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Review Article

Yoga and stress profile for women undergoing infertility treatment: review

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ABSTRACT

Infertility is a silent struggle rising rapidly. Women undergoing treatment for infertility experience tremendous stress not only emotionally but socially also. It has been hypothesized that stress can hamper fertility and studies indicate an effective role of yoga in reducing stress. Hence, the review aims to assess if yoga has an effect on stress levels in infertile women thus improving the clinical outcome. Present review was registered on Prospero prospectively (CRD42022336237). A review was carried out to summarize the interventions assessing role of Yoga in reducing stress among women undergoing infertility treatment. Literature search was performed using a pre-defined search strategy on PubMed, Embase, and CTRI along with a manual search of references during the last decade. A total of 2959 articles via database searching and 202 via manual and citation searching were screened. Only two studies were found relevant meeting the inclusion criteria. Three studies with a similar intervention were retrieved but had different study designs and outcomes. All studies supported the recommendation of yoga as a complementary intervention. The review concluded yoga may have the potential in reducing stress thus improving clinical outcomes and suggests Ayush to conceive and plan large scale RCTs on this area to see the effect on clinical outcome.

Keywords: Yoga, Stress, Infertility, Subfertility, Assisted reproduction

INTRODUCTION

Failure to conceive after more than 12 months of regular unprotected sexual intercourse is defined as infertility.[1] Diagnosis of infertility lowers self-esteem and can exacerbate marital problems as a result may lead to a feeling of isolation. For the treatment of infertility, assisted reproductive technology (ART) is used. Psychological stress and distress feelings may affect negatively the chances of obtaining viable pregnancy with IVF treatment.[2,3] A study by Crawford et al has revealed that infertile women who screened positive for depression were comparatively less likely to initiate infertility treatment and they also concluded screening for depression as an important criteria.[4] Also, the treatment for fertility itself is stress generating, which increases the chances of failure of the process, hence patient distress is an important factor to consider before treatment initiation.

For most of the patients ART is a stressful process, because of repeated failed cycles and recurrent loss of pregnancy.[5,6] Yoga is a holistic life-based intervention focusing on regulating the lifestyle through mind-body practices. It is the traditional healing system which encourages physical

and mental relaxation, reducing stress and anxiety. Studies have revealed that yoga could reduce pain, depression, anxiety, stress, increases rate of vaginal delivery and also improve fetal outcomes.[7]

METHODS

Aims and objectives

The present study is aimed to assess the role of yoga in women undergoing treatment for ART. As, stress is present during the entire process of the ART treatment and yoga is considered to be a stress reduction therapy.

Methodology

Preferred reporting items for systematic review and meta-analysis (PRISMA) statement for conducting the review was followed.[8] This meta-analysis was registered prospectively on Prospero (CRD42022336237).

Search strategy

Literature search was performed via two independent investigators (RZ and DR) using a pre-defined search strategy mentioned below published on PubMed, Embase and CTRI along with manual search during last decade and relevant articles were retrieved. The key word used in search strategy were Yoga, infertility, ART, women, Stress with filters for clinical trial, and randomized control trial (RCT). The detailed search strategy is mentioned below.

(Yoga[Title]) AND (Infertility[Title]) OR (Infertile[Title])) AND (ART[Title]) OR (Assisted Reproductive[Title])) AND (Female[Title])) OR (Women[Title])) AND (Stress[Title])) OR (Psychological[Title])) OR (Psychosocial[Title])) OR (Distress[Title]) Filters: Clinical Trial, Randomized Controlled Trial, in the last 10 years, Humans, English (till March 2023).

Inclusion criteria

All intervention studies with effects on yoga on infertility were included in the study, and studies with design as Interventional or RCT were included in the review.

We have included all the studies in which women were undergoing ART treatment.

Articles that reported changes in stress levels among women undergoing for treatment for infertility were also included.

