

Discrepancy in Knowledge, Attitude and Perception about Assisted Reproductive Technology Treatment among Infertile Couples Seeking Treatment at Government Clinic/ Tertiary Hospitals in Mumbai

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ABSTRACT

Children are an invaluable part of human life, especially for infertile couples, and assisted reproductive technology (ART) brings hope to those struggling with infertility. However, attitudes towards treatment through ART are influenced by socio-cultural, financial barriers, and access concerns. Therefore, this paper aimed to assess the knowledge, attitudes, and respondents' perceptions about various ART procedures. Primary data from two hospitals in Mumbai was collected using a structured schedule. The study involved 200 couples married for at least 3 years and undergoing treatment for at least 6 months. In the study, husbands showed greater awareness of donor oocytes (48.5% vs wife 35), sperm (65.5%), and egg freezing (19.5%), while wives showed greater awareness of IVF (68%) and IUI (67.5%). Wives showed more positivity toward ART methods, especially IVF, IUI, and ICSI, while husbands were more favorable toward donor-related methods. Cultural stigma, affordability, and fear of treatment negatively influenced attitudes, with significant differences between sexes. ART experience, particularly IVF, positively influenced awareness and acceptance for both sexes. Awareness and attitudes towards ART differ between husbands and wives, shaped by gender, type of infertility, and previous ART experience. While wives favor advanced ART methods, husbands lean towards donor-derived treatments. Stigma and affordability remain barriers, highlighting the need for targeted education and support to encourage informed decision-making among couples facing infertility. The findings of the study emphasize the importance of tailored education to improve awareness and reduce stigma-surrounding ART.

Keywords: Infertility, Assisted-reproductive-technology, Knowledge, Attitude, and Perception.

INTRODUCTION

Childbearing is a fundamental desire for many humans, holding considerable significance in social, religious, historical, cultural, and economic contexts. Despite this, some couples are unable to conceive and classified as infertile. WHO (2023) define infertility, as “Infertility is a disease of the male or female reproductive system defined by the failure to achieve a pregnancy after 12 months or more of regular unprotected sexual intercourse” [1]. Infertility can indeed be classified as temporary or permanent. Temporary infertility may occur due to reversible factors such as hormonal imbalances, stress, or the use of contraception methods like hormonal birth control, which suppress ovulation but allows fertility to return upon discontinuation [2]. On the other hand, permanent infertility results from irreversible conditions such as congenital absence of reproductive organs, surgical sterilization, or severe reproductive diseases [3].

According to a recent WHO report, a considerable segment of the world's population faces infertility during their lifetime. Globally, 17.5% of adults, equating to approximately 1 in 6 individuals worldwide, grapple with infertility. The lifetime prevalence of the infertility among high-income and middle-income countries' the prevalence rate was 17.8% and 16.5% respectively [1]. This emphasizes the urgent need to enhance accessibility to affordable and top-notch fertility care for those in need [1]. The infertility rate among women who have been married for at least five years and are currently in a union has slightly decreased from 1.9 to 1.87 at the national level between NFHS-4 and NFHS-5 [4], [5].

ART procedures include the surgical retrieval of eggs from a woman's ovaries, which are then fertilized with sperm in a lab before being reintroduced into the woman or a gestational carrier. ART also encompasses the freezing (cryopreservation) of eggs and embryos, as well as the donation of eggs and embryos. The most widely used ART method is in vitro fertilization (IVF). Less commonly performed ART techniques include gamete intrafallopian transfer (GIFT) and zygote intrafallopian transfer (ZIFT) [6]. Assisted reproductive technologies (ART) are medical procedures designed to help individuals who struggle with natural conception to achieve pregnancy [7]. Worldwide, more than 3 million Assisted Reproductive Technology (ART) cycles are documented yearly, resulting in approximately 769,977 babies being born [8]. Registry data is estimated to capture about 75% of all ART treatments [9]. Success Rates Report, around 238,126 individuals underwent 413,776 ART cycles at 453 clinics across the United States in 2021. These endeavors led to 91,906 live births, encompassing the delivery of one or more living infants and 97,128 live-born infants [10].

There exists a broad range of treatment alternatives available for addressing infertility, each personalized to address the specific underlying causes affecting individual patients. Certain causes of infertility can be treated effectively with medication, while others may require surgical intervention. In more complex cases, advanced technologies such as Assisted Reproductive Technology (ART) are necessary to achieve conception.

ART includes a variety of medical procedures developed to aid individuals and couples in achieving pregnancy. These procedures apply to both males and females, addressing diverse fertility issues. The choice of a specific ART procedure is contingent upon the unique fertility challenges identified through comprehensive medical assessments. It is essential to highlight that each ART procedure's success rates and suitability can vary among individuals and couples. Therefore, a thorough understanding of these procedures becomes pivotal in making informed decisions about fertility treatment. Having a good knowledge of assisted reproductive technology empowers patients to make informed decisions, actively participate in their treatment, and better cope with the emotional and practical challenges associated with fertility treatments.

The attitude of infertile couples towards ART is a nuanced interplay of hope, uncertainty, and various socio-cultural influences. For many, ART represents a beacon of hope, offering the possibility of fulfilling their dreams of parenthood. However, alongside this optimism, there may also be apprehension and skepticism fueled by concerns about the efficacy, safety, and ethical considerations surrounding ART procedures.

Cultural, and religious convictions and societal biases linked to infertility and ART further shape the attitudes of couples, influencing their willingness to pursue treatment. Moreover, the financial burden associated with ART can significantly impact couples' attitudes, with considerations about affordability often weighing heavily in their decision-making process. Accessibility to ART services, including the availability of clinics and the quality of care provided, also influences attitudes, particularly in regions with limited resources.

Over the past few decades, Assisted Reproductive Technology (ART) has become more widely implemented in India, providing solutions for infertility, which impacts an estimated 10-15% of married couples in the country [11]. The introduction of ART has led to notable changes, including the creation of specialized fertility clinics, advancements in procedures such as in vitro fertilization (IVF), and the establishment of regulatory frameworks like the ART Regulation Bill, 2020, aimed at standardizing practices and safeguarding the rights of donors and recipients [12]. ART is crucial in addressing the social and psychological challenges of infertility, particularly in India, where there is a strong cultural focus on childbearing. This study aims to assess the effectiveness of ART implementation in India, identify existing barriers to accessibility and regulation, and offer recommendations to improve outcomes for individuals seeking fertility treatments.

Overall, the attitude of infertile couples towards ART is a complex amalgamation of hope, apprehension, cultural influences, financial considerations, and accessibility factors. Understanding these attitudes is essential for healthcare providers and policymakers to tailor support services and address barriers to access, ensuring that all couples have equitable opportunities to pursue their desire for parenthood.

In a developing country like India, where literacy rates are low and poverty is high, there is a critical need to understand the knowledge and perception of infertility treatment among economically disadvantaged individuals. In this context, the paper aimed to assess the knowledge, attitudes, and perceptions of infertile couples in Mumbai regarding assisted reproductive technologies (ART), with a specific focus on gender-based differences.

MATERIAL AND METHODS

Site and Study Design: The study adopted a mixed-method research approach, utilizing a sequential explanatory design. This involved collecting and analyzing quantitative data first, followed by qualitative data, allowing for a comprehensive understanding of the research topic.

The study occurred in a fertility clinic in a National Institute specialized in the area of reproductive health in Mumbai, serving individuals from nearby areas peripheral regions and referrals from different regions of India. These facilities offer a range of gynecology and fertility services, providing a more affordable option for couples unable to afford private treatment. This research sheds light on challenges faced by infertile couples. Study involved National Institute for Research in Reproductive and Child Health (NIRRCH), Mumbai and Nowrosjee Wadia Maternity Hospital, Mumbai. NIRRCH offers free consultations and diagnostics, while Nowrosjee Wadia provides low-cost ART services with modern technology.

Study Population: Primary data was collected from the selected study sites from married couples diagnosed with infertility, undergoing treatment for at least six months and willing to participate in the study

Sample size: The study utilized a purposive selection process, initially screening couples for eligibility.

