress were observed in couples that did not conceive. Significant gender differences were observed
Slade et al. (1992), (54)	A longitudinal study	Convenient sampling: 28 couples with primary infertility. England	Dyadic Adjustment Scale	1. For the infertile groups, marital adjustment tended to deteriorate over time, however, this was paralleled in the fertile groups 2. Self-blame was correlated with marital difficulties in the females; self-blame and detachment were particularly linked with marital difficulties in the males
Levin et al. (1997), (42)	Cross-sectional study	Convenient sampling: 46 couples undergoing different stages of infertility treatment. USA	Dyadic Adjustment Scale	Marital distress in the infertility population is impacted by the intra-couple coping methods
Leiblum et al. (1998), (53)	A longitudinal study	Convenient sampling: 75 infertile women were followed after the completion of infertility treatment, Group 1 (n = 41), successful IVF women; Group 2 (n = 16), unsuccessful IVF women who adopted; Group 3 (n = 18), unsuccessful IVF women who remained childless. USA	Locke-Wallace Marital Adjustment Test	1. There were no significant differences between the three groups on the standardized measures of marital satisfaction 2. Childless women reported that infertility had exerted a significantly greater negative impact on their marriages than that reported by the other two groups
Markestad et al. (1998), (43)	Cross-sectional study	Convenient sampling: 20 infertile couples. USA	Dyadic Adjustment Scale	Length of time infertile couples have been seeking medical attention may not severely affect marital adjustment
Lee et al. (2000), (44)	Cross-sectional study	Convenient sampling: 59 infertile couples. Tai wan	Marital Satisfaction Questionnaire	The husbands' marital satisfaction was higher than that of the wives
Lee et al. (2001), (45)	Cross-sectional study	Convenient sampling: 138 infertile couples. Tai wan	Marital Satisfaction Questionnaire	Infertility diagnosis is an important factor in assessing the marital satisfaction between husbands and wives
Verhaak et al. (2001), (55)	A longitudinal study	Convenient sampling: 207 infertile women. Netherlands	Maudsley Marital Questionnaire	Marital satisfaction changed in both pregnant and nonpregnant women after the first IVF and ICSI cycle
Peterson et al. (2003), (46)	Cross-sectional study	Convenient sampling: 525 infertile couples. USA	Dyadic Adjustment Scale	Both men and women in couples who perceived equal levels of social infertility stress reported higher levels of marital adjustment
Monga et al. (2004), (47)	Cross-sectional study	Not mentioned, Study group: 18 women being on infertility treatment; Control group: 12 women seeking elective sterilization. USA	Locke-Wallace Marital Adjustment Test	The Marital Adjustment Test scores for the women of the infertile couples were significantly lower than the scores of the controls
Peterson et al. (2006), (48)	Cross-sectional study	Convenient sampling: 506 infertile men, 520 infertile women. USA	Dyadic Adjustment Scale	No significant differences were reported between men and women for marital adjustment, but coping is related to marital adjustment
Reporaki et al. (2007), (56)	A longitudinal study	Convenient sampling. Study group: 367 couples with singleton IVF/ICSI pregnancies; Control group: 379 couples with spontaneous singleton pregnancies. Finland	Dyadic Adjustment Scale	Successful ART does not constitute a risk for marital adjustment. The shared stress of infertility may even stabilize marital relationships
Wang et al. (2007), (49)	cross-sectional study	Convenient sampling. Two groups of infertile women, 100 registered for IVF, and 100 registered for ICSI; A control group of 100 women attending a gynecology clinic, who had no known history of infertility. China	ENRICH (Evaluating & Nurturing Relationship Issues, Communication & Happiness) Marital Inventory	The stresses associated with infertility and IVF treatment had a negative impact on Chinese women's marital quality
Drosdzol et al. (2009), (50)	Cross-sectional study	Convenient sampling. Study group: 206 infertile couples; Control group: 190 fertile couples. Poland	Index of Marital Satisfaction	The risk factors of marital dissatisfaction in infertility include: female sex, age over 30, lower education level, diagnosis of male infertility, and infertility duration of 3-6 years
Smith et al. (2009), (51)	Cross-sectional study	Convenient sampling: 357 men in infertile couples. USA	Marital Impact Scale	No significant differences were seen between infertility groups in terms of Marital Impact scores

studies could not meet the criteria O "The loss to follow-up was described and was less than

<20%".