Exclusion criteria

Articles without full-text availability, incomplete data or published in a language other than English were excluded from the study.

Study selection

Initially, retrieved articles were screened for their titles and abstract by two independent investigators (RZ and DR) to find all eligible articles suing using the medical sub-headings keywords followed by the removal of duplicates and then finally full-text assessment. Disagreement regarding the inclusion of any article was sought by another co-author (AKY).

Data extraction

Relevant data extraction including study design, settings. Sample size, participants, intervention, comparator and the outcomes were extracted. If any conflict, third co-author (AKY) was approached. Data were tabulated using an excel spreadsheet.

Quality assessment

For critical appraisal the JBI checklists were used as per the study design. Each study was evaluated separately by RZ and DR regarding the quality assessment. AKY was approached for any disagreement.

Statistical analysis

For each study data were extracted through direct extraction from studies. Quality assessment was performed by Cochrane risk of bias scale using Review Manager software, version 5.4 (RevMan 5.4).

RESULTS

The initial search identified a total of 2959 articles via database searching and 202 via manual and citation searching. After duplicates removal and other irrelevant articles followed by full-text assessment only two study by Kirca et al and Josy et al were found relevant meeting the inclusion criteria with study design as experimental design with randomized control.[9,10]

However, we found 3 studies with similar intervention but the study design was different hence were not included in the meta-analysis (Table 1 and Figure 1). Among all 5 included studies in the review, Kirca et al and Josy et al were experimental design with randomized controls, Valoriani et al was pilot cohort study and remaining two studies Jasani et al and Oron et al were prospective in design (Table 1).[9-13]

Kirca et al study was conducted in a private IVF clinic involving 128 volunteers (n=64 each group) undergoing infertility treatment.[19] The intervention group was provided 6-weeks yoga classes. On comparing COMPI fertility problem stress scale pre-post scores statistically significant difference was noted in experimental groups ($p<0.05$), but for control group this was non-significant ($p>0.05$). This study suggested practice of yoga reduced

stress in women undergoing infertility treatment prior to IVF (Table 2).

Josy et al study was conducted among women undergoing infertility treatment in Bansal, Madhya Pradesh.[10] A total of sixty patients, thirty in each arm were included namely experimental and control respectively. It was noted that for the intervention group pre-test stress scale revealed a prevalence of 4 (13.3%) moderately stressed and 26 (86.6%) highly moderately stressed followed by 30 (100%) moderately stressed post intervention. Similarly, for the control group the prevalence was noted for pre-test group as 2 (6.6%) with moderate stress and 28 (93.3%) as high moderate stress followed by 4 (13.3%) moderate stress and 26 (86.6%) as high moderate stress. Significant differences between stress in experimental group was noted in the study (p=0.01). The study concluded effectiveness of yoga therapy in stress reduction and depression as well among patients undergoing infertility treatment in various ART centres (Table 2).

Valoriani et al study was conducted in Florence, Italy including a total of 120 subjects (n=45 in yoga group and n=75 in control group).[11] Women before starting their first IVF cycle were included in the study and an intervention for 3 months Hath yoga was provided to the subjects. Mean age of all patients were 36.4±3.2 (Yoga group: 36.8±3.4 and control group: 36.0±3.2). The study aims to evaluate symptoms of anxiety, depression and distress using state-trait anxiety inventory (STAI-Y1), Edinburgh depression scale (EDS) and general health questionnaire-12 (GHQ-12) respectively. This study revealed beneficial effect of Hath Yoga in improving the outcomes namely anxiety, depression and distress among women undergoing IVF (p<0.001) (Table 1). This study highlighted the need for incorporating yoga practice among the patient's undergoing treatment to stay healthy (Table 2).

