



**Awareness and Perceived Efficacy of the Utilization of Assisted Reproductive Technologies among Women Attending Infertility Clinics in Lahore, Pakistan**

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**Abstract**

**Background:** Assisted Reproductive Technology (ART) refers to procedures that involve the manipulation of human eggs and sperm, or embryos, outside the body in order to achieve pregnancy. ART has been reported to help reduce the impact of infertility, which affects around 48.5 million couples globally. Assisted reproductive technologies (ARTs) offer hope and the possibility of parenthood to couples. This study thus explored the level of awareness, perceived efficacy of the utilization of ARTs among women attending infertility Clinics of tertiary care hospitals of Lahore, Pakistan.

**Methodology:** A descriptive cross-sectional study was conducted. A convenient sampling technique was used in selecting for data collection. The self-administered questionnaire contains four sections with section A to C bordering on demographics, awareness, perceived efficacy of utilization of ART respectively. Data were analyzed with Statistical Package for Social Science (SPSS) version 25. Descriptive and inferential statistical methods were used for the presentation of results.

**Results:** Two hundred and eight infertile women with infertility problems participated in the study. Out of 208 infertile women, 126 indicated that they were aware of ART. Among the 126 participants, over half (54%) had an average level of awareness, 36% had a good level of awareness, and only 10% had a poor level of awareness. The majority of participants, 95 (75.4%), demonstrated a high level of perceived efficacy, while 31 (24.6%) perceived a low level of efficacy of the utilization of ART.

**Conclusion:** The findings of the current study revealed that majority of the women had average level of awareness about ART and perceived that ART is efficacious. Lack of support by government, cost, Poor knowledge, multiple hospital visits and painful ART procedure were the prevalent factors affecting the utilization of ART. Superior emphasis should be placed on the benefits of ART within communities. With government financial support and reduced costs, women in need of ART may have better access to these treatments.

**Key words:** Assisted reproductive technology, Infertility, Awareness on ART, Perceived efficacy.

## **Introduction**

According to the World Health Organization, infertility is a reproductive health concern defined as an inability to conceive following a year of frequent, unprotected sexual intercourse (Mariotti et al., 2020). The WHO has recognized infertility as a global public health concern that affects 8 to 12% of couples who are of reproductive age 15–49 year (Akalewold et al., 2022). Pakistan experience infertility. Infertility is reported to affect 22% of Pakistani couples, with 3.5% of them experiencing primary and 18.4% experiencing secondary infertility. The inability to conceive for the first time is referred to as primary

infertility. According to Ahmed et al. (2022) "secondary infertility" is the inability of a couple to conceive a second time. Over nearly three decades, the number of infertile women increased by 14.962% (Ullah et al., 2021) To overcome the burden of infertility, Infertility treatments were incorporated in the World Health Organization's first global plan on reproductive health, which was presented in 2004. (Dyer et al., 2020)

In recent years, there has been an increased interest in analyzing social perspectives and attitudes about Assisted Reproductive Technology (ART) in various cultural and geographical situations. The anticipated annual demand for ART is well over 10 million cycles, with over 3 million ART cycles performed globally each year. Some people who need ART do not request it because of misconceptions, social restraints, and a lack of awareness regarding fertility, cost, and reproductive autonomy. Fertility awareness comprises an understanding of reproduction and related individual risk factors (e.g., old age; sexual health problems, such as STDs; and lifestyle variables, such as smoking and obesity).and non-individual risk factors (e.g., environmental and workplace factors); including the awareness of societal and cultural factors affecting options to meet needs for reproductive family planning (Adamson et al., 2023)

The knowledge and attitudes of 1370 men and women in Hungary between the ages of 18 and 50 was the assessed through a cross-sectional online survey. According to the findings, 49.3% of the participants reported that they were aware of ART. More than 80% of respondents, both male and female supported ART and perceived it efficacious for infertility treatment options while less than 3% were opposing it. (Szalma and Bitó, 2021)

The most commonly used ART treatment is IVF and IUI, which are approachable in most of the Asian nation. IUI is one of the widely applied infertility treatment methods for infertility with unknown factors and with male problems (some sperm disorders). Also, it can be used for the infertility problems caused by the condition of the cervical mucus and sexual disability. IVF is the most popular and advanced ART method for patients who have reduced ovarian reserve, ovarian failure (with donor eggs), ovulatory dysfunction, tubal factor, male factor, and unexplained infertility (Jain and Singh, 2022). Success rates for

