BJNS

AL-KINDI CENTER FOR RESEARCH
AND DEVELOPMENT

| RESEARCH ARTICLE

Knowledge and Attitude about In Vitro Fertilization (IVF) among People in Saudi Arabia

Abeer Ibrahim Baka[1]; Aman Ali Albutayyan[1]; Ebtihaj Ayed Alqarni[2]; Hanin Mofadai Alenzi[3]; Hayam Ayed Alanazi[4]; Mechael Ahmed Fallath[5]; Sadeem Abdulaziz Alshamran[6]; Sara Fawaz Alenezi[3]; Chinnasamy Lathamangeswari[7]

[1]King Faisal Specialist Hospital and Research Centre; [2]King Fahad Medical City; [3]Prince Mohammed bin Abdulaziz Hospital; [4]Prince Sultan Military Medical City; [5]King Fahd Armed Forces Hospital; [6]King Saud Medical City; [3]Prince Mohammed bin Abdulaziz Hospital; [7]Riyadh Al-Elm University

Corresponding Author: Abeer Ibrahim Baka, **E-mail**: abeerbaka@gmail.com

| ABSTRACT

Infertility is, or has become, a major global issue that affects about 10-15% of women of reproductive age. In vitro fertilization (IVF) is one of the most commonly used assisted reproductive technologies. Knowledge and perceptions of the public regarding IVF are different in various societies and cultures; in many cases quite negative. Awareness of these perceptions is important for enhancing knowledge and acceptance of fertility treatments in Saudi Arabia.The primary aim of this study was to assess knowledge and attitudes about IVF among people in Riyadh, Saudi Arabia, and identify the demographic factors influencing these perceptions. This cross-sectional study was conducted in Riyadh, Saudi Arabia, with 535 participants selected through convenience sampling. A structured questionnaire was used to assess demographics, knowledge, and attitudes toward IVF. Data were analyzed using SPSS, employing descriptive statistics, independent sample t-tests, one-way ANOVA, and Pearson correlation tests to evaluate the relationships between variables. Results showed that the respondents had little knowledge about IVF (mean score 1.69 out of 3) but generally positive attitudes toward them (mean score 3.72 out of 5). Knowledge differed significantly depending on age and marital status but not on attitude. Older and married people were more likely to have higher levels of knowledge. There was no difference in either knowledge or attitude based on gender, residence, or educational level of the participants. Although attitudes toward IVF are largely positive, the Riyadh population has a considerable knowledge gap about this subject. Public health campaigns should be focused on building awareness regarding IVF and increasing the understanding of fertility treatments among those who have not reached out for such services as yet, with a special focus on young and unmarried people.

| KEYWORDS

Knowledge; Attitude; In Vitro Fertilization; Saudi Arabia

| ARTICLE INFORMATION

1. Introduction

The problems that accompany infertility and the startling prevalence of the condition are getting worse all over the globe (Adelosoye et al., 2020). Around 10–15% of reproductive-age females around the world are unable to get conceived naturally within a year of unprotected sexual intercourse, and the occurrence of infertility impact affects between 60 and 168 million

individuals around the world, which accounts for about 13–15% of couples (World Health Organization, 2021). One of the most common forms of medically assisted reproduction practiced in a great number of countries is in vitro fertilization (IVF). This technique is prevalent and well-liked due to the high success rates that have been recorded, despite the well-documented psychological challenges that are associated with undergoing the IVF treatment (Malina et al., 2021). The societal, theological, ethical, and moral considerations that are raised by the use of assisted reproductive technologies like in vitro fertilization are among the most significant obstacles that must be overcome. Some of these methods generate a great deal of sensitivity, and the choice regarding whether or not to use them will be impacted by the perceptions, attitudes, and expectations of both individuals and couples with regard to the utilization of these methods (Rabiei et al., 2022).