Jasani et al study was conducted in Fertility Centres of Illinois, Chicago and Washington DC involving a total of 79 subjects (n=55 in yoga group and n=24 in control group), who were undergoing treatment for infertility.[12] Women were provided 6-week yoga class as an intervention. The study results noted significant lower mean sate and trait anxiety scores (p<0.014 and p<0.001) in the yoga group when compared to control group. This study revealed beneficial role of yoga in reducing anxiety among patients with infertility and also highlighted need for RCTs examining long terms effects of the structured yoga for the women undergoing ART (Table 2).

Oron et al included 49 infertile women awaiting IVF treatment.[13] Six-weeks Hath yoga class was provided to the subjects. The study noted statically significant difference for the outcome measured using beck depression inventory (p=0.004) and state-trait anxiety inventory scores (p=0.002). In this study yoga was found to improve overall life quality related to infertility, reducing negative feelings. This study recommended Hath Yoga for women diagnosed with infertility as a complementary intervention prior to IVF treatment. The study highlighted need for RCTs on this area.

Methodological quality of study

Risk of bias graph, review authors judgements about each risk of bias item presented as percentages and risk of bias summary based on Cochrane systematic review guidelines for Kirca et al and Josy et al study (green for low risk of bias, yellow for unclear risk of bias and red for high risk of bias) is presented in Figure 2a and b.[9,10]

Table 1: Characteristics of the included studies in the present review.

Author and year	Study design	Settings	Age	Sample size (Yoga/no-Yoga)	Particip-ants	Intervention	Compar-ator
Kirca et al, 2018[9]	Experiment-al design with randomized controls	Department of obstetrics and gynaecological nursing, Faculty of Health Sciences, Sanko University, Gaziantep, Turkey	28.23± 4.01	128 (64/64)	Primary infertile women undergoing IVF treatment	Twice 6 weeks of yoga sessions	Routine nursing care
Josy et al, 2021[10]	Experiment-al design with randomized controls	Department of reproductive medicine, Bansal, Madhya Pradesh	20-30 years	60 (30/30)	Women undergoing infertility treatment	Hath yoga including meditation and Pranayama every week for two months	Routine care
Jasani et al, 2016[12]	Prospective feasibility study (non-randomized)	Fertility Centres of Illinois, Chicago and Washington DC	X	79 (55/24)	Women undergoing infertility treatment	6-week yoga class	X

Continued.

Author and year	Study design	Settings	Age	Sample size (Yoga/no-Yoga)	Particip-ants	Intervention	Compar-ator
Oron et al, 2015[13]	Observati-onal prospective single center study	McGill University Health Centre's Reproductive Centre, a large public university affiliated fertility clinic in Montreal, Quebec, Canada	35.7± 4.5 (range 26–43)	49	Women awaiting their IVF treatment	6-week Hath yoga	X
Valoriani et al, 2014[11]	Pilot cohort study	Florence, Italy	36.8± 3.4	120 (45/75)	Women before starting their first in IVF cycle	3 months Hath Yoga	X