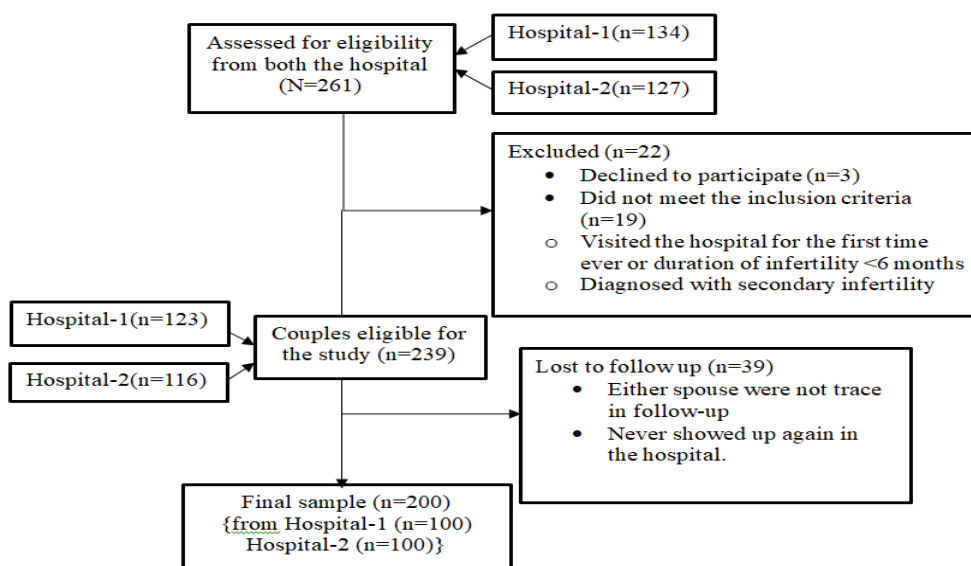


Figure 1: Flow chart of Sample screening and sample selection

Data collection technique: A self-structured schedule was devised for the study, and patient records were also accessed to fulfill the objectives. Data collection tools were developed after in depth consultation and inputs from the gynecologists in the research team. It was designed in simplified language, which the participants could understand, including inquiries about 12 types of ART treatments posed separately to couples. The structured schedule underwent pre-testing to confirm that the questions were clear, consistent, and acceptable to respondents. Following this phase, any required adjustments were made, and the questionnaires were prepared for implementation in the fieldwork. It was subsequently translated into Hindi and Marathi to make it easier for the participants. Detailed information about each procedure was provided, such as, "Do you know the process in which a woman provides her eggs (ova) to someone to achieve pregnancy (egg donation)?" The respondent's answer (yes or no) was coded. Regarding attitude, responses indicating a willingness to opt for a method if required were coded as a positive attitude. Reasons for opting or not were considered perceptions of the stated treatment procedure.

Data compilation and analysis: Following data collection, variables were created in SPSS 20 for data entry, which was also performed using the same software. Data cleaning was done to ensure the quality and accuracy. To achieve the study objectives, quantitative data analysis was performed using statistical software, including SPSS 20, STATA 16, and R.

Ethical consideration: The study demonstrated a strong commitment to ethical standards, with ethical approval from the institute's Institutional Review Board (approval no: 15/1830) (IIPS Ethics Committees). Subsequently, permissions were sought from the NIRRH ethics committee (approval no.: D/ICEC/Sci-85/89/2019) for clinical studies and the Institutional ethics committee (IEC-NWMH/10/2019) at Nowrosjee Wadia Maternity Hospital. Before the commencement of data collection, participants were provided with consent forms to sign and had the opportunity to have all their concerns and inquiries addressed. The anonymity and confidentiality of participants were guaranteed, as no identifiable or potentially incriminating information was included. The Marathi translator helped participants who were not proficient in Hindi or English.

Table of variables:

Variable Category	Variable	Description
Couple Characteristics	Wife Age (Years)	Age groups of wives: <25, 25-29, 30-34, 35 and above.
	Husband Age (Years)	Age groups of husbands: <30, 30-34, 35-39, 40 and above.
	Marital Duration (Years)	Duration of marriage: <5 years, 5-9 years, 10+ years.
	Education (Wife)	Educational attainment of wives: No education, Primary, Secondary, High, Intermediate, Graduation, PG and above.
	Education (Husband)	Educational attainment of husbands: No education, Primary, Secondary, High, Intermediate, Graduation, PG and above.
	Husband Income	Monthly income of husbands: <15,000, 15,000-19,000, 20,000-24,000, 25,000-29,000, 30,000+.
	Wife Income	Monthly income of wives: <9,000, 10,000-14,000, 15,000-19,000, 20,000+.
	Household Income	Total monthly household income: <15,000, 15,000-19,000, 20,000-24,000, 25,000-29,000, 30,000+.

ART Knowledge & Attitude	Knowledge of ART Methods	Awareness of ART methods (e.g., IVF, IUI, ICSI, Surrogacy) among wives and husbands.
	Attitude Toward ART Methods	Perception of ART methods (e.g., affordability, cultural stigma, religious beliefs, fear of treatment).
Perception of ART	Barriers to ART Adoption	Factors influencing reluctance to adopt ART: affordability, cultural stigma, religious beliefs, fear of treatment, lack of family support.
Predictors of ART Use	Cause of Infertility	Primary cause of infertility: Female only, Male only, Both, Unexplained.
	Female Cause of Infertility	Specific causes for female infertility: PCOS, Tubal Blockage, Ovulation Defects, Endometriosis, Low AMH, Unexplained, Combination.
	Current Mode of Treatment	Type of treatment currently being pursued: Medical, ART.
	History of Conception	Whether the couple has ever conceived earlier: Yes or No.
	History of IUI Treatment	Whether the couple has ever undergone Intrauterine Insemination (IUI): Yes or No.
	History of IVF Treatment	Whether the couple has ever undergone In Vitro Fertilization (IVF): Yes or No.

RESULTS

Demographic profile:

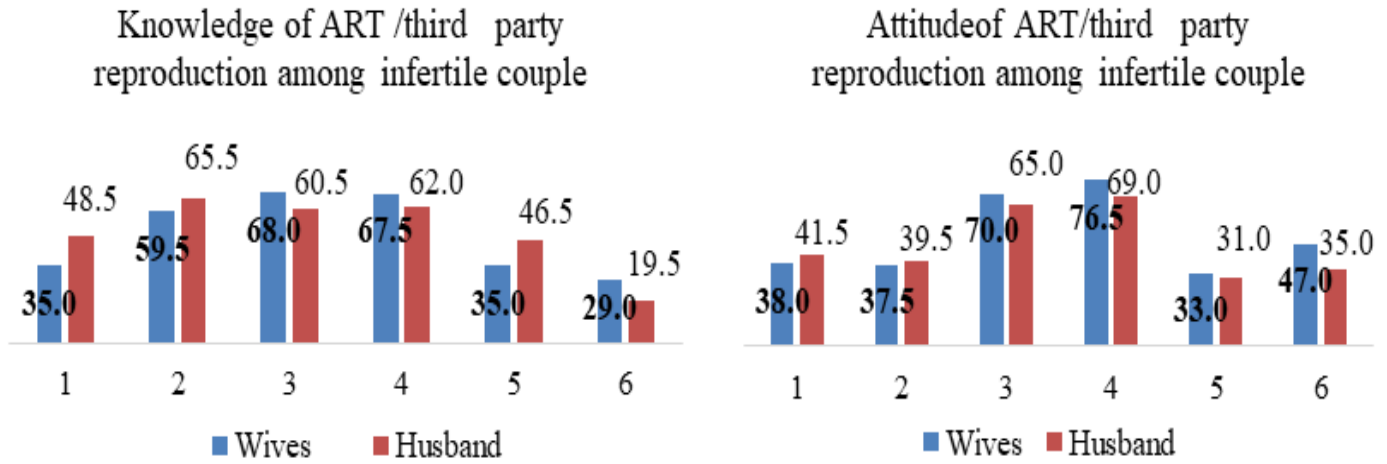
Table 1: Percentage distribution of couples by their characteristics for both hospitals

Couple characteristics		Hospital-1	Hospital-2	Total
		%	%	%
Wife age (Year)	<25	16.0	5.0	10.5
	25-29	46.0	31.0	38.5
	30-34	27.0	37.0	32.0
	35 and above	11.0	27.0	19.0
Husband age (Year)	<30	20.0	13.0	16.5
	30-34	45.0	42.0	43.5
	35-39	16.0	26.0	21.0
	40 and above	19.0	19.0	19.0
Marital Duration (Year)	<5 (3-4.99)	44.0	38.0	41.0
	5-9	43.0	37.0	40.0
	10+	13.0	25.0	19.0