ART procedures depend on a number of factors, including the patient's age, the underlying cause of their infertility, and their previous experiences with infertility treatments (Darvishi et al., 2020)

ART is likely to be influenced by their religious beliefs. On March 23, 1980, the Al Azhar University issued the first medically assisted reproduction fatwa that was widely accepted. The opening of IVF clinics in Muslim nations was made possible by this fatwa. In Islam, seeking infertility treatment is not only acceptable but also recommended. Major determinants of women's decisions to utilize ART include religion, culture, cost, ethics, and their husbands (Ahmed et al., 2022, Olorunfemi et al., 2021). Pakistani Islamic law states that ART processes are only permitted when no third parties are involved in the process (Nafees et al., 2020a)

Perceived efficacy and acceptance are equally complex. High perceived efficacy, as seen in Hungary (>80% support) and Saudi Arabia (62% positive attitude), often correlates with higher education, economic development, and secular or supportive religious environments (Szalma & Bitó, 2021; Alnaim et al., 2024).

It is important to note that the acceptance of ARTs in the country has been influenced by a number of different variables. The study found that the use of ARTs is influenced by a number of legal, moral, ethical, religious, accessible, affordable, social, and health variables. Some of the variables that have contributed to this include couples' desires to have at least one child of each sex and the ongoing support provided by socio-cultural elements including patriarchy, assistance for parents in their later years, title inheritance, and morbidity difficulties (Kwaghga et al.).

Saudi Arabia survey, 79% of participants were familiar with ART, demonstrating a high level of awareness, 58% of participants demonstrated a thorough awareness of the Islamic norms governing ART practices, with 77% agreeing that certain kinds of ART are prohibited under Islamic principles. Despite this, the majority (62%) had a positive attitude toward ART, indicating widespread acceptability in the community. Furthermore, 45% stated that physicians might play a critical role in molding public opinions of ART (Alnaim et al., 2024).

**This study has the following objective:**

To assess the level of awareness and perceived efficacy of infertile women regarding assisted reproductive technology.

**Methodology**

This descriptive cross-sectional study conducted at Institute of Nursing, UHS Lahore with the collaboration with four tertiary care hospitals of Lahore (Lady Willingdon Hospital, Lady Aitchison Hospital, Lahore General Hospital and Services Hospital, Lahore) from March 2024 to August 2024. **Target population** consisted of the women with primary or secondary infertility.

The current study was approved by the Ethical Review Board and Advanced Studies & Research Board (ASRB) of UHS.

A convenience sampling technique was used & the sample size was calculated using the Kish Leslie formula, with the confidence level equal to 95% and the margin of error equal to 6%, assuming the prevalence of women with the knowledge of Assisted Reproductive Technology is equal to 73.3% (Abazie and Abimbola, 2021)

$$n = \frac{z_{1-\alpha/2}^2 \cdot P(1 - P)}{d^2}$$

$$n = \frac{1.96^2 \cdot 1.96 \cdot .733(1-.733)}{.06^2}$$

$$= \frac{3.84 \cdot 0.196}{.0036}$$

$$= \frac{.752}{.0036}$$

$$= 208.88$$

$$= 209$$

$$= 209$$

n= 208

Females diagnosed with primary and secondary infertility attending infertility clinic with the age 19-35 were included. Healthcare professionals, those women who have already used ART and psychological problems were excluded.

#### **Data Collection Tool:**

A self-structured questionnaire was employed to collect information. The questionnaire comprises of following four sections:

**Section A** consists of 07 questions designed to collect the Socio-demographic profile of the participants. It includes age in years, duration of marriage (years), type of infertility, religion, educational qualification, employment status, and number of children.

**Section B** consists of 13 questions to assess the level of awareness of ART among infertile women. The level of awareness was assessed with YES and NO answers.

**Section C** consists of 11 questions to assess the level of perceived efficacy of ART among women attending an infertility clinic. The level of perceived efficacy was assessed through the 5 point-Likert scale.

#### **Scoring of the Tool:**

The level of awareness was categorized by using bloom's cutoff with < 50% as poor, 50-75% as average and > 75% marked as good. It consists of 13 questions. To calculate each "Yes" response was assigned a score of 1, while each "No" response was assigned a score of 0. The total score range is from 0 to 13. Score of 1-6 indicates < 50% awareness, 7-10 indicates 50-75% and >10 indicates more than 75% awareness.