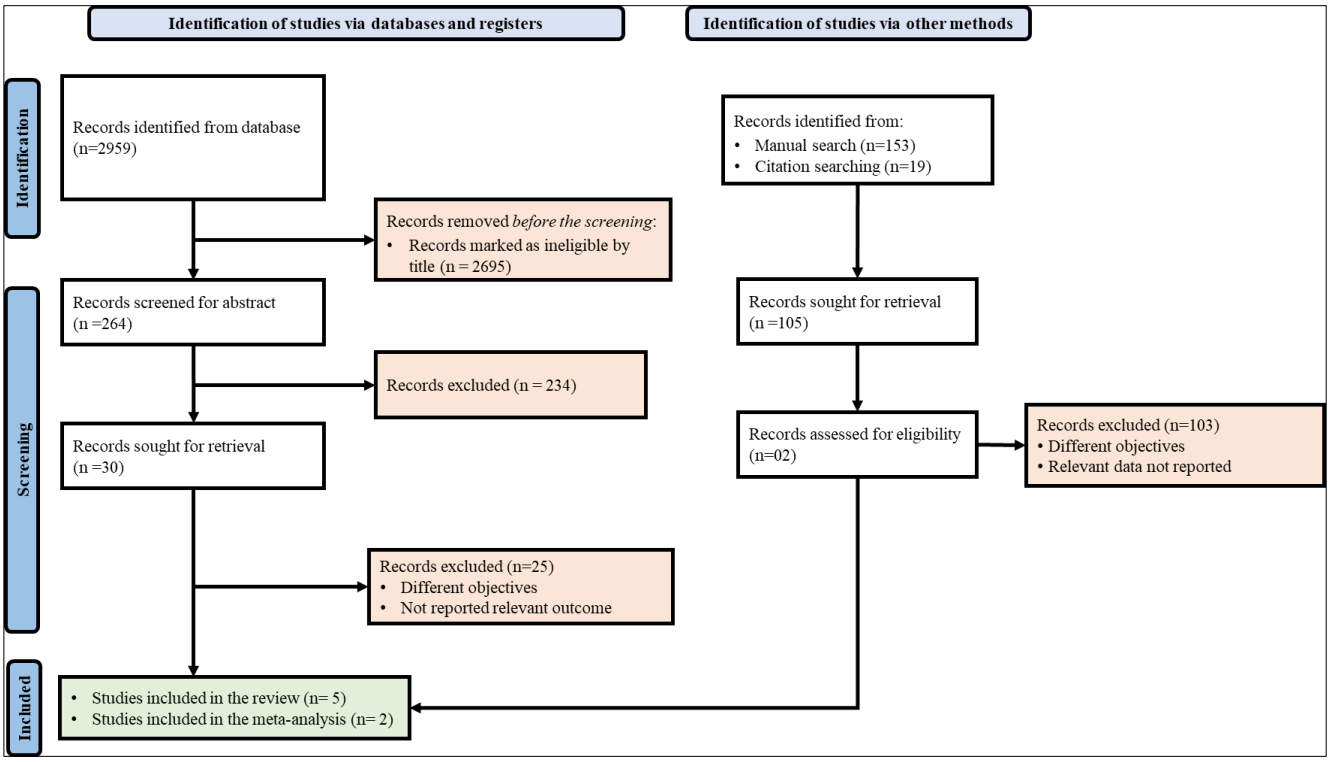

Figure 1: Study flow diagram.

Table 2: Brief summary of scales used and outcomes reported specific to stress.

Author and year	Outcomes reported			
Kirca et al, 2018[9]	**COMPI fertility problem stress scale**			
	Intervention_pre test	Intervention_post test	Ctrl_pre test	Ctrl_post test
	23.55±5.56	44.94±4.92	25.83±5.81	29.14±5.66
Josy et al, 2021[10]	**Fertility problem inventory**			
	Control	Experimental	P value	
	185.0±4.7	155.9±3.6	0.01	
	Beck's depression scale			
	Control	Experimental	P value	
	31.4±2.76	17.8±2.43	0.05	

Continued.

Author and year	Outcomes reported			
Jasani et al, 2016[12]	**Mean state anxiety score**			
	Yoga_baseline	Yoga_follow up	Ctrl_baseline	Ctrl_follow up
	48.2	38.4	45.6	44.5
	Mean trait anxiety score			
	Yoga_baseline	Yoga_follow up	Ctrl_baseline	Ctrl_follow up
	44.6	39.1	42.2	41
Oron et al, 2015[13]	**Beck depression inventory (13-item self-report measure of depression)**			
	Before		After	
	7.77±5.97 (48)		5.26±3.9 (47)	
	State-trait anxiety inventory (to diagnose anxiety and to distinguish it from depressive syndromes)			
	Before		After	
	46.7±12.1 (46)		42.8±9.6 (42)	
	Dyadic adjustment scale (scale for evaluating the quality and adjustment of a couple's relationship)			
	Before		After	
	95.5±7.58 (38)		96.1±7.18 (41)	
	Core fertility related quality of life (effect of fertility problems on the emotional and mind-body functioning)			
	Before		After	
	55.4±14.3 (43)		64.7±15.3 (32)	
Valoriani et al, 2014[11]	**Edinburgh depression scale mean score**			
	Before		After	
	9.27±5.50		6.60±4.77	
	State-trait anxiety inventory (to diagnose anxiety and to distinguish it from depressive syndromes)			
	Before		After	
	43.16±9.67		37.67±8.89	
	General health questionnaire mean score			
	Before		After	
	12.56±5.82		9.47±5.42	