There is an abundance of information about in vitro fertilization (IVF) available on the internet; however, the contemporary public's impressions of it are still unclear due to the fact that attitude studies are no longer being conducted (Fauser et al., 2019). There are a variety of myths that women believe about their own fertility, the dangers of becoming pregnant at a more advanced age, and the viability of IVF. (Pedro et al., 2018). In addition, having adequate information about IVF has the potential to alter people's perspectives and lessen the psychological difficulties that follow conception and childbearing. As long as there is no tension or psychological distress in the home, having sufficient information and maintaining an optimistic attitude can also help a family prepare for the future (Rabiei et all., 2022). In addition, a dearth of knowledge about fertility in young people and among women pursuing fertility medication may increase the longevity of fertility, and ultimately, these individuals may require in-vitro fertilization if they are unable to conceive naturally (Ajayi et al., 2017). Therefore, the main purpose of the present study is to assess people's knowledge and attitude about In Vitro Fertilization in Saudi Arabia.

People who struggle with infertility experience a great deal of emotional distress, which can have a negative impact on their physical health. Some of the negative emotions associated with infertility include hopelessness, melancholy, remorse, poor self-esteem, feelings of failure, and an inability to adhere to the diagnostic and treatment plan (Rabiei et al., 2022). The main purpose of the present study is to assess people's knowledge and attitude about In Vitro Fertilization in Saudi Arabia.

2. Methodology

2.1 Study Design

This study employed a quantitative cross-sectional design, which is a well-established approach for assessing knowledge and attitudes at a single point in time. Cross-sectional designs are particularly advantageous when aiming to capture data across a wide population and analyze correlations between variables at a specific moment. This design was chosen due to its efficiency in gathering a large amount of data from a broad sample, making it suitable for the objectives of this study, which involved assessing knowledge and attitudes toward In Vitro Fertilization (IVF) among people in Saudi Arabia. The nature of the study being descriptive and analytical aligns well with the cross-sectional design, allowing for a snapshot of the population's views and understanding of IVF without manipulating any variables.

2.2 Study Setting

The study was conducted in Riyadh, the capital city of Saudi Arabia. Riyadh, being a significant cultural and economic hub in the region, provides a diverse population that represents various segments of Saudi society. By choosing Riyadh as the study setting, the research aimed to capture a wide range of knowledge and attitudes about IVF from different demographic backgrounds. The city's population includes individuals with varying levels of education, socioeconomic status, and access to healthcare services, making it an ideal location for this research. The study took place over a six-month period, from January to June 2023.

2.3 Study Population

The study population comprised general married and unmarried individuals residing in Riyadh. To ensure the inclusion of a broad spectrum of perspectives, the study did not limit participation based on marital status, as knowledge and attitudes toward IVF are pertinent to both groups. The total estimated population of interest was 20,000 individuals. This estimate was based on available population data for Riyadh, focusing on people who are likely to have an interest in or awareness of fertility treatments, including both married and unmarried individuals aged 25 to 50 years.

2.4 Sample Size and Sampling Design

The sample size was calculated using Stephen Thompson's formula for sample size determination, which is commonly used in population studies where the total population size is known. Based on this formula, the minimum required sample size was calculated to be 377. However, to ensure a robust sample and account for potential non-responses or incomplete data, the researchers collected 535 samples. The sample was obtained through convenient sampling, which involves selecting participants based on their availability and willingness to participate in the study. Although convenience sampling may have some limitations

in terms of generalizability, it was considered appropriate for this exploratory study, given the practical constraints of time and resources.

2.5 Inclusion and Exclusion Criteria

The study included participants who were either married or unmarried, aged 25 years or older, and residents of Riyadh. These criteria were chosen to capture a population that is likely to have formed opinions or possess knowledge regarding fertility and reproductive health, including In Vitro Fertilization (IVF). The study sought to explore the perspectives of adults who may have varying degrees of interest in or awareness of fertility treatments, reflecting the diversity of experiences within this demographic. Exclusion criteria were set to omit individuals over the age of 50, as people in this age group are typically beyond the reproductive age range and less likely to consider IVF as a relevant option. Additionally, individuals with known mental health issues were excluded from the study to ensure that the responses collected were both coherent and reflective of the participants' true understanding and attitudes towards IVF. These criteria were intended to enhance the relevance and quality of the data collected.