Marital relationship of male participants with infer-

Table 3. Methodological assessment of study quality

Studies	Criteria for methodological assessment of study quality															Score	
	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O		P
Ulbrich et al. (1990), (39)	+	+	+	+	+	+	+	+	-	+	-	-	+	-	-	+	11
Berg et al. (1991), (40)	+	+	+	+	+	+	-	+	-	+	-	-	+	-	-	+	10
Pepe et al. (1991), (41)	+	+	+	+	+	+	+	-	-	-	-	-	+	-	-	+	9
Benazon et al. (1992), (52)	+	+	+	+	+	+	+	-	-	+	+	+	+	+	-	+	13
Slade et al. (1992), (54)	+	+	+	+	+	+	+	-	-	-	+	+	+	+	-	+	12
Levin et al. (1997), (42)	+	+	+	+	+	+	+	-	+	-	-	-	+	-	-	+	10
Leiblum et al. (1998), (53)	+	+	+	+	+	+	-	-	-	+	+	+	+	+	-	+	12
Markestad et al. (1998), (43)	+	+	+	+	+	+	+	-	-	-	-	-	+	-	-	+	9
Lee et al. (2000), (44)	+	+	+	+	+	+	-	-	-	+	-	-	+	-	-	+	9
Lee et al. (2001), (45)	+	+	+	+	+	+	-	-	+	+	-	-	+	-	-	+	10
Verhaak et al. (2001), (55)	+	+	+	+	+	+	+	-	-	+	+	+	+	+	+	+	14
Peterson et al. (2003), (46)	+	+	+	+	+	+	+	+	-	+	-	-	+	-	-	+	11
Monga et al. (2004), (47)	+	+	+	+	+	+	-	-	-	-	-	-	+	-	-	+	8
Peterson et al. (2006), (48)	+	+	+	+	+	+	+	-	-	+	-	-	+	-	-	+	10
Reporaki et al. (2007), (56)	+	+	+	+	+	+	+	+	+	+	+	+	+	+	-	+	15
Wang et al. (2007), (49)	+	+	+	+	+	+	+	+	+	+	-	-	+	-	-	+	12
Drosdzol et al. (2009), (50)	+	+	+	+	+	+	+	-	+	+	-	-	+	-	-	+	11
Smith et al. (2009), (51)	+	+	+	+	+	+	+	+	-	+	-	-	+	-	-	+	11

tility: Three studies were on infertile males’ marital relationship among the 18 studies, using a cross-sectional design.

One study demonstrated that male factor infertility did not have a negative marital impact after controlling for male age, partner's age, race, religion, educational level, employment status, prior pregnancy, duration of infertility, and prior paternity (51). Another study presented the incidence of partnership disorders within marriage was not different between infertile and fertile males, but the marital dysfunction of infertile males should be given more attention in males over 30, lower education and infertility lasting 3-6 years (50).

Findings of a third study on the effects of infertility diagnosis on marital relationship in Chinese society, indicated no significant differences between infertile males and their spouse regarding infertility stress, but infertile males expressed more marital satisfaction than their partners (45).

Marital relationship in infertile females: Studies on marital relationship of infertile females are reported either in specific studies (five papers) (41, 49, 50, 53, 55) or as part of investigations in couples (one paper) (45).

Among infertile females referred for ART, the findings indicated infertile females had less stable relationships than fertile females, and the condition was negatively correlated with advanced age, increased duration of infertility, and failed IVF-

ICSI attempts in the past (49). Moreover, more partnership disorders seen within marriage in infertile females appeared to be due to age over 30, lower education and infertility lasting 3–6 years (50). However, those women who became biological mothers through IVF were significantly more satisfied with their marital lives than women who were unsuccessful in IVF and remained childless (53), even though marital satisfaction changed in both pregnant and non-pregnant women after the first treatment cycle due to an increase in sexual dissatisfaction (55). As for the infertile female’s marital satisfaction in different treatment periods, one study demonstrated that marital satisfaction during treatment was significantly lower compared with the periods before and after the treatment. In addition, the study found female initiation of treatment, partner's embarrassment for treatment termination, female’s age and length of treatment period were negatively correlated with marital satisfaction in infertile females for all the three aforesaid periods, but no significant relationship was found between type of infertility (primary vs. secondary) and marital satisfaction (41).

Apart from the above studies, which directly selected infertile females as research subjects, another study selected infertile females from infertile couples as research subjects to explore marital relationship. The findings indicated that

infertile females experienced significantly more distress than their husbands, and were less satisfied with their marriage than their husbands (45).