Education wife	No education	4.0	1.0	2.5
	Primary	3.0	7.0	5.0
	Secondary	17.0	10.0	13.5
	High	16.0	20.0	18.0
	Intermediate	24.0	19.0	21.5
	Graduation	33.0	35.0	34.0
	PG and other	3.0	8.0	5.5
Education husband	No education	1.0	2.0	1.5
	Primary	3.0	9.0	2.5
	Secondary	5.0	31.0	7.0
	High	25.0	17.0	28.0
	Intermediate	30.0	34.0	23.5
	Graduation	31.0	6.0	32.5
	PG and other	5.0	7.0	6.0
Husband Income	< 15000	24.0	25.0	24.5
	15000-19000	33.0	23.0	28.0
	20000-24000	13.0	17.0	15.0
	25000-29000	9.0	9.0	9.0
	30000+	21.0	26.0	23.5
Wife Income	<9000	37.1	44.8	40.6
	10000-14000	28.6	17.2	23.4
	15000-19000	14.3	10.3	12.5
	20000+	20.0	27.6	23.4
Household Income	<15000	24.0	25.0	24.5
	15000-19000	33.0	23.0	28.0
	20000-24000	13.0	17.0	15.0
	25000-29000	9.0	9.0	9.0
	30000+	21.0	26.0	23.5

The table1 compares couples' demographic, educational, and income characteristics across two hospitals. Hospital-1 serves younger wives (<25 years, 16%) and husbands, while Hospital-2 caters to older couples, with

27% of wives aged 35+ (vs. 11% in Hospital-1) and 26% of husbands aged 35-39 (vs. 16% in Hospital-1). Marital durations under five years are higher in Hospital-1 (44% vs. 38%), but Hospital-2 has more couples married over 10 years (25% vs. 13%). Educationally, Hospital-2 has slightly more wives with postgraduate qualifications (8% vs. 3%), while Hospital-1 has more graduate husbands (31% vs. 6%). In terms of participants level of income, Hospital-2 has a higher proportion of husbands and households earning over 30,000 (26% vs. 21%) and wives earning over 20,000 (27.6% vs. 20%). Overall, Hospital-1 focuses on younger, less established couples, while Hospital-2 serves older, more financially stable couples.



1- Egg donation 2-Sperm donation 3-IVF, 4-IUI, 5-Surrogacy, 6-Donor Insemination

Figure 2: Knowledge and attitude of assisted reproductive technology /third party reproduction among infertile couple

Knowledge of ART method: There were significant differences between husbands and wives regarding knowledge about various assisted reproductive technologies (Figure 2). Husbands exhibited a higher level of awareness about donor oocytes (Husband: 48.5% > Wife: 35%), donor sperm (Husband: 65.5% > Wife: 59.5%), and egg freezing (Husband: 19.5% > Wife: 16%) compared to wives. Conversely, wives displayed greater familiarity with In Vitro Fertilization (IVF) (Wife: 68% > Husband: 60.5%) and Intrauterine Insemination (IUI) (Wife: 67.5% > Husband: 62%) compared to husbands. Both husbands and wives had relatively little knowledge about other advanced infertility treatments such as Preservation of Ovarian Tissue, Gamete Intrafallopian Tube Transfer, and Zygote Intrafallopian Transfer. A considerable number of both husbands and wives were aware of surrogacy, with approximately 47% of husbands and 35% of wives knowing about it (Table 2).

Table 2: Knowledge and attitude of assisted reproductive technology (ART) /third-party reproduction among infertile couples

Assisted reproductive technology /third-party reproduction	Knowledge			Attitude		
	Wives	Husbands	Chi2	Wives	Husbands	Chi2
	% (N)	% (N)		% (N)	% (N)	
Donation of egg	35 (70)	48.5 (97)	3.22*	38 (76)	41.5 (83)	20.89***
Donation of Sperm	59.5 (119)	65.5 (131)	0.85	37.5 (75)	39.5 (79)	15.97***
Egg Freezing	16 (32)	19.5 (39)	7.86***	26 (52)	24.5 (49)	52.12***
In vitro fertilization (IVF)	68 (136)	60.5 (121)	5.73**	70 (140)	65 (130)	15.07***
Intrauterine insemination (IUI)	67.5 (135)	62 (124)	6.66**	76.5 (153)	69 (138)	35.1***

Intracytoplasmic sperm injection (ICSI)	14.5 (29)	13.5 (27)	1.50	75.5 (151)	70.5 (141)	49.64***
Preservation of embryos	9.5 (19)	12 (24)	1.63	50 (100)	50.5 (101)	48.02***
Preservation of ovarian tissue	3.0 (6)	5.5 (11)	1.48	44.5 (89)	40.5 (81)	48.2***
Surrogacy	35 (70)	46.5 (93)	3.68*	33.0 (66)	31.0 (62)	7.71***
Gamete Intrafallopian Tube Transfer	4 (8)	12 (24)	1.33	67.5 (135)	56.5 (113)	10.67***
Zygote intrafallopian transfer	3.0 (6)	8.5 (17)	0.57	71.0 (142)	54.0 (108)	17.34***
Donor Insemination	29 (58)	19.5 (39)	2.11	47.0 (94)	35.0 (70)	28.90***

*p<0.1, **p<0.05, ***p<0.05

Attitude toward various Assisted reproductive technology treatments among infertile couples: Males demonstrated a more favorable stance on donor oocytes (Husband: 41.5% > Wife: 38%) and donor sperm (Husband: 39.5% > Wife: 37.5%) compared to females. Conversely, a more significant percentage of wives displayed positive attitudes toward various assisted reproductive technologies. Wives expressed higher positivity towards In Vitro Fertilization (IVF) (Wife: 70% > Husband: 65%), Intrauterine Insemination (IUI) (Wife: 76.5% > Husband: 69%), Intracytoplasmic Sperm Injection (ICSI) (Wife: 75.5% > Husband: 69%), as well as Gamete Intrafallopian Tube Transfer, Zygote Intrafallopian Transfer, and Donor Insemination (Wife: 47% > Husband: 35%) (Table-2).

Husbands had a more positive attitude towards the donation of eggs and sperm. Compared to husbands, wives had a positive attitude towards IVF, IUI, ICSI, Gamete Intrafallopian Tube Transfer, Zygote intrafallopian transfer, and Donor Insemination. The proportion of husbands favored using donor eggs over donor sperm and donor Insemination.

Table 3: Perception and apprehension of different ART procedures among couples facing infertility

Type of ART		Wives % (N)	Husbands % (N)
Donation of egg	Not affordable	-	4.27 (5)
	Cultural and social stigma	53.23 (66)	29.91 (35)
	Religious belief against ART	11.29 (14)	11.97 (14)
	Fear of trying treatment	9.68 (12)	26.5 (31)
	Medication or better not take any treatment	16.94 (21)	19.66 (23)
	Lack of support from family or spouse	8.87 (11)	7.69 (9)
Donation of Sperm	Not affordable	-	4.96 (6)
	Cultural and social stigma	54.4 (68)	32.23 (39)
	Religious belief against ART	12 (15)	12.4 (15)

	Fear of trying treatment	9.6 (12)	17.36 (21)
	Medication or better not take any treatment	13.6 (17)	25.62 (31)
	Lack of support from family or spouse	10.4 (13)	7.44 (9)
Egg Freezing	Not affordable	1.35 (2)	0.66 (1)
	Cultural and social stigma	39.19 (58)	24.5 (37)
	Religious belief against ART	6.76 (10)	5.96 (9)
	Fear of trying treatment	14.86 (22)	24.5 (37)
	Medication or better not take any treatment	16.89 (25)	33.77 (51)
	Lack of support from family or spouse	6.08 (9)	10.6 (16)
	Age is not sufficient for this	14.86 (22)	
In vitro fertilization (IVF)	Not affordable	20.0 (12)	15.71 (11)
	Cultural and social stigma	31.67 (19)	22.86 (16)
	Religious belief against ART	6.67 (4)	8.57 (6)
	Fear of trying treatment	25 (15)	17.14 (12)
	Medication or better not take any treatment	16.67 (10)	35.71 (25)
Intrauterine Insemination (IUI)	Cultural and social stigma	42.55 (20)	30.65 (19)
	Religious belief against ART	6.38 (3)	11.29 (7)
	Fear of trying treatment	17.02 (8)	24.19 (15)
	Medication or better not take any treatment	21.28 (10)	19.35 (12)
	Lack of support from family or spouse	8.51 (4)	6.45 (4)
Intracytoplasmic sperm injection (ICSI)	Not affordable	4.08 (2)	
	Cultural and social stigma	28.57 (14)	32.2 (19)
	Religious belief against ART	8.16 (4)	11.86 (7)
	Fear of trying treatment	12.24 (6)	15.25 (9)
	Medication or better not take any treatment	38.78 (19)	32.2 (19)
	Lack of support from family or spouse	8.16 (4)	8.47 (5)