#### **Level of Perceived efficacy was rated as good and poor:**

Level of perceived efficacy was categorized that >60% indicated good and ≤60% indicated a poor level of efficacy.

This section consists of 11 items, each rated on a five-point Likert scale, with scores ranging from 1 to 5. This results in a total possible score range of 11 to 55. Score range 11-37 showed as  $\leq 60\%$  and scoring range 38-55 as  $> 60\%$  perceived efficacy.

#### **Data Collection Procedure:**

After obtaining approval from the ERC & ASRB, administrative permission was taken from the selected hospitals' management for data collection. The study's purpose was explained to the participants, and they were provided with a consent form to seek written consent. Data collection involved filling out a paper-based self-administered questionnaire.

#### **Data Analysis:**

The data was analyzed using descriptive statistics with the SPSS version 25. Descriptive statistic indicators such as frequency and percentage were calculated for demographic profile. Level of awareness and perceived efficacy was assessed by using scoring of tool and percentage. Data was presented in the form of tables, figures and graphs.

#### **Ethical Consideration:**

Formal permission was obtained from the Ethical Review Committee (ERC) of the University of Health Sciences, Lahore vide letter NO: **UHS/Education/126-23/6323I**. Formal permission was obtained from to conduct the research from concerned hospitals. All participants were informed about the purpose of the study. Voluntary written informed consent was obtained before data collection. Due to the sensitive nature of the research topic, efforts were made to ensure confidentiality to protect the ethical rights of the participants. Participants were assured of their right to withdraw from the study at any time without providing any reason. Ethical considerations were strictly adhered to throughout the entire study period.

#### **Results**

## Demographic Profile of Participants

**Table 1: Socio-Demographic profile (N=208)**

Variable	Category	Frequency (n)	Percentage (%)
<b>Age (Years)</b>	19 – 25	72	34.6%
	26 – 35	136	<b>65.4%</b>
<b>Marriage Duration (Yrs)</b>	0 – 1	2	1.0%
	2 – 5	109	<b>52.4%</b>
	6 – 10	58	27.9%
	Above 10	39	18.8%
<b>Type of Infertility</b>	Primary	68	32.7%
	Secondary	140	<b>67.3%</b>
<b>Religion</b>	Muslim	198	<b>95.2%</b>
	Christian	10	4.8%
<b>Educational Level</b>	No Formal Education	57	27.4%
	Primary	43	20.7%
	Matric/O-Level	53	25.5%
	Intermediate/A-Level	37	17.8%
	Graduate	12	5.8%
	Post-Graduate	6	2.9%
<b>Employment Status</b>	Housewife	191	<b>91.8%</b>
	Employed	17	8.2%
<b>Number of Children</b>	None	68	32.7%
	One	140	<b>67.3%</b>

Table 1 shows that majority (65.4%) of the participants fell between the age of 26-35 years. As for duration of marriage, (52.4%) had 2- 5 years of duration of marriage, 58 (27.9%). Among 208 participants 140 (67.3%) couples experienced secondary type of infertility and only 68 (32.7%) had primary type of infertility. (27.4%) females were with no formal education and vast majority (91.8%) were housewives. A majority of the females (67.3%) had one child.