Marital relationship in infertile couples: Amongst the studies on marital relationship in infertile couples, one study (45) examined marital relationship affected by a gender-specific infertility diagnosis in Chinese society, and made comparison between husbands and wives. The findings indicated when both partners were infertile women expressed less marital satisfaction than their husbands. No differences in marital satisfaction between wives and husbands with unexplained infertility were seen, and only wives with a diagnosed female infertility expressed higher distress than their husbands.

In other studies, the data on marital relationship were mixed without differentiating gender-specific infertility diagnosis. One study suggested marital adjustment of the wives of infertile couples were significantly lower than the scores of controls, but no differences were noted in husbands of infertile couples (47). However, some studies further demonstrated various factors contributing to marital dissatisfaction in infertile couples, *e.g.*, age of partners above 30 years, individuals with greater stress, higher emotional distress, lower education, lower income, lengthier treatment, and unsuccessful treatment (39, 43, 44, 56). In addition, the level of sexual satisfaction in female partners was positively correlated to their marital satisfaction, but the level of infertility-related stress did not contribute significantly to fluctuations in their marital satisfaction. By contrast, marital satisfaction of male partners was influenced by the level of infertility stress, and not by their own degree of sexual satisfaction, nor by their wives becoming pregnant (52). Furthermore, coping strategies were emphasized to be correlated with marital relationship and coping strategies such as self-blame, were emphasized to be correlated with marital difficulties in both male and female partners (54). Both escape/avoidance and accepting responsibility coping strategies could diminish marital adjustment in both males and females, but seeking social support and planful problem-solving coping strategies could enhance or did not diminish their marital satisfaction (48).

Considering that infertility is a condition shared by both couples, other studies have suggested the intra-couple coping concordance might have different effects on marital relationship. One study

demonstrated couples with high levels of congruence concerning infertility stress reported significantly higher levels of marital adjustment when compared to couples with different infertility-related stress (46). Another study showed that marital satisfaction was highest in couples where the males were using low levels of emotion-oriented coping, specifically the least satisfaction for women was evident when the woman was using less emotion-oriented coping than her partner or than when both partners were using more emotion-oriented coping strategies (42).

Discussion

In studies on infertility, marital issues are increasingly reported to be in part due to the impact of infertility per se, and also due to the importance of mutual support provided during the process of infertility treatment (8).

The purpose of this systematic review was to provide an overview of studies that addressed the impact infertility diagnosis and subsequent treatment on marital relationship.

In all of the selected studies, we found very few studies on infertile males' marital relationship. The findings indicated infertile males' marital relationship were not seriously impaired by infertility diagnosis. The reasons might be related to the sampling methods in infertile males with newly diagnosed infertility or the short duration of marriage which might not develop infertility stress or marital strain. On the other hand, the infertile males' perception of infertility could be another mediator and infertile men undergoing treatment held the optimism for conceiving a child (57). From theoretical perspective, infertility may place significant stress on a man's social and marital relationships (58), however, the insufficient response of infertile males in the selected studies was not helpful for correlation analysis on infertility and marital relationship. Therefore study on infertile males' marital relationship should be given more attention via increasing participants' response and implementing longitudinal studies to explore the marital relationship and factors influencing it.

Regarding marital relations in infertile females, most studies mainly focused on the effect of treatment, which indicated lower marital satisfaction to be very common in infertile females in comparison with their partners or with fertile females. However, only two longitudinal studies made comparison between successful and unsuccessful

treatment in infertile female participants. Since unsuccessful treatment is frequently seen in infertility, longitudinal studies would be necessary to examine marital relationship and its determinants, specifically, among infertile females with treatment failure.

Correlation analysis was also used to explore certain factors related to marital relationship affected by infertility diagnosis or treatment but studies with multivariate analyses controlling for interaction among various variables' were very few. Therefore, though coping strategies were proved to be crucial in marital adjustment for infertile females with different treatment results, this conclusion might be weak if the studies neglect the effect from infertile females' sexuality, infertility experience, social-demographics and psychological well-being, *etc.* of infertile females.

As for the related studies on infertile couples, some findings showed treatment (process and outcome) to be related to the couples' level of marital satisfaction, but some were not; some findings reflected infertility-related stress could influence the males' level of marital satisfaction, but some suggested no relationship between females' marital satisfaction and infertility-related stress. The above conflicts or ambiguities could be explained by adoption of coping strategies, level of education, economical status, or the age of infertile couples.