2.6 Study Instrument

The primary instrument for data collection was a structured questionnaire adapted from the Fertility Awareness Survey developed by Daniluk et al. (2012) and Daniluk & Koert (2013). This tool was selected due to its robust design and previous validation in assessing knowledge and attitudes regarding fertility treatments. The questionnaire comprised three sections: personal characteristics, knowledge about IVF, and attitudes toward IVF. The first section collected demographic data, such as age, gender, education level, marital status, and employment status, to contextualize the respondents' knowledge and attitudes. The second section focused on knowledge about IVF and included eight items where participants rated their knowledge on a four-point scale, ranging from no knowledge (1) to very knowledgeable (4), with total scores ranging from 8 to 32. The third section assessed attitudes towards IVF through eight statements adapted from Arhin et al. (2022), using a five-point Likert scale ranging from strongly disagree (1) to strongly agree (5), resulting in scores between 8 and 40. To ensure accessibility, the questionnaire was made available in both paper and electronic formats, and interviews were conducted for participants who preferred verbal responses.

2.7 Statistical Management

Data analysis was performed using the Statistical Package for the Social Sciences (SPSS) version 26. The analysis strategy incorporated both descriptive and inferential statistics to address the research objectives comprehensively. Descriptive statistics, including frequencies, percentages, means, and standard deviations, were utilized to summarize participant demographics and their knowledge and attitudes toward IVF. Inferential statistics were then applied to examine relationships and differences between groups. An independent sample t-test was conducted to compare mean scores between two groups, such as male and female participants, while one-way analysis of variance (ANOVA) was used to assess differences across multiple groups, such as different age or education levels. Pearson correlation analysis was employed to explore the relationship between continuous variables, such as age and knowledge about IVF. All statistical tests were conducted with a significance level set at $p<0.05$ and confidence intervals were established at 95%, ensuring that the findings are statistically reliable and interpretable within the context of the study.

2.8 Ethical Considerations

Ethical considerations were carefully addressed throughout the study. The research protocol received approval from the Institutional Review Board (IRB) with IRB number FUGRP/2023/31/967/865. Ethical approval ensured that the study met all necessary ethical guidelines for conducting research involving human participants. Participants were informed that their participation in the study was voluntary and that they could withdraw at any time without any consequences. They were assured that there were no risks associated with participating in the study and that their responses would be treated with the utmost confidentiality. Anonymity was maintained throughout the data collection and analysis process by assigning unique codes to each participant instead of using personal identifiers. Informed consent was obtained from all participants prior to their participation. The consent form provided detailed information about the study's purpose, procedures, and the rights of the participants. Only those who provided their consent were allowed to complete the survey.

3. Results

The majority of participants in this study were female, accounting for 90.8% of the sample, while 9.2% were male. In terms of age distribution, 59.6% of participants were between the ages of 25 and 30, 20.9% were aged 41 to 50, and 14.2% were in the 36 to 40 age group. Additionally, over half of the participants (53.3%) were married, while 46.7% were single. Most participants (94.0%) resided in urban areas, with only 6.0% living in rural settings (Table 1). The results further revealed that the mean score for participants' knowledge about IVF was 1.69 out of 3 (56.3%), and their mean attitude score was 3.72 out of 5 (74.4%) as shown in Table 2.

Table 1: Frequency Distribution of the Sociodemographic Variables of the Sample (n = 535)

Variables	Number	Percentage (%)
Gender		
Male	49	9.2
Female	486	90.8
Age groups		
25-30 years	319	59.6
36-40 years	76	14.2
41-50 years	112	20.9
51-60 years	26	4.9
> 60 years	2	0.4
Residence		
City	503	94.0
Village	32	6.0
Marital status		
Single	250	46.7
Married	285	53.3

The results indicated that there was no significant difference in the mean score of participants' knowledge regarding IVF based on their gender (p > 0.05). Similarly, no significant differences were observed in participants' knowledge scores based on their place of residence (p > 0.05). Additionally, participants' education levels did not significantly affect their knowledge scores (Table 3).