### Level of Awareness Regarding ART

**Figure 1: Proportion of Women Aware of ART (N=208)**

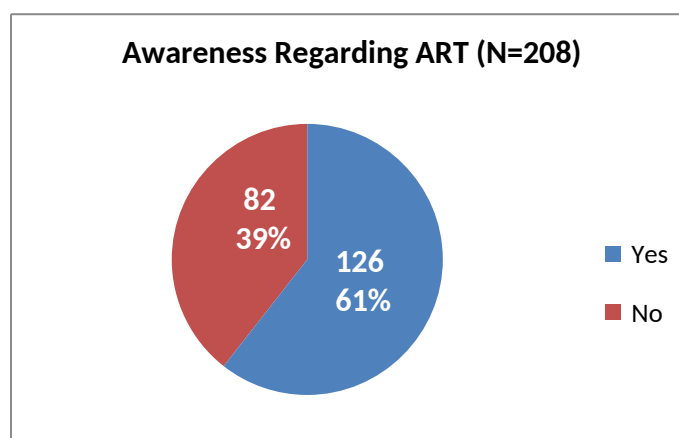
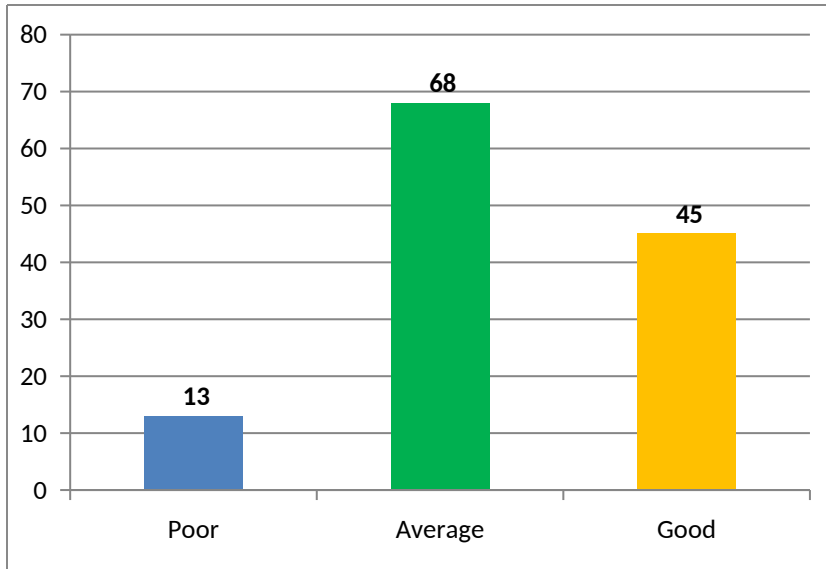


Figure 1, shows that a majority of respondents, 60.6%, had awareness about ART. On the other hand, 39.4% of respondents do not have awareness about ART.

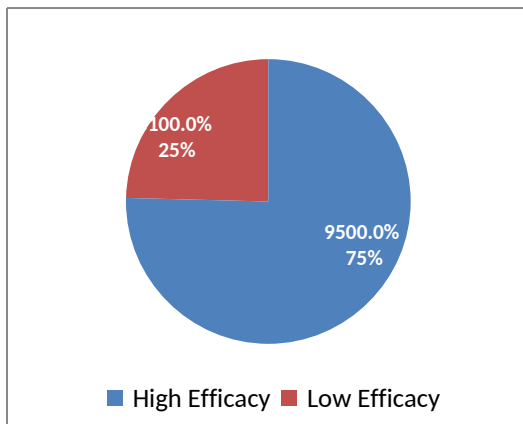
### Level of Awareness of Infertile Women about ART (N=126)



**Figure 2**, represents that more than half 54% having average level of awareness followed by 36% having good and only 10% having poor.

#### 4.3: Level of Perceived Efficacy of Infertile Women about ART

**Figure 3: Level of Perceived Efficacy of ART (N=126)**



**Figure 3** shows that a striking majority (75.4%) who were aware of ART held a **high level of perceived efficacy**.

#### Discussion

### **Demographic Data:**

In the present study, 65.4% of the total participating women were between the ages of 26-35 years. Similarly, the study of Chikeme et al., (2022) and Osian et al. (2019) also showed that all of the participants were between the ages of 26-35 years. The results of current study revealed that majority of couples had duration of 2-5 years of marriage which was similar with the study conducted by Osian et al., (2019) showed the study participants duration of marriage lies between 2-5 years. Whereas the contrary findings of Eladle et al., (2019) showed that participants had 5-10years of marriage duration. The current study also showed that (67.3%) couples had secondary type of infertility which is similar to the findings of Eladle et al., (2019) which showed that (54.6%) participants had secondary type of infertility. This was in disagreement with the studies that showed 76.4% and 79.2% study participants had primary infertility (Mahey et al., 2018, Zaidouni et al., 2018). The higher percentage of secondary infertility in Pakistan may be due to cultural norms, healthcare quality, access maternal health issues and socioeconomic factors. In our study the majority of the participants were Muslims because of Muslim populated region and only (4.8%) were Christian whereas the findings of Osian et al., (2019), Joe et al., (2023) showed majority of the participants were Christian. The current study showed that most of the females (67.3%) had one child similar to the study of Ahmed et al., (2020) also showed that more than half participants had children. In contrast to study conducted by Akande et al., (2019) 22.3% study participants having one child.