Preservation of embryos	Not affordable	3 (3)	
	Cultural and social stigma	47 (47)	23.23 (23)
	Religious belief against ART	6 (6)	14.14 (14)
	Fear of trying treatment	31 (31)	20.2 (20)
	Medication or better not take any treatment	8 (8)	30.3 (30)
	Lack of support from family or spouse	5(5)	12.12 (12)
Preservation of ovarian tissue	Not affordable	7.21 (8)	4.2 (5)
	Cultural and social stigma	38.74 (43)	17.65 (21)
	Religious belief against ART	8.11 (9)	10.08 (12)
	Fear of trying treatment	26.13 (29)	20.17 (24)
	Medication or better not take any treatment	11.71 (13)	39.5 (47)
	Lack of support from family or spouse	8.11 (9)	8.4 (10)
Surrogacy	Not affordable	12.69 (17)	10.87 (15)
	Cultural and social stigma	38.81 (52)	18.12 (25)
	Religious belief against ART	4.48 (6)	7.97 (11)
	Fear of trying treatment	7.46 (10)	17.39 (24)
	Medication or better not take any treatment	14.93 (20)	31.16 (43)
	Lack of support from family or spouse	8.96 (12)	10.14 (14)
	Experience pregnancy	12.69 (17)	4.35 [#] (6)
Gamete Intrafallopian Tube	Not affordable	12.31 (8)	8.05 (7)
	Cultural and social stigma	49.23 (32)	45.98 (40)
	Religious belief against ART	7.69 (5)	9.2 (8)
	Fear of trying treatment	4.62 (3)	8.05 (7)
	Medication or better not take any treatment	16.92 (11)	22.99 (20)
	Lack of support from family or spouse	9.23 (6)	5.75 (5)
	Not affordable	1.72 (1)	1.09 (1)

Zygote Intrafallopian Transfer	Cultural and social stigma	27.59 (16)	29.35 (27)
	Religious belief against ART	10.34 (6)	9.78 (9)
	Fear of trying treatment	25.86 (15)	15.22 (14)
	Medication or better not take any treatment	17.24 (10)	30.43 (28)
	Lack of support from family or spouse	17.24 (10)	14.13 (13)
Donor Insemination	Not affordable		3.85 (5)
	Cultural and social stigma	45.28 (48)	26.92 (35)
	Religious belief against ART	11.32 (12)	15.38 (20)
	Fear of trying treatment	10.38 (11)	10.77 (14)
	Medication or better not take any treatment	21.7 (23)	26.15 (34)
	Lack of support from family or spouse	11.32 (12)	16.92 (22)

Perception about various ART treatments: Table 3 presents the Perception of different assisted reproductive technology (ART) procedures among couples facing infertility. In couples exhibiting a negative attitude towards ART treatments, reasons for not opting for such treatments shed light on their perceptions. Cultural and social stigmatization was cited by over half of women as a barrier to obtaining donor eggs (53.23% of wives vs. 29.91% of husbands) and sperm. Husbands often report a higher fear of trying treatment than wives for egg freezing (24.5% husbands vs. 14.86% wives). The difference between wives and husbands on religious beliefs against ART is minimal across procedures.

Medication/treatment avoidance was a notable concern for both spouses regarding sperm donation. More husbands than wives believe in opting for medication or avoiding treatment altogether. For instance, in IVF, 35.71% of husbands prefer this option compared to 16.67% of wives. For egg freezing, cultural stigma was a concern for 39.2% of wives and 24.5% of husbands, while fear of treatment and medication concerns were prominent for both spouses. Regarding IVF, affordability is a bigger concern for wives (20%) than for husbands (15.71%). Husbands lean more toward medication or avoiding treatment (35.71%) than wives (16.67%) for IVF. In surrogacy, cultural stigma is notably higher among wives (38.81%) than husbands (18.12%). Husbands report higher preference for medication or no treatment (31.16%) compared to wives (14.93%).

Table 4.1: Percentage Distribution of Knowledge of Various ART Treatment Methods among wives Based on Different Predictors

Predictors		Knowledge of various ART treatment method, Wife (% (N))							
		Donation of egg	Donation of Sperm	Egg Freezing	In vitro fertilization (IVF)	Intrauterine Insemination (IUI)	Intracytoplasmic Sperm injection (ICSI)	Surrogacy	Donor Insemination
Cause of Infertility	Female only	33.3 (28)	56.0 (47)	17.9 (15)	67.9 (57)	64.3 (54)	17.9 (15)	41.7 (35)	29.8 (25)
	Male only	33.3 (7)	66.7 (14)	19.0 (4)	66.7 (14)	85.7 (18)	14.3 (3)	14.3 (3)	33.3 (7)

	Both	35.4 (28)	62 (49)	13.9 (11)	69.6 (55)	65.8 (52)	12.7 (10)	34.2 (27)	27.8 (22)
	Unexplained	43.8 (7)	56.3 (9)	12.5 (2)	62.5 (10)	68.8 (11)	6.3 (1)	31.3 (5)	25 (4)
	Chi2	0.67	1.17	0.76	0.34	3.68	1.86	5.72	0.39
Female cause of infertility	PCOS	41.8 (28)	64.2 (43)	14.9 (10)	70.1 (47)	64.2 (43)	14.9 (10)	49.3 (33)	28.4 (19)
	Tubal Blockage	40 (10)	56 (14)	24 (6)	72 (18)	68 (17)	16 (4)	44 (11)	36 (9)
	Ovulation defects	26.3 (5)	52.6 (10)	10.5 (2)	68.4 (13)	68.4 (13)	21.1 (4)	31.6 (6)	21.1 (4)
	Endometriosis	19 (4)	47.6 (10)	23.8 (5)	61.9 (13)	57.1 (12)	19 (4)	19 (4)	23.8 (5)
	Low AMH	26.7 (4)	53.3 (8)	20 (3)	60 (9)	60 (9)	6.7 (1)	33.3 (5)	33.3 (5)
	Unexplained	43.8 (7)	56.3 (9)	12.5 (2)	62.5 (10)	68.8 (11)	6.3 (1)	31.3 (5)	25 (4)
	Combination	31.3 (5)	68.8 (11)	0 (0)	75 (12)	75 (12)	12.5 (2)	18.8 (3)	31.3 (5)
	Chi2	5.69	3.14	3.14	6.09	1.71	1.75	7.62	3.09
Current mode of treatment	Medical	60 (87)	34.5 (50)	13.8 (20)	65.5 (95)	63.4 (92)	11.7 (17)	35.2 (51)	27.6 (40)
	ART	58.2 (32)	36.4 (20)	21.8 (12)	74.5 (41)	78.2 (43)	21.8 (12)	34.5 (19)	32.7 (18)
	Chi2	0.06	0.06	1.91	1.49	3.95**	3.28	0.01	0.512
Ever conceived earlier	No	59.6 (106)	35.4 (63)	14.6 (26)	66.9 (119)	66.3 (118)	14 (25)	36 (64)	29.2 (52)
	Yes	59.1 (13)	31.8 (7)	27.3 (6)	77.3 (17)	77.3 (17)	18.2 (4)	27.3 (6)	27.3 (6)
	Chi2	0.00	0.11	2.34	0.98	1.08	0.27	0.65	0.04
Ever taken IUI	No	58.9 (103)	36.6 (64)	15.4 (27)	67.4 (118)	67.4 (118)	12.6 (22)	35.4 (62)	29.1 (44)
	Yes	64 (16)	24 (6)	20 (5)	72 (18)	68 (17)	28 (7)	32 (8)	28.6 (14)
	Chi2	0.08	0.41	2.01	0.89	5.91**	1.83	0.00	0.01
Ever taken IVF	No	59.4 (117)	34.5 (68)	15.2 (30)	67.5 (133)	67 (132)	14.2 (28)	35 (69)	28 (49)
	Yes	66.7 (2)	66.7 (2)	66.7 (2)	100 (3)	100 (3)	33.3 (1)	33.3 (1)	36 (9)
	Chi2	0.24	1.52	0.34	0.21	0.00	4.2*	0.11	0.68

*p<0.1, **p<0.05, ***p<0.05

Table 5.2: Percentage Distribution of Knowledge among husband of Various ART Treatment Methods Based on Different Predictors