Regarding the couple as the research unit, there is merit in analysing how each partner is both influenced by and influences the response by their partners. We recommend future studies further explore marital relationships of infertile couple with male factor, female factor, a combination of male and female factors and unexplained factors through using marital pairs as the unit, especially exploring the congruency of couples' perceptions of infertility, intra-couple coping, and dyadic relationships.

In retrieving the literature, we found most studies had a predominately medical focus, and few studies explored the impact of infertility diagnosis on marital relationship from psychosocial, emotional and sexual perspectives. Obviously, further research on intimacy, sexuality, marriage and social functions is necessary to understand and provide improved services to infertile couples.

Moreover, there were other limitations in this systematic review, firstly the reviewed papers were confined to the English language literature,

thus, some relevant non-English language studies were missed. Secondly, the papers were reviewed by title, abstract, or keywords; therefore studies containing relevant marital relationship and infertility-related information as a minor part of the results could have been neglected. Thirdly, while all studies were selected strictly according to the inclusion criteria, there may still have been some bias due to the lack of a second, independent reviewer. Fourthly, most data were obtained from clinical settings and the study results might not be representative of the general infertile population. Given these methodological limitations, it is important to consider all aspects of a systematic review when evaluating their applicability.

Conclusion

The current review found most studies of high quality, but few studies were scarce of rigor in sample size and study design. However, these selected studies provide an outline for understanding the marital relationship in the context of infertility. We expect the future studies on marital relationship in infertility can be broadly implemented from both the perspective of infertile couples, across a range of different infertility types, extended sample sizes and longitudinal research, specifically using qualitative methodologies to contribute information to this work.

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References

1. World Health Organization. Recent advances in medically assisted conception. Report of a WHO Scientific Group. World Health Organ Tech Rep Ser. 1992;820:1-111.
2. World Health Organization, Programme on Maternal and Child Health and Family Planning, Division of Family Health. Infertility: a tabulation of available data on prevalence of primary and secondary infertility. 1st ed. Geneva: World Health Organization; 1991. p. 964-8.
3. Boivin J, Bunting L, Collins JA, Nygren KG. International estimates of infertility prevalence and treatment-seeking: potential need and demand for infertility medical care. *Hum Reprod.* 2007;22(6):1506-12.
4. Burns LH, Covington SN. Infertility counseling: A comprehensive handbook for clinicians. 2nd ed. Cambridge: Cambridge University Press; 2006. p. 1.