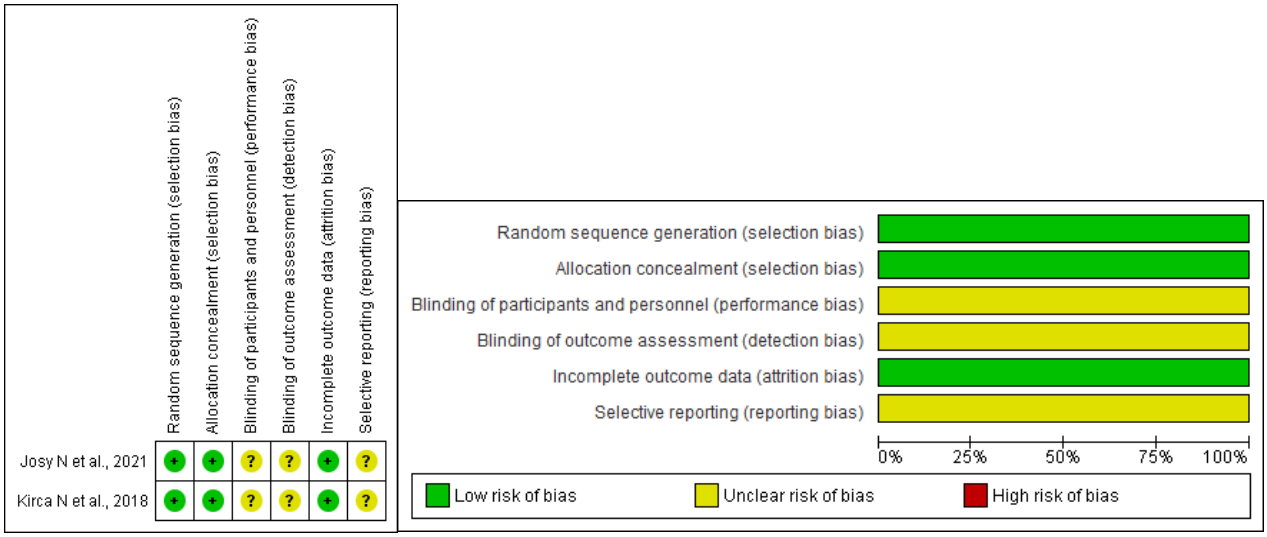

Figure 2: Risk of bias (a) risk of bias summary: review authors' judgement about each risk of bias item for included study (green for low risk of bias, yellow for unclear and red for high risk of bias); and (b) risk of bias graph: review authors' judgement about each risk of bias item presented as percentages (green for low risk of bias, yellow for unclear and red for high risk of bias).

DISCUSSION

The present study was conducted to generate evidence for use of Yoga among women undergoing infertility treatment.

Among all the included studies in the present review five used Hath Yoga intervention and it was observed that Hath Yoga which emphasizes on dynamic practices and physical postures, helped in reduction of stress.