Predictors		Knowledge of various ART treatment method Husband (% (N))							
		Donation of egg	Donation of Sperm	Egg Freezing	In vitro fertilization (IVF)	Intrauterine insemination (IUI)	Intracytoplasmic sperm injection (ICSI)	Surrogacy	Donor Insemination
Cause of Infertility	Female only	50 (42)	61.9 (52)	25 (21)	59.5 (50)	60.7 (51)	17.9 (15)	51.2 (43)	22.6 (19)
	Male only	52.4 (11)	66.7 (14)	19 (4)	66.7 (14)	57.1 (12)	4.8 (1)	42.9 (9)	19 (4)
	Both	44.3 (35)	67.1 (53)	16.5 (13)	62 (49)	63.3 (50)	12.7 (10)	45.6 (36)	19 (15)
	Unexplained	56.3 (9)	75 (12)	6.3 (1)	50 (8)	68.8 (11)	6.3 (1)	31.3 (5)	6.3 (1)
	Chi2	1.14	1.22	3.88	1.18	0.64	3.51	2.38	2.33
Male cause of infertility	Problem with sperm	47.7 (42)	69.3 (61)	17 (15)	64.8 (57)	61.4 (54)	10.2 (9)	44.3 (39)	20.5 (18)
	Unexplained	56.3 (9)	75 (12)	6.3 (1)	50 (8)	68.8 (11)	6.3 (1)	31.3 (5)	6.3 (1)
	Varicocele	33.3 (3)	55.6 (5)	22.2 (2)	44.4 (4)	77.8 (7)	11.1 (1)	55.6 (5)	11.1 (1)
	Chi2	1.21	1.03	1.47	2.38	1.16	0.27	1.53	2.17
Current mode of treatment	Medical	42.8 (62)	62.8 (91)	15.2 (22)	59.3 (86)	61.4 (89)	10.3 (15)	43.4 (63)	17.9 (26)
	ART	63.6 (35)	72.7 (40)	30.9 (17)	63.6 (35)	63.6 (35)	21.8 (12)	54.5 (30)	23.6 (13)
	Chi2	6.96***	1.75	6.29**	0.31	0.09	4.49**	1.974	0.827
Ever conceived earlier	No	47.2 (84)	65.7 (117)	20.2 (36)	60.7 (108)	61.8 (110)	14.6 (26)	47.8 (85)	19.7 (35)
	Yes	59.1 (13)	63.6 (14)	13.6 (3)	59.1 (13)	63.6 (14)	4.5 (1)	36.4 (8)	18.2 (4)
	Chi2	1.11	0.04	0.54	0.02	0.03	1.70	1.02	0.03
Ever taken IUI	No	44.4 (67)	62.3 (94)	17.2 (26)	60.3 (91)	59.6 (90)	11.9 (18)	44.4 (67)	18.5 (28)
	Yes	61.2 (30)	75.5 (37)	26.5 (13)	61.2 (30)	69.4 (34)	18.4 (9)	53.1 (26)	22.4 (11)

	Chi2	4.21*	2.88	2.04	0.01	1.50	1.32	1.12	0.36
Ever taken IVF	No	46.9 (82)	64.6 (113)	17.7 (31)	58.3 (102)	62.3 (109)	11.4 (20)	48.6 (85)	18.3 (32)
	Yes	60.0 (15)	72.0 (18)	32.0 (8)	76.0 (19)	60.0 (15)	28.0 (7)	32.0 (8)	28.0 (7)
	Chi2	1.51	0.53	2.84	2.87	0.05	5.14**	2.42	1.32

*p<0.1, **p<0.05, ***p<0.01

The data in the table 4.1 and 4.2 explores the knowledge of Assisted Reproductive technologies (ART) methods among wives and their counterparts. These tables show that IVF and IUI are the most recognized methods among the couple across all groups. Women with unexplained infertility or combined male and female infertility generally display greater awareness of ART methods, while women with male infertility are more knowledgeable about sperm donation. Male-only infertility has the highest awareness for IUI (85.7%) but lower awareness of surrogacy (14.3%).

Among female-specific conditions, women with PCOS display greater familiarity with IVF (70.1%), IUI (64.2%) and surrogacy (49.3%) than women with conditions tubal blockage. Females underwent ART treatments demonstrated greater awareness of advanced technologies than those receiving medical treatment, especially for IVF (74.5% vs 65.5%) and IUI (78.2% vs 63.4%). Those who have conceived before or undergone IUI or IVF also demonstrate higher knowledge of ART methods. For instance, 100% of IVF users recognized IVF and IUI as treatment options, indicating that personal experience directly impacts awareness. Statistical analysis showed significant relationships, such as greater knowledge of IUI among ART users and greater awareness of ICSI among those with prior IUI/IVF experience (table4.1).

Husbands' awareness of ART methods varied depending on the context. Husbands with varicocele showed strong awareness of IUI (77.8%), but had limited knowledge of other methods. Those undergoing ART treatment were significantly more knowledgeable than non-ART users about egg donation (63.6% vs 42.8%), egg freezing (30.9% vs 15.2%), and ICSI (21.8% vs 10.3%). Previous pregnancies increased awareness of egg donation (59.1%), but decreased ICSI knowledge (4.5%). Husbands with IUI experience showed greater awareness of sperm donation (75.5%) and egg donation (61.2%). IVF experience significantly improved knowledge of egg freezing (32% vs 17.7%) and ICSI (28% vs 11.4%), with significant chi-square values (p < 0.01) (table 4.2).

Wives are generally more aware than their husbands about ART methods such as IVF and IUI, while their husbands show slightly better knowledge about sperm-based techniques. Among couples undergoing ART, wives excel in IUI knowledge, while husbands lead in egg donation awareness. Having a previous pregnancy makes wives more aware of IVF and IUI than their husbands. ART awareness increases with specific treatments, especially among wives, where treatment modality is a significant predictor for both sexes.

Table 5.1 shows wives' attitudes towards ART methods based on predictors of infertility. Wives with male-only infertility report the highest positivity towards IUI and ICSI (85.7%). Wives with unexplained infertility show lower attitudes towards sperm and egg donation (12.5%), but more towards egg freezing (31.3%). Women with endometriosis display strong positivity towards IUI (90.5%) and ICSI (85.7%), while wives with PCOS report slightly lower levels. Wives undergoing ART treatment have significantly more positive attitudes towards IUI (89.1%) and ICSI (89.1%) than wives receiving medical treatment (71.7% and 70.3%, respectively). Chi-square tests confirm significant differences according to the type of infertility. Wives with prior pregnancies show slightly more positive attitudes toward ART methods, particularly IUI (90.9%) and ICSI (90.9%), compared with wives without prior pregnancies (74.7% and 73.6%), although the differences are not statistically significant. Prior IUI experience significantly increases positive attitudes toward IUI (89.8%) and ICSI (87.8%), compared with wives without IUI experience (72.2% and 71.5%). Wives with IVF experience show clearly greater positivity toward all ART methods, particularly ICSI (92%), IUI (92%), and egg freezing (40%). Chi-

square tests reveal significant differences for sperm donation ($p < 0.01$), IUI ($p < 0.05$), ICSI ($p < 0.01$), surrogacy ($p < 0.01$) and donor insemination ($p < 0.001$), highlighting the influence of IVF experience on attitudes.

Table 5 .1 Percentage Distribution of Attitude among wives of Various ART Treatment Methods Based on Different Predictors

Predictors		Attitude towards various ART treatment method Wife (% (N))							
		Donation of egg	Donation of Sperm	Egg Freezing	In vitro fertilization (IVF)	Intrauterine insemination (IUI)	Intracytoplasmic sperm injection (ICSI)	Surrogacy	Donor Insemination
Cause of Infertility	Female only	38.1 (32)	40.5 (34)	21.4 (18)	70.2 (59)	71.4 (60)	70.2 (59)	35.7 (30)	45.2 (38)
	Male only	57.1 (12)	57.1 (12)	38.1 (8)	71.4 (15)	85.7 (18)	85.7 (18)	38.1 (8)	57.1 (12)
	Both	38.0 (30)	34.2 (27)	26.6 (21)	69.6 (55)	81.0 (64)	78.5 (62)	30.4 (24)	48.1 (38)
	Unexplained	12.5 (2)	12.5 (2)	31.3 (5)	68.8 (11)	68.8 (11)	75.0 (12)	25.0 (4)	37.5 (6)
	Chi2	7.68*	8.41**	2.75	0.04	3.62	2.82	1.24	1.59
Female cause of infertility	PCOS	41.8 (28)	43.3 (29)	22.4 (15)	65.7 (44)	76.1 (51)	71.6 (48)	26.9 (18)	41.8 (28)
	Tubal Blockage	48.0 (12)	32.0 (8)	24.0 (6)	72.0 (18)	76.0 (19)	76.0 (19)	32.0 (8)	56.0 (14)
	Ovulation defects	21.1 (4)	26.3 (5)	26.3 (5)	78.9 (15)	78.9 (15)	78.9 (15)	21.1 (4)	21.1 (4)
	Endometriosis	38.1 (8)	42.9 (9)	23.8 (5)	76.2 (16)	90.5 (19)	85.7 (18)	61.9 (13)	76.2 (16)
	Low AMH	40.0 (6)	40.0 (6)	26.7 (4)	66.7 (10)	60.0 (9)	66.7 (10)	33.3 (5)	40.0 (6)
	Unexplained	12.5 (2)	12.5 (2)	31.3 (5)	68.8 (11)	68.8 (11)	75.0 (12)	25.0 (4)	37.5 (6)
	Combination	25.0 (4)	25.0 (4)	25.0 (4)	68.8 (11)	68.8 (11)	68.8 (11)	37.5 (6)	50.0 (8)
	Chi2	9.22	7.73	0.64	1.85	5.41	2.65	10.99*	14.74**
Current mode of treatment	Medical	35.2 (51)	35.9 (52)	22.8 (33)	68.3 (99)	71.7 (104)	70.3 (102)	31 (45)	43.4 (63)
	ART	43.6 (24)	43.6 (24)	34.5 (19)	74.5 (41)	89.1 (49)	89.1 (49)	38.2 (21)	56.4 (31)