5. Aldous J, Ganey RF. Family life and the pursuit of happiness the influence of gender and race. *J Fam Issues*. 1999;20(2):155-80.
6. Ren XS. Marital status and quality of relationships: the impact on health perception. *Soc Sci Med*. 1997; 44(2):241-9.
7. Bradbury TN, Fincham FD, Beach SR. Research on the nature and determinants of marital satisfaction: A decade in review. *J Marriage Fam*. 2000;62(4): 964-80.
8. Laffont I, Edelmann RJ. Perceived support and counselling needs in relation to in vitro fertilization. *J Psychosom Obstet Gynaecol*. 1994;15(4):183-8.
9. World Health Organization. Current practices and controversies in assisted reproduction. Report of a meeting on Medical, Ethical and Social Aspects of Assisted Reproduction. Geneva: World Health Organization; 2002. p. 128.
10. Shackelford TK, Besser A, Goetz AT. Personality, marital satisfaction, and probability of marital infidelity. *Individ Differ Res*. 2008;6(1):13-25.
11. Dindia K, Baxter LA. Strategies for Maintaining and Repairing Marital Relationships. *J Soc Pers Relat*. 1987;4(2):143-58.
12. Harper JM, Schaalje BG, Sandberg JG. Daily hassles, intimacy, and marital quality in later life marriages. *Am J Fam Ther*. 2000;28(1):1-18.
13. Trief PM, Wade MJ, Britton KD, Weinstock RS. A prospective analysis of marital relationship factors and quality of life in diabetes. *Diabetes Care*. 2002; 25(7):1154-8.
14. Schmidt L, Holstein B, Christensen U, Boivin J. Does infertility cause marital benefit? An epidemiological study of 2250 women and men in fertility treatment. *Patient Educ Couns*. 2005;59(3):244-51.
15. Abbey A, Andrews FM, Halman LJ. Provision and receipt of social support and disregard: what is their impact on the marital life quality of infertile and fertile couples? *J Pers Soc Psychol*. 1995;68 (3):455-69.
16. Chandra PS, Chaturvedi SK, Issac MK, Chitra H, Sudarshan CY, Beena MB. Marital life among infertile spouses: the wife's perspective and its implications in therapy. *Fam Ther*. 1991;18(2):145-54.
17. Ramezanzadeh F, Aghssa MM, Jafarabadi M, Zayeri F. Alterations of sexual desire and satisfaction in male partners of infertile couples. *Fertil Steril*. 2006;85(1):139-43.
18. Hirsch AM, Hirsch SM. The effect of infertility on marriage and self-concept. *J Obstet Gynecol Neonatal Nurs*. 1989;18(1):13-20.
19. Chachamovich J, Chachamovich E, Fleck MP, Cordova FP, Knauth D, Passos E. Congruence of quality of life among infertile men and women: findings from a couple-based study. *Hum Reprod*. 2009;24(9):2151-7.
20. Schmidt L, Holstein BE, Boivin J, Tjørnhøj-Thomsen T, Blaabjerg J, Hald F, et al. High ratings of satisfaction with fertility treatment are common: findings from the Copenhagen Multi-centre Psychosocial Infertility (COMPI) Research Programme. *Hum Reprod*. 2003;18(12):2638-46.
21. Greil AL. Infertility and psychological distress: a critical review of the literature. *Soc Sci Med*. 1997; 45(11):1679-704.
22. Williams LM. Associations of stressful life events and marital quality. *Psychol Rep*. 1995;76(3 Pt 2): 1115-22.
23. Shek DT. Gender differences in marital quality and well-being in Chinese married adults. *Sex Roles*. 1995;32(11-12):699-715.
24. Terry DJ, Scott WA. Gender Differences In Correlates Of Marital Satisfaction. *Aust J Psychol*. 1987; 39(2):207-21.
25. Conger RD, Conger KJ, Elder Jr, Lorenz FO. Linking economic hardship to marital quality and instability. *J Marriage Fam*. 1990;52(3):643-56.
26. Chen Z, Tanaka N, Uji M, Hiramura H, Shikai N, Fujihara S, et al. The role of personalities in the marital adjustment of Japanese couples. *Soc Behav Pers*. 2007;35(4):561-72.
27. Afifi TO, MacMillan H, Cox BJ, Asmundson GJ, Stein MB, Sareen J. Mental health correlates of intimate partner violence in marital relationships in a nationally representative sample of males and females. *J Interpers Violence*. 2009;24(8):1398-417.
28. Ting-Toomey S. An analysis of verbal communication patterns in high and low marital adjustment groups. *Hum Commun Res*. 1983;9(4):306-19.
29. Karney BR, Bradbury TN. The longitudinal course of marital quality and stability: a review of theory, method, and research. *Psychol Bull*. 1995;118(1): 3-34.
30. Chachamovich JR, Chachamovich E, Ezer H, Fleck MP, Knauth DR, Passos EP. Agreement on perceptions of quality of life in couples dealing with infertility. *J Obstet Gynecol Neonatal Nurs*. 2010;39(5):557-65.
31. Booth A, Johnson DR. Declining health and marital quality. *J Marriage Fam*. 1994;56(1):218-23.
32. Newton TL, Kiecolt-Glaser JK. Hostility and erosion of marital quality during early marriage. *J Behav Med*. 1995;18(6):601-19.
33. Mols F, Vingerhoets AJ, Coebergh JW, van de Poll-Franse LV. Quality of life among long-term breast