Several studies have showed that stress and anxiety may impact fertility and can amplify the difficulties while trying to conceive.[3] Studies regarding benefits of yoga on women's reproductive health has been reported as the meditation and relaxation technique helps in maintaining the chemistry of the body along with providing satisfaction to the patient's undergoing treatment for infertility.[14]

Study conducted by Kirca et al investigated yoga effects on stress level in infertile women.[9] Josy et al noted that implementation of yoga helps in reduction of stress and depression.[10] Valoriani et al found that anxiety, depression and stress levels were significantly decreased when compared with non-yoga group.[11] Jasani et al noted reduction in anxiety and Oron et al revealed reduction in anxiety and depression.[12,13]

Kirca et al implemented yoga programme consisting of 12 sessions.[9] All sessions were carried out in 3 stages. Each stage lasted for one hour consisting of respiratory technique including abdominal breathing (10 minutes), Asana positions followed by deep relaxation (10 minutes) and meditation (10 minutes).

Josy et al provided a class for 60 minutes consisting of meditation, Pranayama and Hatha yoga.[10] The class begin with 'Oha' mantra for 5 minutes, followed by initial beathing to increase the concentration and to catch the diverted mind for 5 minutes and then Hatha Yoga section which included basic asanas for 20 minutes namely Suryanamaskar, Bhiyang asana (cobra pose), Paschimottasana (seat forward bend pose), Ushtrasana (camel pose), Sethubandhasanaa (bridge pose), Poorna tilali asana (butterfly pose), Shavasana (corpse pose). Next to this Pranayma session for 10 minutes.

Valoriani et al in their study used the tailored Asana positions for the infertile patients aiming at central nervous system relaxation and stimulation of reproductive organ activation.[11] Each lesson lasted for 1.5 hour involving the first 25 minutes to remove the whole-body tension followed by second part focusing on Asana positions consisting of 45 minutes and lastly a deep relaxation of 20 minutes.

Jasani et al in the study used six-week yoga intervention which was based on the pulling down the moon Yoga for fertility program, which was based on the model "Kosha" consisting of five different bodies namely the physical, breath, mental, wisdom and bliss body.[12] Each class was focused on Kosha including 30 min discussion followed by gentle Vinyasa-style yoga and Svasana (relaxation).

Oron et al in their study conducted free-of-charge 6-week Hatha Yoga workshop with a qualified certified yoga instructor.[13] The workshop included weekly 2-hr session consisting of beathing and centering for 15 minutes, weekly discussion for 40 minutes on a pre-decided theme followed by 55 minutes of Yoga poses along with 10 minutes of final guided progressive relaxation.

Yoga is the most inexpensive, safe and the natural method as an alternative complementary method. Yoga naturally increases fertility via involvement of certain postures. Study conducted by Patel et al made an attempt to draw attention towards the sociocultural aspects of infertility.[15] The study highlighted that acceptance by the family and social security is low and the distress among women is three times greater. For most of the patients undergoing infertility treatment is an embarrassing, shame-laden and disheartening experience, the study noted. Along with this cost of taking the treatment for the treatment is high which is also a contributing factor for stress. Stress is one of the most important causes of infertility which interfere menstrual cycle as a result delaying ovulation.

It should be taken into consideration while drawing any inference from the review that the results of the present review were not pooled because of heterogeneity of design, use of different yoga and timings of Yoga. Also, less studies have been conducted for effect of Yoga; therefore, the present review suggests Ayurveda, Yoga and Naturopathy, Unani, Siddha and Homeopathy (AYUSH) to conceive and plan large scale randomized controlled trials on use of Yoga on levels of stress for infertile patient to see the effect on clinical outcome.

Limitations

There are some limitations of the present review first, we have included only the studies published in language English. Second, the different study has used different scale for measurement of the stress among patient undergoing ART treatment. There is no cross-comparability between these scales so quantification is difficult, though all of them are indicative of reduction of stress.

CONCLUSION

Yoga might have potential role in reducing stress among women undergoing treatment for infertility. The present review indicates need for randomized controlled trails on this area, to establish yoga as a complementary intervention for women undergoing treatment for infertility. The present review suggests AYUSH to conceive and plan large scale randomized controlled trials on this area to see the effect on clinical outcome.

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