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Knowledge, attitudes, and practices toward exercises among women visiting an infertility clinic: A cross-sectional study

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ABSTRACT

Globally, there is a rising prevalence of infertility, and it has a negative consequence on the quality of life of women. The researchers aimed to understand the knowledge, attitude, and practice of women with infertility toward exercises. A cross-sectional study was conducted on 332 women aged between 18 and 45 years attending an infertility clinic in a tertiary hospital in Southern India. Participants filled a self-developed, content validated, pilot-tested questionnaire. Informants perceived stress and weight gain to be the major causes of infertility. Exercise was believed to improve fertilization by 55.4% of the participants, and walking and yoga were the preferred mode of exercises.

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Background

Infertility is a disease of the reproductive system defined as a failure to achieve a clinical pregnancy after 12 months or more of regular unprotected sexual intercourse (Zegers-Hochschild et al., 2009). Although, there is a decline in fertility from 2.52 births per woman in 2010–15 to 2.47 in 2015–2020 globally, a further decline in the total fertility rate is seen in India from 2.7 births per woman in 2005–06 to 2.2 births in 2015–16 (International Institute of Population Sciences, 2017; United Nations, Department of Economic and Social Affairs, Population division, 2017). Polycystic Ovarian Syndrome (PCOS), endometrial tuberculosis, pelvic inflammatory diseases, tubal infertility, late marriages, and sedentary behaviors are identified as the risk factors associated with infertility in India

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(Foucaut et al., 2019; Garg et al., 2010; Ghosh et al., 2011; Govt. of India. Sample Registration System statistical report, 2016; Rodin et al., 1998). Additionally, infertility is seen to be more prevalent in women who are obese and overweight (Mena et al., 2019). Although obesity is not formally considered a sole cause of anovulation, epidemiological data suggest that high body mass index (BMI) accounts for a significant proportion of primary infertility, and obesity is associated with lower implantation, lower live birth rates and a higher risk of spontaneous abortion (Hakimi & Cameron, 2017).

Lifestyle modifications suggested as a part of treatment for female infertility includes abstaining from tobacco use and alcohol consumption, and aiming for a body mass index less than 30 kg/m² to improve their chances of natural conception or using assisted reproductive technology (Lindsay & Vitrikas, 2015). Previous reviewers have shown benefit of lifestyle changes including exercise on fertility in obese and overweight women with PCOS suggesting that exercise could be used as a treatment option for resolution of ovulation (Haqq et al., 2014; Moran et al., 2011; Panidis et al., 2013; Sharma et al., 2013; Stener-Victorin, 2013). The types of exercise prescribed in studies on effect of exercise on ovulation include low-impact aerobics, brisk walking, lawn mowing, combined aerobics/resistance training to vigorous intensity exercises such as hiking, running, cycling, aerobic dancing, swimming, and tennis (Hakimi & Cameron, 2017).

However, researchers suggest that the association between exercise, body mass index (BMI) and ovulation is U-shaped, and both women who are sedentary with high BMI, and those who are over-trained with low BMI are more likely to suffer hormonal impairment and disturbances to their menstrual cycle. Previous researchers suggest that exercising to the level of exhaustion is associated with 2.3 times the odds of infertility compared to low intensity exercise and vigorous exercise was associated with reduced fertility in all subgroups with the exception of overweight and obese women (Gudmundsdottir et al., 2009; Wise et al., 2012). Thus, it is clear that the frequency, intensity and quantity of exercise are critical and may have an impact on ovulation (Hakimi & Cameron, 2017).

Knowledge acquisition, belief generation, and behavior formation are important aspects for improving health as it enhances healthy behavior and improves self-management (Rao et al., 2018). There exist controversies in beliefs about exercising and its effect on the chances of conception among women undergoing treatment for infertility (Hawkins et al., 2014; Kucuk et al., 2010; Sõritsa et al., 2020; Walker et al., 2017). Although there is evidence on the benefits of exercise in women with infertility, in our clinical practice we observed that the level of adherence to the prescribed exercises is low. To the best of our knowledge, there is no existing literature to understand the exercise behavior among this population

(Esmaeilzadeh et al., 2013). Hence, in this study, the authors aimed to understand the knowledge, attitudes, and practices of women with infertility toward exercise.