### **Awareness Related to ART:**

In the study, 60.6% of women had knowledge about ART. Parallel findings from a study conducted by Osian et al., (2019) in Benin City, Nigeria, revealed a 73.0% awareness level of ART. These findings were also in line with Abazie et al., (2021). Contrary findings from a study by Chikeme et al., (2022) revealed that 90.7% of women had heard about ART. In our study findings 54% of study participants had average level of awareness about ART similar to the findings of Joe-Ikechebelu et al., (2023) had 61.1% of average level of awareness. The average level of awareness in this study indicated the limited access to ART facilities especially in remote areas of Pakistan. These findings are comparable with other studies

that reported a poor level of awareness toward ART by Eladle et al., (2019) and Abazie et al., (2021). The level of awareness about Assisted Reproductive Technologies (ART) in Pakistan was average; it might be due to several factors, such as the education system is including comprehensive sex education, cultural and religious beliefs, limited healthcare infrastructure, particularly in rural areas, media coverage about ART, low socioeconomic status, lack of effective public health campaigns, and the stigma associated with infertility and its treatments.

### **Perceived Efficacy Related to Art:**

The current study results showed that 75.4% of women perceived ART as efficacious similar with the results of Szalma and Bitó, (2021 ) recognizing more than 80% of respondents, both male and female supported ART and perceived it efficacious for infertility treatment options. Current study results also echoes with the study of Alnaim et al., (2024) which revealed that the majority (62%) displayed a positive attitude towards ART. Furthermore, contrary to the current study findings, Chikeme et al., (2022) indicated that the majority knew the procedure but could not address male infertility, and (82.2%) study participants perceived ART as non-efficacious. Similarly, a study conducted by Eladle et al., (2019) at Mansoura University Hospital in Egypt revealed that 97% of study participants had a neutral attitude. In this study, participants agreed that ART resulted in multiple gestations and expressed fear of rejection by their society for using ART methods, which was similar to the findings of Abazie et al., (2021). In many parts of Pakistan limited awareness and understanding of ART can lead to fear of exposing personal reproductive issues to the public and may be perceived as a failure to meet the societal expectations.

### **Statements and Declarations**

#### **Funding:**

The authors declare that no funds, grants, or other support were received during the preparation of this manuscript.”

#### **Competing Interests:**

The authors have no relevant financial or non-financial interests to disclose.”

#### **Author Contributions**

All authors contributed to the study conception and design. Material preparation, data collection and analysis were performed by Shahida Parveen. The first draft of the manuscript was written by Shahida Parveen and all authors commented on previous versions of the manuscript. All authors read and approved the final manuscript.

#### **Ethics approval**

This study was performed in line with the principles of the Declaration of Helsinki. Approval was granted by the Ethics Committee of University of Health Sciences Lahore, Pakistan.

#### **Consent to participate**

Informed consent was obtained from all individual participants included in the study.

#### **Consent for publication:**

Informed consent was obtained from all individual participants included in the study.

#### **Availability of data and materials:**

The datasets used and/or analysed during the current study are available from the corresponding author on reasonable request.

#### **7. Recommendations**

In view of the findings of the present study, following recommendations can be considered:

Developing programs meant for educating infertile women about Assisted Reproduction Technologies (ARTs) and changing their perceptions about it.

Platform of Mass Media can play a great role to educate about infertility treatment.

Government should take initiative to make ART clinics accessible to all.

Religious institutions like as Masjids, churches, and organizations can significantly reduce the stigma associated with adoption of ART.

Non-Governmental Organizations, Health insurance schemes and Government should make ART adaptive, available and affordable for couples at a cost-effective rate.

## **6. Conclusion**

This study explored the level of awareness, perceived efficacy and utilization of ARTs among women attending infertility clinics of tertiary care hospital, Lahore. The findings of the current study revealed that majority of the women had average level of awareness about ART. While majority of women perceived that ART is efficacious. Lack of support by government, cost, Poor knowledge, multiple hospital visits and painful ART procedure were the prevalent factors affecting the utilization of ART. Consequently, it is crucial to conduct more research and build capacity for healthcare providers in this sub-specialty.

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