Table 2: Summery of Knowledge and Attitude about IVF

Domain	Min. score	Max. score	Mean ± SD
Knowledge	1	3	1.69 ±0.84
Attitude	1	5	3.72 ±0.91

In contrast, there was a significant difference in participants' knowledge scores based on their age groups (p < 0.05). The Tukey post hoc test revealed that the difference was between the 25-30 and 51-60 age groups, with the older group (51-60 years) having a higher mean knowledge score. Additionally, a significant difference was found in knowledge scores concerning marital status (p < 0.05), with married participants showing a significantly higher level of knowledge about IVF compared to single participants. However, the analysis showed no significant differences in participants' attitudes toward IVF based on gender, residence, or education level (p > 0.05 for all comparisons).

Table 5: Differences in participants' knowledge with regard to their demographic factors

Knowledge about IVF	N	Mean	SD	t statistics	p value [a]
Gender					
Male	49	1.63	0.80	-0.529 (533)	0.597 [a]
Female	486	1.69	0.84		
Residence					
City	503	1.69	0.84	0.473 (533)	0.636 [a]
Village	32	1.62	0.83		
Age groups					
25-30 years	319	1.58	0.85	5.473 (4, 530)	0.000 [b]
36-40 years	76	1.75	0.75		
41-50 years	112	1.84	0.84		

	N	Mean	SD		
51-60 years	26	2.23	0.71		
> 60 years	2	1.00	0.00		
Marital status					
Single	250	1.58	0.87	-2.935 (533)	0.003[a]
Married	285	1.79	0.80		
Education					
No education	3	2.33	0.57		
Middle school	16	1.81	1.04		
High school	132	1.65	0.85	0.595 (4, 530)	0.666 [b]
Bachelor degree	365	1.69	0.84		
Master degree	19	1.68	0.67		

[a] Independent Sample t test, [b] One-Way ANOVA

On the other hand, there was a significant difference in the mean attitude scores of participants based on their age groups ($p < 0.05$). The Tukey post hoc test indicated that the significant difference was between the 25-30 and 36-40 age groups, with participants in the 36-40 age group showing a higher mean attitude score. Additionally, a significant difference in attitude scores was observed with regard to marital status ($p < 0.05$), with married participants demonstrating significantly more positive attitudes toward IVF compared to single participants (Table 4).

Table 4: Differences in participants' attitude with regard to their demographic factors

Attitude about IVF	N	Mean	SD	t statistics	p value [a]
Gender					
Male	49	3.65	1.09	-0.578 (533)	0.564 [a]
Female	486	3.73	0.89		
Residence					
City	503	3.73	0.91	1.435 (533)	0.152 [a]
Village	32	3.50	0.84		
Age groups					
25-30 years	319	3.62	0.91		
36-40 years	76	3.93	0.80		
41-50 years	112	3.86	0.90	2.807 (4, 530)	0.025 [b]
51-60 years	26	3.80	1.09		
> 60 years	2	3.50	0.70		
Marital status					
Single	250	3.54	0.95	-4.355 (533)	0.000 [a]
Married	285	3.88	0.84		
Education					
No education	3	3.66	0.57		
Middle school	16	3.93	0.77		
High school	132	3.59	0.90	1.428 (4, 530)	0.223 [b]
Bachelor degree	365	3.75	0.93		
Master degree	19	4.00	0.66		

[a] Independent Sample t test, [b] One-Way ANOVA

4. Discussion

This study aimed to assess the knowledge and attitudes regarding In Vitro Fertilization (IVF) among individuals in Riyadh, Saudi Arabia. It was found that the respondents had good attitudes but limited knowledge of the IVF process. This chapter presents a discussion of the findings compared with previous studies and explains their implications for public health and education in the region. The study revealed that participants had relatively low knowledge about IVF, with a mean score of 1.69 out of 3 (56.3%). Notwithstanding this fact, respondents demonstrated good attitudes toward IVF, with a mean score of 3.72 out of 5 (74.4%). This denotes a knowledge-attitude disparity wherein participants might be looking favorably at IVF without completely understanding what the concept entails. However, regarding knowledge, this is in sharp variance with the findings from Arhin et al.'s study (2022), 66.8% of the participants knew about IVF, and 74.8% thought that IVF can provide hope for those couples who are facing infertility. The lower levels of knowledge in this study could be related to differences in the region regarding access to information or factors of culture shaping the discussions and understanding related to fertility treatments.