Methods

Ethics

Approval to conduct the study was obtained from Institutional Ethics Committee and the study was registered under Clinical Trial Registry of India (CTRI number: CTRI/2019/06/019486).

Study design

The researchers followed a cross-sectional study design and research participants were recruited from a reputed Assisted Reproduction center of a tertiary care hospital in Southern India. The research participants were recruited based on convenience sampling method and after providing detailed explanation about the study, a written informed consent was obtained prior to their participation.

Study participants

Three hundred and thirty-two women with infertility (either primary or secondary) between 18 and 45 years of age, who did not undergo prior Assisted Reproductive Technique participated in this study. The exclusion criteria for the study were women having unstable health conditions where exercise was contraindicated, and those with diagnosed psychiatric conditions. This was confirmed using the Physical activity readiness questionnaire (PAR-Q) (Bredin et al., 2013, Warburton et al., 2011).

Sample size

The sample size was calculated using the estimation of proportion formula $[n = N \times X / (X + N - 1)]$: $[n = N \times X / (X + N - 1)]$, where $X = Z_{\alpha/2}^2 * p * (1-p) / MOE^2$, and $Z_{\alpha/2}$ is the critical value of the Normal distribution at $\alpha/2$ (e.g. for a confidence level of 95%, α is 0.05 and the critical value is 1.96), MOE is the margin of error (5%), p is the sample proportion (30%), and N is the population size i.e. 100,000.

Procedure

Contents of the questionnaire were developed based on the themes, which emerged following a qualitative in-depth, face-to-face interview as a part

of the first phase of the study. The questionnaire was content validated, and the final questionnaire with 22 questions was developed in English and vernacular language. Major components of the questionnaire included knowledge about causes of infertility, attitude toward exercise, and exercise practices.

We collected socio-demographic and obstetric details, including age, BMI, level of education, occupation, years of marriage, and diagnosis of infertility. Participants were requested to answer all the questions and choose multiple options, if necessary and the average duration taken to complete the questionnaire was ten minutes.

Statistical analysis

Statistical analysis was performed using SPSS version 16.0. Descriptive statistics was used to report the frequencies in percentage. Multiple binary regression analysis was used to report the association between current exercise behavior and age, BMI, education, and occupation.

Results

Three hundred and thirty-two women with infertility were screened and were recruited for the study. The socio-demographic and obstetric details of the participants are reported in [Table 1](#).

Among our study participants, 37.6% were aged between 30 and 35 years, and 31% of the participants were aged between 24 and 30 years. Participants with normal BMI constituted 62.9% of the study population, and 27.1% of the participants were overweight.

The knowledge of the participants about the causes of infertility, perceived general benefits of exercise, and the source of knowledge about exercise is shown in [Table 2](#). Stress and weight gain were considered as major causative factors for infertility by 55.7% and 47.2% of the participants, respectively. Family members contributed to knowledge about exercise in 79.2% of our participants.

The attitude of the participants regarding fitness, the effect of exercise on conception, and readiness to perform the exercise, is presented in [Table 3](#). Fitness was perceived as 'being healthy' by 67.1%, and exercise was believed to improve fertilization by 55.4% of our participants. However, 22.8% believed that exercise could hinder the implantation of the ovum.

[Table 4](#) represents the lifestyle practices and barriers to exercise for conception. Out of the 219 participants who exercised regularly, 64.3% preferred walking. Walking was the preferred mode of exercise among homemakers (76.9%). However, employed women (74.7%), women with

Table 1. Sociodemographic and obstetric details of the participants ($n = 332$).

Sociodemographic and obstetric details	% (n)
<i>Age group (years)</i>	
24–30	31.0 (103)
30–35	37.6 (125)
35–40	25.9 (86)
≥40	5.4 (18)
<i>Body mass index (kg/m²)^a</i>	
<18.5	1.5 (5)
18.5–22.9	62.9 (209)
23–24.9	27.1 (90)
≥25	8.4 (28)
<i>Education</i>	
Primary	31.0 (103)
Secondary	37.6 (125)
Higher secondary and above	31.3 (104)
<i>Occupation</i>	
Homemaker	65.7 (218)
Employed	34.3 (114)
<i>Years of marriage</i>	
2–6	53.0 (176)
6–10	40.0 (133)
10–13	6.9 (23)
<i>Diagnosis</i>	
Primary infertility	92.1 (306)
Secondary infertility	7.8 (26)
Cyst	5.7 (19)
Fibroid	10.5 (35)
Endometriosis	5.1 (17)

^aBased on Asia-pacific body mass index classification.