- cancer survivors: a systematic review. *Eur J Cancer*. 2005;41(17):2613-9.
34. Den Ouden BL, Van Heck GL, De Vries J. Quality of life and related concepts in Parkinson's disease: a systematic review. *Mov Disord*. 2007;22(11):1528-37.
 35. Jackson N, Waters E; Guidelines for Systematic Reviews in Health Promotion and Public Health Taskforce. Criteria for the systematic review of health promotion and public health interventions. *Health Promot Int*. 2005;20(4):367-74.
 36. Pullens MJ, De Vries J, Roukema JA. Subjective cognitive dysfunction in breast cancer patients: a systematic review. *Psychooncology*. 2010;19(11):1127-38.
 37. Kuijpers T, van der Windt DA, van der Heijden GJ, Bouter LM. Systematic review of prognostic cohort studies on shoulder disorders. *Pain*. 2004;109(3):420-31.
 38. Wells J, Barlow J, Stewart-Brown S. A systematic review of universal approaches to mental health promotion in schools. *Health Educ*. 2003;103(4):197-220.
 39. Ulbrich PM, Coyle AT, Llabre MM. Involuntary childlessness and marital adjustment: his and hers. *J Sex Marital Ther*. 1990;16(3):147-58.
 40. Berg BJ, Wilson JF. Psychological functioning across stages of treatment for infertility. *J Behav Med*. 1991;14(1):11-26.
 41. Pepe MV, Byrne T. Women's perceptions of immediate and long-term effects of failed infertility treatment on marital and sexual satisfaction. *Fam Relat*. 1991;40(3):303-9.
 42. Levin JB, Sher TG, Theodos V. The effect of intracouple coping concordance on psychological and marital distress in infertility patients. *J Clin Psychol Med Settings*. 1997;4(4):361-72.
 43. Markestad CL, Montgomery LM, Bartsch RA. Infertility and length of medical treatment effects on psychological, marital, and sexual functioning. *Int J Rehabil Health*. 1998;4(4):233-43.
 44. Lee TY, Sun GH. Psychosocial response of Chinese infertile husbands and wives. *Arch Androl*. 2000;45(3):143-8.
 45. Lee TY, Sun GH, Chao SC. The effect of an infertility diagnosis on the distress, marital and sexual satisfaction between husbands and wives in Taiwan. *Hum Reprod*. 2001;16(8):1762-7.
 46. Peterson BD, Newton CR, Rosen KH. Examining congruence between partners' perceived infertility-related stress and its relationship to marital adjustment and depression in infertile couples. *Fam Process*. 2003;42(1):59-70.
 47. Monga M, Alexandrescu B, Katz SE, Stein M, Ganiats T. Impact of infertility on quality of life, marital adjustment, and sexual function. *Urology*. 2004;63(1):126-30.
 48. Peterson BD, Newton CR, Rosen KH, Skaggs GE. Gender differences in how men and women who are referred for IVF cope with infertility stress. *Hum Reprod*. 2006;21(9):2443-9.
 49. Wang K, Li J, Zhang JX, Zhang L, Yu J, Jiang P. Psychological characteristics and marital quality of infertile women registered for in vitro fertilization-intracytoplasmic sperm injection in China. *Fertil Steril*. 2007;87(4):792-8.
 50. Drosdzol A, Skrzypulec V. Evaluation of marital and sexual interactions of Polish infertile couples. *J Sex Med*. 2009;6(12):3335-46.
 51. Smith JF, Walsh TJ, Shindel AW, Turek PJ, Wing H, Pasch L, et al. Sexual, marital, and social impact of a man's perceived infertility diagnosis. *J Sex Med*. 2009;6(9):2505-15.
 52. Benazon N, Wright J, Sabourin S. Stress, sexual satisfaction, and marital adjustment in infertile couples. *J Sex Marital Ther*. 1992;18(4):273-84.
 53. Leiblum SR, Aviv A, Hamer R. Life after infertility treatment: a long-term investigation of marital and sexual function. *Hum Reprod*. 1998;13(12):3569-74.
 54. Slade P, Raval H, Buck P, Lieberman BE. A 3-year follow-up of emotional marital and sexual functioning in couples who were infertile. *J Reprod Infant psychol*. 1992;10:233-43.
 55. Verhaak CM, Smeenk JM, Eugster A, van Minnen A, Kremer JA, Kraaimaat FW. Stress and marital satisfaction among women before and after their first cycle of in vitro fertilization and intracytoplasmic sperm injection. *Fertil Steril*. 2001;76(3):525-31.
 56. Repokari L, Punamäki RL, Unkila-Kallio L, Vilska S, Poikkeus P, Sinkkonen J, et al. Infertility treatment and marital relationships: a 1-year prospective study among successfully treated ART couples and their controls. *Hum Reprod*. 2007;22(5):1481-91.
 57. Boivin J, Shoog-Svanberg A, Andersson L, Hjelmstedt A, Bergh T, Collins A. Distress level in men undergoing intracytoplasmic sperm injection versus in-vitro fertilization. *Hum Reprod*. 1998;13(5):1403-6.
 58. Newton CR, Sherrard W, Glavac I. The Fertility Problem Inventory: measuring perceived infertility-related stress. *Fertil Steril*. 1999;72(1):54-62.