The limited knowledge observed is in line with Szalma and Bitó's (2021) findings regarding the lack of comprehensive knowledge on IVF among both men and women. Similarly, Harper et al. (2017), Pedro et al. (2018), have noted widespread misconceptions among women about fertility, risks of advanced maternal age, as well as success rates for IVF. This reflects a worldwide problem of inadequate public awareness on the issues of fertility treatments and their implications. In Saudi Arabia, these gaps may be further complicated by cultural norms due to limited discussion in most settings regarding sexual health or topics related to reproductive rights; thus targeted information campaigns are essential components toward promoting better understanding among all sectors within society about such vital matters which also affect them personally each day including those surrounding their right choices when it comes time for starting families or planning for future generations However, this positivity is often not accompanied by discussions regarding the potential risks related to these technologies for the women undergoing the procedures and also for the resulting children (Rebar, 2013). The findings of the current study seem to indicate that, although there is an openness to IVF among the Saudi population, public awareness needs to be enhanced to ensure that these attitudes are informed with accurate knowledge.

Demographic analysis revealed that there were no significant differences in knowledge based on gender, residence, and education. This indicates that the knowledge gaps on IVF are not specific to any one group but cut across all segments of the population; hence, the need for mass educational interventions. On the other hand, age and marital status showed significant differences. Respondents aged 51-60 years and those who were married had significantly higher levels of knowledge about IVF than younger people and unmarried individuals. Probably because older and married people are more likely to be directly related to fertility issues, which in turn leads them to seek more information regarding reproductive technologies. Findings in this research differ from those reported by Arhin et al. (2022), where education level significantly influenced attitudes toward IVF among participants. In the current study, education was not significantly associated with knowledge or attitudes, which might suggest variation in fertility information access across educational strata in Saudi Arabia. Alternatively, it may reflect that formal education is not always related to the opportunity of having fertility treatment information provided, thus implying that targeted public health campaigns for such issues are needed for a larger population beyond educational institutions.

Marital status equally had a significant effect on knowledge and attitudes where higher levels were shown in married participants than in single participants for both. This is in line with the findings of Oche et al. (2018) who identified marital status as a significant factor that influences willingness to use IVF services. The relationship between older ages and higher levels of knowledge found in this study is also supportive by Szalma and Bitó (2021) who argued that some sociodemographic factors, including age and past experience with IVF treatments, play an important role in determining knowledge and attitudes. The positive relationship between older ages and more knowledge can be explained by the fact that older people are closer to the endpoint of their reproductive years, hence having increased interest in fertility treatment as observed from the increased score on questions related to assessment depending on patients' age. Moreover, participants who are married may have some level of interest in fertility and reproductive health more than those that are not married, this could be a factor that encourages them to look for information on IVF and other ARTs. The results underline the importance of demographic characteristics in designing public health intervention programs to increase awareness and knowledge concerning fertility treatments.

Knowledge and attitude towards IVF were found to have a significant positive relationship, indicating that with an increase in the knowledge of the participants, their attitudes become more favorable. This further reinstates the idea where education and knowledge are primordial in developing favorable attitudes toward fertility treatments: people who have insight into what IVF is are more probable to take a balanced stand on the procedure, viewing it positively for what it can do as much as negatively for what might go wrong. This positive relationship between knowledge and attitude replicates a lot of broader literature emphasizing how crucial information is in forming attitudes. As stated by Pedro et al. (2018), higher levels of knowledge on reproductive health make individuals capable of making informed choices, as well as holding more positively oriented views about fertility treatments.

The results of this study indicate that an increase in public awareness about IVF could bring about more favorable and supportive attitudes to the procedure, thus acceptance and utilization of fertility treatments in Saudi Arabia may be increased.