Table 2. Knowledge about the causes of infertility, perceived general benefits of exercises and source of knowledge about exercises ($n = 332$).

<i>Knowledge about the causes of infertility</i>	% (n)
Stress	55.7 (185)
Weight gain	47.2 (157)
Change in lifestyle	35.8 (119)
Irregular menstruation	34.3 (114)
Low sperm count	31.9 (106)
Fibroids/tube blocks	30.7 (102)
Lack of bonding between the couple	11.7 (39)
Lack of awareness about fertile period in menstrual cycle	6.6 (12)
<i>Perceived general benefits of exercises</i>	
Fitness	69.8 (232)
Weight reduction	64.1 (213)
Prevents body pains	61.1 (203)
Maintain body weight	55.4 (184)
Reduces stress	40.3 (134)
Mental peace	33.7 (112)
Increases capacity to work	13.8 (46)
Boosts confidence	6.9 (23)
<i>Source of knowledge about exercises</i>	
Family members	79.2 (263)
Social media	63.8 (212)
Media (Television, newspapers, magazine)	53.6 (178)
Doctors	40.0 (133)

Table 3. Attitude towards fitness, perceived effect of exercises on conception and readiness to perform exercises ($n=332$).

<i>Variables</i>	<i>% (n)</i>
<i>Attitude towards fitness</i>	
Healthy	67.1 (223)
Strong	42.1 (140)
Able to do all household chores by self	39.4 (131)
Happy	37.6 (125)
<i>Perceived effect of exercises on conception</i>	
Improves fertilization	55.4 (184)
Redistribution of fat	32.2 (107)
Prevents egg implantation	22.8 (76)
Exercises need not be done to conceive	13.2 (44)
<i>Readiness to perform exercise</i>	
Yes	56.3 (187)
No	43.6 (145)

secondary education (65.6%), and underweight women (80%) preferred to do yoga. The preferred mode of instructions for exercise was through videos by 50% of the participants. When the response about barriers to exercise was compared between employed women and homemakers, 55.9% of employed women considered lack of time as a major barrier compared to 41.6% of homemakers. Lack of awareness about exercise, lack of motivation, and lack of facilities were the other reported barriers to exercise.

No association was found between the current exercise behavior and age, BMI, education and occupation as represented in [Table 5](#).

Discussion

Infertility is a distressing condition that is associated with social stigma and has a psychosocial influence on the couple, especially in women (Hasanpoor-Azghdy et al., 2014). The main contribution of the authors in this study to the existing literature is in understanding the knowledge, attitude towards exercise and exercise practices in women with infertility. This piece of scientific information might facilitate in identifying the gaps in the current exercise practices and ways to overcome it by acknowledging the client's preferences.

The major causes of infertility perceived by our participants were stress, weight gain, lifestyle changes, irregular menstruation, low sperm count, and fibroids/tube blocks. Katole and Saoji (2019) identified association between primary infertility and various sociodemographic, physiological, and psychological factors in urban population of central India. Factors such as obesity, delayed menarche, irregular menstruation, depression and stress showed significant association with primary infertility in their study. In the current study, only 6.6% of participants considered lack of awareness about fertile period in menstrual cycle as a cause of infertility. Mahey

Table 4. Lifestyle practices and barriers to exercise for conception.