	Chi2	1.22	1.02	2.88	0.75	6.69**	7.58***	0.92	2.67
Ever conceived earlier	No	37.1 (66)	37.6 (67)	25.3 (45)	69.1 (123)	74.7 (133)	73.6 (131)	32 (57)	46.6 (83)
	Yes	40.9 (9)	40.9 (9)	31.8 (7)	77.3 (17)	90.9 (20)	90.9 (20)	40.9 (9)	50 (11)
	Chi2	0.12	0.09	0.44	0.62	2.86	3.17	0.70	0.09
Ever taken IUI	No	37.1 (56)	37.1 (56)	23.8 (36)	70.2 (106)	72.2 (109)	71.5 (108)	33.1 (50)	47.7 (72)
	Yes	40.8 (20)	38.8 (19)	32.7 (16)	69.4 (34)	89.8 (44)	87.8 (43)	32.7 (16)	44.9 (22)
	Chi2	0.22	0.05	1.49	0.01	6.38**	5.27**	0.00	0.12
Ever taken IVF	No	36.6 (64)	34.9 (61)	24 (42)	67.4 (118)	74.3 (130)	73.1 (128)	30.3 (53)	42.9 (75)
	Yes	48 (12)	56 (14)	40 (10)	88 (22)	92 (23)	92 (23)	52 (13)	76 (19)
	Chi2	1.21	4.17**	2.91	4.41**	3.82*	4.21**	4.67**	9.65***

*p<0.1, **p<0.05, ***p<0.05

Table 5.2: Percentage Distribution of Attitude among Husband of Various ART Treatment Methods Based on Different Predictors

Predictors		Attitude towards various ART treatment method, Husband (% (N))							
		Donation of egg	Donation of Sperm	Egg Freezing	In vitro fertilization (IVF)	Intrauterine insemination (IUI)	Intracytoplasmic sperm injection (ICSI)	Surrogacy	Donor Insemination
Cause of Infertility	Female only	41.7 (35)	38.1 (32)	27.4 (23)	60.7 (51)	64.3 (54)	63.1 (53)	31 (26)	35.7 (30)
	Male only	42.9 (9)	47.6 (10)	23.8 (5)	57.1 (12)	66.7 (14)	66.7 (14)	42.9 (9)	42.9 (9)
	Both	41.8 (33)	41.8 (33)	21.5 (17)	72.2 (57)	78.5 (62)	77.2 (61)	27.8 (22)	35.4 (28)
	Unexplained	37.5 (6)	25.0 (4)	25.0 (4)	62.5 (10)	68.8 (11)	62.5 (10)	31.3 (5)	18.8 (3)
	Chi2	0.13	2.23	0.76	3.07	4.15	4.23	1.75	0.48

Male cause of infertility	Problem with sperm	43.2 (38)	44.3 (39)	22.7 (20)	68.2 (60)	76.1 (67)	72.7 (64)	30.7 (27)	39.8 (35)
	Unexplained	37.5 (6)	25.0 (4)	25.0 (4)	62.5 (10)	68.8 (11)	62.5 (10)	31.3 (5)	18.8 (3)
	Varicocele	44.4 (4)	33.3 (3)	22.2 (2)	77.8 (7)	77.8 (7)	88.9 (8)	22.2 (2)	22.2 (2)
	Chi2	0.19	2.31	0.04	0.62	0.43	2.02	0.29	3.36
Current mode of treatment	Medical	45.5 (66)	39.3 (57)	22.1 (32)	63.4 (92)	68.3 (99)	66.9 (97)	29.7 (43)	33.1 (48)
	ART	30.9 (17)	40 (22)	30.9 (17)	69.1 (38)	70.9 (39)	80 (44)	34.5 (19)	40 (22)
	Chi2	3.51*	0.01	1.69	0.56	0.13	3.29	0.45	0.83
Ever conceived earlier	No	42.7 (76)	41 (73)	25.3 (45)	65.2 (116)	68 (121)	69.7 (124)	30.3 (54)	34.8 (62)
	Yes	31.8 (7)	27.3 (6)	18.2 (4)	63.6 (14)	77.3 (17)	77.3 (17)	36.4 (8)	36.4 (8)
	Chi2	0.95	1.55	0.53	0.02	0.79	0.55	0.33	0.02
Ever taken IUI	No	44.4 (67)	39.7 (60)	23.8 (36)	64.9 (98)	68.9 (104)	68.9 (104)	31.1 (47)	33.8 (51)
	Yes	32.7 (16)	38.8 (19)	26.5 (13)	65.3 (32)	69.4 (34)	75.5 (37)	30.6 (15)	38.8 (19)
	Chi2	2.09	0.01	0.15	0.00	0.01	0.78	0.01	0.41
Ever taken IVF	No	42.9 (75)	37.7 (66)	24 (42)	64 (112)	68 (119)	66.9 (117)	28.6 (50)	33.7 (59)
	Yes	32 (8)	52 (13)	28 (7)	72 (18)	76 (19)	96 (24)	48 (12)	44 (11)
	Chi2	1.06	1.87	0.19	0.62	0.66	8.93***	3.86**	1.02

*p<0.1, **p<0.05, ***p<0.05

Attitudes of wives and husbands towards ART treatments are shaped by factors such as causes of infertility, treatment method and previous ART experience. Wives with direct ART exposure, particularly through IUI or IVF, display more positivity towards advanced methods such as ICSI and surrogacy, while husbands are more accepting of IUI, IVF and ICSI, particularly in cases of combined infertility or previous ART experience. Both groups show lower acceptance of donor-related methods such as egg and sperm donation. ART experience, particularly IVF, significantly increases acceptance of advanced treatments for both sexes. These findings

highlight the need to raise awareness and address attitudes, particularly among couples with unexplained infertility or no ART history.

DISCUSSION

This study highlights significant gender differences in the awareness and attitudes of infertile couples in Mumbai toward assisted reproductive technologies (ART). Husbands demonstrated greater awareness of donor oocytes (48.5%), donor sperm (65.5%), and egg freezing (19.5%), while wives were more knowledgeable about in vitro fertilization (IVF) (68%) and intrauterine insemination (IUI) (67.5%). These findings contrast with a study conducted in Benin City, Nigeria, where 67.5% of female respondents were more aware of gamete donation than males (53.8%) [13]. This variation may be attributed to differences in cultural norms, educational exposure, and healthcare accessibility. Similarly, in the UK, awareness of egg freezing was limited, aligning with the findings of our study [14]. This suggests that even in more developed healthcare systems, egg freezing remains an under-discussed fertility preservation option.

Compared to previous research, our study population exhibited higher awareness of donor oocyte and sperm utilization than that reported in Nigeria [15]. The greater awareness observed in our study could be due to increased exposure to media, awareness programs, and advancements in reproductive medicine in India. However, knowledge of oocyte freezing was lower than observed in Oman, Italy, Singapore, Denmark, and Chicago [13,18–21]. This discrepancy may stem from differences in medical outreach programs, economic conditions, and the availability of fertility preservation services.

Awareness levels regarding egg freezing ranged from 0% to 25%, while 36.9% of interviewees in China expressed support for elective egg freezing, closely aligning with our study [23]. The primary determinant influencing their endorsement was significant [23], suggesting that factors such as economic stability, career considerations, and cultural acceptance play a key role in individuals' decisions to pursue fertility preservation.

The study also highlights notable gender disparities in IVF awareness. Our findings align with the 67% awareness rate among females in Ghana [24], yet contrast with studies conducted in Ogun State, Nigeria [25], as well as in Cape Coast, Ghana (37%) and Anambra State, Nigeria (34.1%) [25,26]. These differences suggest that sociocultural beliefs, access to reproductive education, and regional healthcare disparities influence awareness and attitudes toward ART. Additionally, a recent study in Spain reported that 76.7% of respondents had heard about IVF, while 22.7% had no prior knowledge, indicating that even in high-income countries, gaps in reproductive health education still exist [27].