5. Conclusion

The results of this study show that, although the attitudes toward IVF in Riyadh are positive overall, there is a significant knowledge gap concerning this procedure. Such demographic factors as the participants' age as well as their marital status were proven to influence both knowledge and attitudes with higher levels demonstrated by older and married individuals. The positive relationship between knowledge and attitude emphasizes the role of education in forming perceptions of IVF within society. To fill the identified knowledge gap with respect to issues on IVF, public health campaigns need to be developed for raising public awareness about IVF and other types of fertility treatment, with such programs being aimed at a wide audience to cover common gaps in knowledge regarding the benefits and risks related to IVF. Through enhancing the general public's knowledge of infertility treatments, these can contribute in making individuals make well-informed choices regarding their reproductive health, and eventually lead to greater uptake of IVF in Saudi Arabia.

References

[1] Adelosoye, A. A., Fasipe, O. J., Medunoye, E. I., Adelosoye, O. C., & Sunday, E. O. (2020). Assessment of family function impact on depression severity among infertile women attending a teaching hospital in South-South Nigeria. *Future science OA*, *6*(8), FSO595. https://doi.org/10.2144/fsoa-2020-0033

[2] Ajayi, A., Ajayi, V., Biobaku, O., Oyetunji, I., Aikhuele, H. and Afolabi, B.M. (2017). Awareness, Knowledge and Perception of in Vitro Fertilization among Final-Year Medical Students in South-West Nigeria. *International Journal of Pregnancy & Child Birth*, *2*.

[3] 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*, 5129199. https://doi.org/10.1155/2022/5129199

[4] Fauser, B. C. J. M., Boivin, J., Barri, P. N., Tarlatzis, B. C., Schmidt, L., & Levy-Toledano, R. (2019). Beliefs, attitudes and funding of assisted reproductive technology: Public perception of over 6,000 respondents from 6 European countries. *PloS one*, *14*(1), e0211150. https://doi.org/10.1371/journal.pone.0211150

[5] Harper, J., Boivin, J., O'Neill, H. C., Brian, K., Dhingra, J., Dugdale, G., Edwards, G., Emmerson, L., Grace, B., Hadley, A., Hamzic, L., Heathcote, J., Hepburn, J., Hoggart, L., Kisby, F., Mann, S., Norcross, S., Regan, L., Seenan, S., Stephenson, J., ... Balen, A. (2017). The need to improve fertility awareness. *Reproductive biomedicine & society online*, *4*, 18–20. https://doi.org/10.1016/j.rbms.2017.03.002

[6] Malina, A., Roczniewska, M., & Pooley, J. A. (2021). Contact, moral foundations or knowledge? What predicts attitudes towards women who undergo IVF. *BMC pregnancy and childbirth*, *21*(1), 346. https://doi.org/10.1186/s12884-021-03810-9

[7] Oche, O.M., Ango, J.T., Gana, G.J., Oladigbolu, R.A., Okafoagu, N.C., Umar, A.S., Adam, F.A., Oluwatobi, O.J. and Gatawa, A.M., 2018. In vitro fertilization: Perceptions and misperceptions among women of reproductive age group in Sokoto, Nigeria. *J Reprod Biol Health*, *6*, p.1.

[8] Pedro, J., Brandão, T., Schmidt, L., Costa, M. E., & Martins, M. V. (2018). What do people know about fertility? A systematic review on fertility awareness and its associated factors. *Upsala journal of medical sciences*, *123*(2), 71–81. https://doi.org/10.1080/03009734.2018.1480186

[9] Rabiei, N., Bahreini, F., Yavangi, M., Artimani, T., & Mohammadpour, N. (2022). Knowledge and Attitude of Infertile People toward Assisted Reproductive Techniques in Hamadan, Iran. *Medical journal of the Islamic Republic of Iran*, *36*, 54. https://doi.org/10.47176/mjiri.36.54

[10] Rebar R. W. (2013). What are the risks of the assisted reproductive technologies (ART) and how can they be minimized?. *Reproductive medicine and biology*, *12*(4), 151–158. https://doi.org/10.1007/s12522-013-0156-y

[11] Szalma, I., & Bitó, T. (2021). Knowledge and attitudes about assisted reproductive technology: Findings from a Hungarian online survey. *Reproductive biomedicine & society online*, *13*, 75–84. https://doi.org/10.1016/j.rbms.2021.06.005

[12] World Health Organization. (2021). WHO fact sheet on infertility. *Global Reproductive Health*, *6*(1), p.e52.