<i>Variables</i>	<i>% (n)</i>
<i>Lifestyle practices being followed for conception (n=332)</i>	
Rest during menstruation	52.5 (176)
Avoid oily food	40.9 (136)
Reduce weight	33.4 (111)
Exercise	31.6 (105)
Avoid heat causing items	24.6 (82)
Visit religious places	24.3 (81)
Meet herbal healers	12.0 (40)
No changes made	20.4 (68)
<i>Current exercise practice (n=332)</i>	
Yes	65.9 (219)
No	34.1 (113)
<i>Types of exercise being performed (n=219)</i>	
Walking	64.3 (141)
Yoga	57.0 (125)
Gym	5.0 (11)
<i>Current exercise duration (minutes/ day) (n=219)</i>	
15–20	28.3 (59)
30–40	51.1 (112)
45–60	17.4 (38)
90–120	2.7 (6)
<i>Current frequency of exercises (days/ week) (n=219)</i>	
3	8.2 (18)
4	24.7 (54)
5	28.3 (62)
6	38.8 (85)
<i>Preferred type of exercise (n=332)</i>	
Walking	75.3 (250)
Yoga	63.2 (210)
Dance	12.0 (40)
Gym	7.2 (24)
Strengthening with weights	4.8 (16)
<i>Preferred exercise duration (minutes/ day) (n=332)</i>	
10–20	35.4 (118)
30–40	47.8 (159)
45–60	16.5 (55)
<i>Preferred frequency of exercises (days/ week) (n=332)</i>	
2–3	8.4 (28)
4–5	36.7 (122)
6–7	54.7 (182)
<i>Preferred method of performing exercise by participants (n=332)</i>	
Exercise self by watching videos	50.0 (166)
Exercise under supervision	31.3 (104)
Exercise taught by professional along with booklets / pamphlets	18.6 (62)
<i>Perceived barriers to exercise by the participants (n=332)</i>	
Lack of time	46.3 (154)
Not aware of the type of exercises to be done	35.8 (119)
Lack of motivation	25.9 (86)
Lack of facilities	20.4 (68)

et al. (2018) used survey methods to find the fertility awareness and knowledge among women with infertility reported that 85% of their participants missed to report the fertile window in menstrual cycle.

In our study, participants adopted lifestyle modifications such as avoiding oily food to reduce body weight, and exercise regularly to improve the chances of conception. This indicates their awareness about the impact of lifestyle modifications on improving the chances of fertility. Higher

Table 5. Association between current exercise behavior and body mass index, education, and occupation.

Variables	Categories	Current exercise behavior count (%)		Adjusted Odds ratio (95% CI)	p-value
		Yes	No		
Age (mean ± SD)	–	32.1 ± 4.6	32.6 ± 4.7	1.01 (0.96, 1.07)	0.49
Body mass index (kg/m ²)	18.5–22.9	133 (60.7)	80 (70.8)	1.17 (0.50, 2.77)	0.70
	23–24.9	67 (30.6)	24 (21.2)	0.82 (0.32, 2.09)	0.67
	>= 25	19 (8.7)	9 (8.0)	1.00	
Education	Till 5 th grade	75 (34.2)	28 (24.8)	0.76 (0.38, 1.51)	0.44
	Till 10 th grade	79 (36.1)	46 (40.7)	1.04 (0.59, 1.82)	0.89
	Till 12 th grade/ Under graduation	65 (29.7)	39 (34.5)	1.00	
Occupation	Home maker	146 (66.7)	72 (63.7)	0.85 (0.52, 1.39)	0.53
	Employed	73 (33.3)	41 (36.3)	1.00	

numbers of participants were aware of female-related causes than male-related causes of infertility in our study. This could be due to the lack of proper fertility-related education in the formative years of schools and colleges in India (Mahey et al., 2018).

The participants of this present study perceived improvement in general fitness, reduction of body weight and prevention of body pain as significant benefits of exercising. However, awareness about the effect of exercise on stress reduction and mental peace was lower. Although more than half of the participants in our study believed that exercising improves fertilization, few believed that exercise prevents implantation of the ovum and hence not necessary. A similar result was obtained by Rao et al. (2018) examination of infertile couples' perceptions of lifestyle changes and IVF success in which 76% of participants believed exercising during IVF to be beneficial, while 32% preferred bed rest as any lifestyle change was thought to affect conception. However, a previous researcher focusing on beliefs and behavior of women with infertility toward physical activity reported that 80.1% of participants limited their activity during IVF, believing it to cause adverse effects (Homan et al., 2007).

Most participants in our study gained knowledge about exercise from family members. Some participants reported the role of print media and doctors in creating awareness about exercise as they opined that information from these sources would be more accurate and reliable. Similar findings were reported by Hammarberg et al. (2017) whose participants proposed that health care providers, social media, and mass media should propagate information about fertility-related practices.