Surrogacy remains a controversial and ethically debated reproductive option worldwide. In our investigation, 33.3% of women and 46.5% of men had prior knowledge of surrogacy. These findings align with research conducted in Assam, India, where surrogacy awareness was limited, particularly among lower socioeconomic groups [44]. The lack of awareness in lower-income populations may be due to financial constraints, restricted access to fertility treatments, and deeply rooted cultural beliefs.

In our study, more than 30% of respondents expressed a positive attitude toward surrogacy. This level of acceptance is encouraging, suggesting that societal perspectives on alternative reproductive options are gradually shifting. Similarly, Shirai (cited by Kian et al., 2014) found approval rates of 24% among infertile females and 40% among infertile males for gestational surrogacy [42]. In Japan, 45% of both infertile women and men supported gestational surrogacy, yet overall acceptance remained low at 26%, which is consistent with our findings [43].

A higher proportion of infertile individuals in our study expressed willingness to use gestational surrogacy if necessary, with 31% of men and 33% of women indicating acceptance. This contrasts with a Japanese study, which reported lower acceptance rates of 10% among women and 23% among men [54]. Such variations emphasize the importance of cultural and legal factors in shaping reproductive choices.

Similarly, an Iranian study found that 24.0% of female participants expressed a positive attitude toward surrogate motherhood, while 76.0% stated they would never accept a surrogate mother [42]. The negative attitudes toward

surrogacy in conservative societies could stem from religious beliefs, concerns about genetic lineage, and societal pressures regarding traditional motherhood roles. Among those who supported surrogacy, opinions varied regarding the identity of the surrogate mother, with some preferring anonymity, while others favored a familial connection [43].

Our study highlights several barriers to ART adoption, including cultural stigma, financial constraints, fear of treatment, and religious concerns. Cultural and social stigma was the most frequently reported barrier, particularly among wives, who were more concerned about donor oocytes (53.23%), donor sperm (54.4%), and surrogacy (38.81%) than husbands. These findings align with previous studies that suggest women face greater societal judgment for infertility treatments than men [16,17].

Financial constraints were another major concern, with 20% of wives and 16% of husbands stating that IVF was unaffordable. The high cost of ART procedures remains a global issue, with similar affordability concerns reported in Ghana, Nigeria, and Spain [24,26,27]. Unlike some developed countries where IVF is covered under health insurance, many individuals in low- and middle-income countries must rely on personal finances, making ART services inaccessible to many couples.

Fear of undergoing ART treatments was another key deterrent. Fear of complications, emotional distress, and treatment failure were commonly cited concerns. 14.86% of wives and 24.5% of husbands expressed fear regarding egg freezing, while 31% of wives and 20.2% of husbands had concerns about embryo preservation. Similar anxieties have been documented in studies from Japan and Iran, where fear of fetal demise and procedural risks were primary reasons for ART hesitancy [40,41].

The adoption of ART faces sociocultural and ethical hurdles worldwide. In many traditional societies, ART is viewed with skepticism due to concerns over genetic lineage, the role of third-party donors, and perceived interference with natural reproduction [32–34]. In some regions, ART is stigmatized as disrupting traditional childbirth norms, particularly in low- and middle-income countries [35–38]. Studies in Pakistan and other conservative societies show that ART is still perceived as a social stigma, unlike in developed nations where ART is widely accepted and normalized [50]. Islamic laws in Pakistan prohibit third-party involvement in ART, including donor sperm, donor eggs, and surrogacy, similar to the attitudes observed in our study [51–53].

RECOMMENDATIONS FOR FUTURE RESEARCH AND POLICY

Education & Awareness Campaigns: Increasing ART education through media, healthcare providers, and counseling services can help reduce stigma and improve acceptance rates.

Financial Assistance Programs: Policymakers should consider subsidizing ART costs or including fertility treatments in insurance coverage.

Cultural Sensitivity Training: Healthcare professionals should receive cultural competency training to address patient concerns effectively.

Longitudinal Studies: Future research should track changes in ART perceptions over time to better understand evolving attitudes and barriers.

CONCLUSION

The study reveals notable differences in the awareness and attitudes of husbands and wives toward assisted reproductive technologies (ART), underscoring the need for focused education and awareness initiatives. Husbands were generally more knowledgeable about specific procedures such as donor oocytes and sperm, while wives were more familiar with methods like In Vitro Fertilization (IVF) and Intrauterine Insemination (IUI). Wives also displayed a more positive outlook toward most ART treatments. Despite these variations, both spouses showed the highest level of agreement when it came to IVF and IUI.

Cultural and social stigmas emerged as significant obstacles, especially for women, who often experience greater societal pressure and hesitation in seeking ART. Conversely, men were more likely to favor medication or avoid

treatment altogether, frequently citing affordability, cultural stigma, or concerns about adopting advanced medical procedures. Moreover, there remains a considerable lack of understanding regarding advanced techniques such as gamete and zygote preservation.

As infertility rates rise, addressing these gaps in ART knowledge and accessibility becomes increasingly important. Governments and non-governmental organizations must play a proactive role in educating the public, breaking down misconceptions, and positioning ART as a practical option for couples struggling with infertility. By reducing cultural stigmas and encouraging informed decision-making, these efforts can help close the gap in ART utilization and improve access to reproductive healthcare for all.

Limitation

The study concentrated solely on two hospital facilities in Mumbai, suggesting that the results may need to be more generalizable to other regions with distinct cultural contexts. To gain a more comprehensive understanding of individuals' experiences with assisted reproductive technology (ART) as an alternative method of childbirth, future research should broaden its scope to include diverse geographical locations worldwide. This expansion would facilitate a more nuanced examination of the cultural factors influencing perceptions and utilization of ART services across various societies.

Abbreviations:

ART: Assisted reproductive technology

ICMR: Indian Council of Medical Research

ICSI: Intracytoplasmic sperm injection

IVF: In vitro fertilization (IVF)

IUI: Intrauterine insemination (IUI)

GIFT: Gamete Intrafallopian Tube Transfer

ZIFT: Zygote intrafallopian transfer

NFHS: National Family Health Survey

IIPS: International Institute for Population Science

NIRRH: National Institute for Research in Reproductive and Child Health

SPSS: Statistical Package for Social Science

WHO: World Health Organization

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REFERENCE

1. World Health Organization. (2023). Infertility prevalence estimates, 1990–2021. Geneva: World Health Organization; 2023.
2. Clark, L. R., Barnes-Harper, K. T., Ginsburg, K. R., Holmes, W. C., & Schwarz, D. F. (2006). Menstrual irregularity from hormonal contraception: A cause of reproductive health concerns in minority adolescent young women. *Contraception*, 74(3), 214-219. Available at: <https://pubmed.ncbi.nlm.nih.gov/16904414/>
3. Mascarenhas, M. N., Flaxman, S. R., Boerma, T., Vanderpoel, S., & Stevens, G. A. (2012). National, regional, and global trends in infertility prevalence since 1990: A systematic analysis of 277 health surveys. *PLOS Medicine*, 9(12), e1001356. Available at: <https://journals.plos.org/plosmedicine/article?id=10.1371/journal.pmed.1001356>
4. Unisa, S., Negi, K., Pujari, S., & Chaurasia, V. (2022). Do dietary patterns and morbidities have a relationship with primary infertility among women? A study from NFHS-4 (2015–16), India. *Journal of biosocial science*, 54(4), 682-697.
5. Agiwal, V., Madhuri, R. S., & Chaudhuri, S. (2023). Infertility Burden Across Indian States: Insights from a Nationally Representative Survey Conducted During 2019–21. *Journal of Reproduction & Infertility*, 24(4), 287.
6. Centers for Disease Control and Prevention. (2022). Assisted Reproductive Technology: A guide for patients. <https://www.cdc.gov>
7. Jain, M., & Singh, M. (2022). Assisted reproductive technology (ART) techniques. Jain M, Singh M. Assisted Reproductive Technology (ART) Techniques. [Updated 2023 Jun 7]. In: StatPearls [Internet]. Treasure Island (FL): StatPearls Publishing; 2025 Jan-. Available from: <https://www.ncbi.nlm.nih.gov/books/NBK576409/>
8. ESHRE Add-ons working group, Lundin, K., Bentzen, J. G., Bozdag, G., Ebner, T., Harper, J., Clef, N Le, Moffett, A. et al. (2023). Good practice recommendations on add-ons in reproductive medicine. *Human Reproduction*, 38(11), 2062-2104.
9. Smeenk, J., Wyns, C., De Geyter, C., Kupka, M., Bergh, C., Cuevas Saiz, I. et al., V. (2023). ART in Europe, 2019: results generated from European registries by ESHRE. *Human Reproduction*, 38(12), 2321-2338.
10. Centers for Disease Control and Prevention (2023). 2021 Assisted Reproductive Technology Fertility Clinic and National Summary Report. US Dept of Health and Human Services.
11. Gupta, S., Sharma, R., & Agarwal, A. (2021). Infertility and ART in India: Challenges and Opportunities. *Indian Journal of Community Medicine*, 46(2), 201-205.
12. Ministry of Health and Family Welfare. (2020). the Assisted Reproductive Technology (Regulation) Bill, 2020. Government of India.
13. Aziken, M. E., Orhue, A. A., Kalu, O. O., & Osemwemkha, P. A. (2010). Knowledge, perception and attitude of infertile women in Benin City, Nigeria to the causation of infertility and in vitro fertilisation and embryo transfer. *Tropical Journal of Obstetrics and Gynaecology*, 27(2), 40-45.
14. Bracewell-Milnes T, Holland J.C., Jones B.P., Saso S., Almeida P., Maclaran K., Norman-Taylor J., Nikolaou D., Shah N.M., Johnson M., Thum M.Y.(2021). Exploring the knowledge and attitudes of women of reproductive age from the general public towards egg donation and egg sharing: a UK-based study. *Human Reproduction*, 36(8), 2189-2201.
15. Adesiyun, A. G., Ameh, N., & Avidime, S. (2011). Awareness and perception of assisted reproductive technology practice amongst women with infertility in Northern. *Open Journal of Obstetrics and Gynecology*, 1, 144-8.
16. Arafa, M. A., Abdulkader, S. M., Farhat, K. H., Rabah, D. M., Awartani, D. K., Aldriweesh, A. A., Awartani K.A., Alkahtani M.K., Alsadhan, G.A., & Mohamed, D. A. (2023). Are There Any Developments in the Attitudes and Practices of Oncologists Regarding Fertility Preservation in Saudi Arabia After 12 Years?. *Cureus*, 15(9).

17. Tozzo, P., Fassina, A., Nespeca, P., Spigarolo, G., & Caenazzo, L. (2019). Understanding social oocyte freezing in Italy: a scoping survey on university female students' awareness and attitudes. *Life sciences, society and policy*, 15, 1-14.
18. Tan, S. Q., Tan, A. W. K., Lau, M. S. K., Tan, H. H., & Nadarajah, S. (2014). Social oocyte freezing: A survey among Singaporean female medical students. *Journal of Obstetrics and Gynaecology Research*, 40(5), 1345-1352.
19. Lallemand, C., Vassard, D., Nyboe Andersen, A., Schmidt, L., & Macklon, N. (2016). Medical and social egg freezing: internet-based survey of knowledge and attitudes among women in Denmark and the UK. *Acta obstetrica et gynecologica Scandinavica*, 95(12), 1402-1410.
20. Ikhen-Abel, D. E., Confino, R., Shah, N. J., Lawson, A. K., Klock, S. C., Robins, J. C., & Pavone, M. E. (2017). Is employer coverage of elective egg freezing coercive?: a survey of medical students' knowledge, intentions, and attitudes towards elective egg freezing and employer coverage. *Journal of assisted reproduction and genetics*, 34, 1035-1041.
21. Zhou, Y., Li, X., Ou, S., Leng, Q., Zhang, B., Yu, R., ... & Xie, F. (2022). Perceptions and attitudes towards elective egg freezing of Chinese college students: a survey from eastern China. *Journal of Assisted Reproduction and Genetics*, 39(6), 1383-1392.
22. Arhin, S. K., Tang, R., Hamid, A., Dzandu, D., & Akpetey, B. K. (2022). Knowledge, attitude, and perceptions about in Vitro Fertilization (IVF) among women of childbearing age in Cape Coast, Ghana. *Obstetrics and Gynecology International*, 2022.
23. Joe-Ikechebelu, B. B., Okehi, U. G., Onuoha, K. N., Jegede, O. T., Asini, A. O., Moshood, I. O. (2023). Knowledge, Attitude and Perception of Assisted Reproductive Technology Among Patients Attending Health Clinics at Babcock University Teaching Hospital Ilishan-Remo Ogun State. *International Journal of Scientific Advances*, 4(1), 57-65.
24. Okafor, N. I., Joe-Ikechebelu, N. N., & Ikechebelu, J. I. (2017). Perceptions of infertility and in vitro fertilization treatment among married couples in Anambra State, Nigeria. *African journal of reproductive health*, 21(4), 55-66.
25. Aurrekoetxea-Casaus, M., Ronda, L., & Govillard, L. (2022). Gender differences in attitudes toward assisted reproduction in the Spanish population: The weight of religiosity and conservatism. *Frontiers in Political Science*, 4, 1027997.
26. Kilic, S., Ucar, M., Yaren, H., Gulec, M., Atac, A., Demirel, F., Karabulut, C. & Demirel, O. (2009). Determination of the attitudes of Turkish infertile women towards surrogacy and oocyte donation. *Pak J Med Sci*, 25(1), 36-40.
27. Kian, E. M., Riazi, H., & Bashirian, S. (2014). Attitudes of Iranian infertile couples toward surrogacy. *Journal of human reproductive sciences*, 7(1), 47-51.
28. Nagata Y, Ichikawa Y, Okada H, Kyouno H, Sato E, Sato K, et al (2004). Views of infertile patients on assisted reproductive technologies for extra-marital state. *J Fert Implant (Tokyo)*.
29. Saito, Y., & Matsuo, H. (2009). Survey of Japanese infertile couples' attitudes toward surrogacy. *Journal of Psychosomatic Obstetrics & Gynecology*, 30(3), 156-161.
30. Haimes, E. (1993). Issues of gender in gamete donation. *Social science & medicine*, 36(1), 85-93.
31. Power, M., Baber, R., Abdalla, H., Kirkland, A., Leonard, T., & Studd, J. W. W. (1990). A comparison of the attitudes of volunteer donors and infertile patient donors on an ovum donation programme. *Human Reproduction*, 5(3), 352-355.
32. Dornelles, L. M. N., MacCallum, F., Lopes, R. D. C. S., Piccinini, C. A., & Passos, E. P. (2014). 'Living each week as unique': Maternal fears in assisted reproductive technology pregnancies. *Midwifery*, 30(3), e115-e120.
33. Mosalanejad, L., Parandavar, N., & Abdollahifard, S. (2013). Barriers to infertility treatment: an integrated study. *Global journal of health science*, 6(1), 181.
34. Widge, A. (2002). Sociocultural attitudes towards infertility and assisted reproduction in India. *Current practices and controversies in assisted reproduction*, 60, 74.
35. Jegede, A. S., & Fayemiwo, A. S. (2010). Cultural and ethical challenges of assisted reproductive technologies in the management of infertility among the Yoruba of Southwestern Nigeria. *African journal of reproductive health*, 14(2), 115-127.
36. Taylor, B. (2005). Whose baby is it? The impact of reproductive technologies on kinship. *Human Fertility*, 8(3), 189-195.

37. Savage, O. M. N. (1992). Artificial donor insemination in Yaounde: Some socio-cultural considerations. *Social Science & Medicine*, 35(7), 907-913.
38. Bradbury, K., & Sutcliffe, A. (2014). The health of children born following assisted reproductive technologies. *Paediatrics and Child Health*, 24(4), 172-176.
39. Inhorn, M. C. (2003). The worms are weak: Male infertility and patriarchal paradoxes in Egypt. *Men and Masculinities*, 5(3), 236–256.
40. Okantey, G. N. O., Adomako, E. B., Baffour, F. D., & Lim, D. (2021). Sociocultural implications of infertility and challenges in accessing assisted reproductive technology: experiences of couples from two health facilities in southern Ghana. *Marriage & Family Review*, 57(5), 375-396.
41. Nafees, R., Khan, H. L., Zareen, H., Imran, Z., & Sher, S. J. (2020). Myths and controversies in Assisted Reproductive Techniques–gynecologists’ perspective. *Biomedica*, 36(3), 301.
42. Van Balen, F., & Bos, H. M. (2009). The social and cultural consequences of being childless in poor-resource areas. *Facts, views & vision in ObGyn*, 1(2), 106.
43. Calik, K. Y., & Bulut, H. K. (2020). Assessment of Turkey IVF (In Vitro Fertilization) websites according to the American Society for Reproductive Medicine (ASRM)/Society for Assisted Reproductive Technology (SART) guidelines. *JPMA*, 2019.