Dependency for information from family members among our participants can be attributed to the traditional Indian family system, which is based on the principle of collectivism. It signifies the role of families as a primary resource for the transfer of values and information to their members (Chadda & Deb, 2013). Hampton et al. (2013) in their study on awareness about fertility in Australian women reported that 86.8% of

participants sought information from the internet (49.5%), books (43.6%), general practitioner (26.6%), friends (26.6%), IVF clinics (18.1%), and others (2.9%).

In our study, the preferred mode of exercise by majority of participants was walking and yoga. Most of the participants who exercised were involved in 150 minutes of moderate intensity activity per week, as recommended by the American College of Sports Medicine (2020) for healthy adults. Similar results were reported by Piché et al. (2018) that amongst couples undergoing fertility treatments, 40% of women were involved in moderate to vigorous physical activity for more than 150 minutes per week. It is evident that the exercise behaviors of participants in our study are significant and on par with the recommended levels of physical activity. Although walking is a recommended mode of exercise according to physical activity guidelines, yogic activities are also gaining popularity across the globe. Furthermore, employed women showed greater interest in yoga compared to other forms of exercise in the current study. The effect of yoga on the parasympathetic system and, thus, on stress reduction could enhance the preference of yoga over other forms of exercise among employed women (Mohanty et al., 2020). Our results are in line with a previous study which has reported walking and yoga as preferred modes of exercise to improve physical activity by women (Mathews et al., 2016). The participants of our study were willing to exercise for 20 to 30 minutes for 5 to 6 days in a week. They preferred you tube video sources as the primary mode of instructions for exercise, followed by supervised exercise sessions. Similar to our study results, Kruse et al. (2017) have reported preference to tele-health services owing to greater patient satisfaction and convenience.

In our study, 43.6% of participants did not show readiness to perform exercises. This could be attributed to the reported barriers. Participants of the current study perceived lack of time and lack of awareness about exercises as significant barriers to exercise. In comparison to homemakers, a larger proportion of employed women expressed these factors as barriers. Lack of time and lack of motivation to exercise among employed women could be because of the expectation of their family members to involve in household chores similar to homemakers (Panigrahi et al., 2014). Mathews et al. (2016) reported that women of Thiruvananthapuram, a city of India, did not prefer to exercise due to social norms. Women often found no time to exercise as they were engaged in performing various social responsibilities.

To the best of our knowledge, this is the first study in South Asia that has explored exercise attitudes and practices of women with infertility. Determining the level of knowledge, attitude, and practices about exercises among women with infertility have major public health implications.

Exercise awareness programs, along with education, could improve the adherence to exercise practices in this population. Further, advice from consulting doctors on exercise has been observed to motivate exercise behavior in these women. This suggests that lifestyle modifications are to be inculcated along with medical management to obtain better outcomes. Our findings from this study suggest that factors such as cultural beliefs, knowledge about the causes of infertility, and exercise along with perceived barriers, influence the exercise behavior of an individual. All these factors must be addressed before planning exercise intervention to facilitate adherence to exercise among these women.

With the growing rate of infertility across the globe, there arises a necessity to address the condition in a more integrated manner. Especially in the current pandemic situation, with all the medical attention diverted for emergency care and infertility continuing as a major stressor, exercising could facilitate conception and improve physical and mental health (Sarkar et al., 2021; Vaughan et al., 2020). The limitation of our study is that we recruited the participants from an infertility center in a tertiary care hospital setting. Hence it may not reflect the perceptions of women living in rural areas who do not have access to such services. Our findings are relevant to physiotherapists, addressing clinicians, and women with infertility for understanding the factors influencing exercise behavior and identifying the necessary measures to improve the adherence to exercise.

Conclusion

From this study, we conclude that women with infertility have the knowledge about the impact of lifestyle interventions on conception. Women were willing to perform low to moderate intensity exercises such as walking and yoga. The readiness to exercise and exercise preference were influenced by the occupational status of the participants. The preference of video as a source of instruction to exercise in this population is an important finding. Employed women faced more barriers to engage in exercise than homemakers. Lack of time, lack of awareness about exercises, lack of motivation, and lack of facilities have been identified as significant barriers to exercise in women with infertility.

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