



Clinical Integration of Patients' Preferences in Treatment Decision Making Among Women With Infertility: A Cross-sectional Study

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Abstract

Objectives: This study aimed to evaluate infertile women's treatment-seeking behavior and to determine the factors that impact the treatment method choices while assessing patients' views regarding infertility management.

Materials and Methods: This cross-sectional survey was distributed anonymously online and targeted infertile females seeking infertility treatment and included participants from all the 12 governorates in Jordan. An electronic questionnaire was designed, which was then distributed on several social media platforms during January 2021. This study included 429 participants seeking in vitro fertilization (IVF), and 52 were seeking intrauterine insemination (IUI) as a treatment modality. The study aimed to examine the aspects that influence infertile women's treatment-seeking behavior and technique selection.

Results: A total of 481 infertile females aged 21-50 years were included in the study. There was a statistically significant relationship between treatment modality and the number of children ($P = 0.012$), years of trying to conceive ($P = 0.006$), and causes of infertility ($P = 0.017$). Participants who wanted to use the IUI method had a significantly higher average number of children (IUI vs. IVF: 0.88 ± 1.11 , 0.46 ± 0.96). Calculating the binary logistic regression to predict the selection of a treatment method based on prior trials of IVF and IUI indicated that the IVF prior trial is a significant predictor method of treatment selection ($P < 0.001$).

Conclusions: The decisions regarding infertility treatment should be shared between the patient and the treating physician. Socioeconomic status, past gynecological, and infertility history should be evaluated to better understand the patient's preference.

Keywords: Reproductive techniques, Decision making, Fertility clinics, Infertility, Socioeconomic factors.

Introduction

Infertility is a disease defined by an individual's failure to achieve a clinical pregnancy despite having regular sexual intercourse for at least 12 months without using any type of contraception or due to a person's reproductive capacity being impaired, whether on a personal level or as a couple (1). Infertility is a universal health concern, with an estimated 15% of couples of reproductive age suffering from it worldwide (2,3). In Jordan, the estimated percentage of women with primary infertility is approximately 8.9% (4). Thus, it is a major challenge for the health system, especially considering the high proportion of Jordanian infertile couples suffering from psychological and stress problems (5).

Regardless of the availability of advanced infertility treatment methods, only 56% of infertile couples seek medical treatment (6). Several factors influence the decision whether to seek medical help or not, age being the main factor encouraging couples to visit infertility clinics (7). This can be explained by the fact that age is a major determinant of the chances of conception, with older women having lower fecundability rates than younger couples (8). In addition, the number of cycles

couples attempted is linked to their degree of education and family income (9). Many other sociodemographic factors also play a role, with ethnicity being one of the major determinants for receiving treatment (10).

In addition to the issues of the prevalence of infertility and its detrimental impacts on the individual, household, and society, patients are confronted with various treatment options, indications, complications, burdens, and costs. Therefore, this study aimed to examine the aspects that influence infertile women's treatment-seeking behavior and technique selection. In addition, it assessed patients' views regarding infertility management. According to our search, no studies have addressed this issue, making this the first study to provide guidance for all reproductive health physicians facing similar situations and a better understanding of what their patients need to plan their treatment in an attempt to improve clinical outcomes.

Materials and Methods

Study Setting and Participants

This study involved a cross-sectional survey conducted at Jordan University Hospital in January 2021. The study included infertile women living inside Jordan who had

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Key Messages

- ▶ Infertility has a significant negative impact on a woman's psychological health and wellbeing. Therefore, the decisions regarding infertility treatment should be shared between the patient and the treating physician.

trouble or delay in conceiving at the time of the survey and had decided on the methods they sought. Participants who had been trying to conceive for less than a year, who had not yet decided on the treatment method they were seeking or had not completed the entire survey were excluded.

Variables

The questions were formulated in Arabic and consisted of four parts: (a) questions to determine the participants who are eligible for the study (the gender, location of living and whether they and their partner are experiencing difficulty or delay in conceiving.); (b) demographic information of the participants (age, area of residence, academic degree and partner academic degree, income, medical insurance); (c) reproductive history of the participants (years being married, number of children, years trying to conceive, prior miscarriages and pregnancies, prior intrauterine insemination (IUI) and in vitro fertilization (IVF) trials and cause of infertility); and (d) final section was oriented to determine which step in the management of infertility the women were during the time of the study and the method of treatment they were seeking.

Data Sources

Participants were recruited using social media by distributing and advertising an online questionnaire across multiple social media sites. In addition, questionnaires were sent to people who attend the hospital fertility clinics. Twelve governorates make up Jordan, which is divided into three regions: central (Amman, Zarqa, Balqa, and Madaba), northern (Mafraq, Irbid, Ajloun, and Jerash), and southern (Ma'an, Aqaba, Karak, and Tafieleh). To ensure that our statistics are nationally representative, we collected data from all twelve governorates.

Sample Size

Due to the lack of similar previous studies. A minimum of 385 participants was to be included to ensure a 95% confidence interval and a margin of error of 5%. The final sample size was 481 to increase its power.

Instrument Development and Validation

A questionnaire (available as supplementary material) was created through Google Forms® online survey development software. Before distribution, the survey was discussed by a committee of experts consisting of a group of consultants from the Department of Gynecology at the University of Jordan Hospital (JUH) for the content and

validity and revised accordingly.

Data Collection Procedure

The data was collected over one month using an anonymous online survey (free streamlined system) without collecting any personal information that could be linked to any person at the end of the questionnaire to protect the respondents' privacy. The survey link was distributed via social media through several fertility and public health groups in Jordan. Participants had to complete a 7-minutes survey regarding their infertility condition.

Statistical Analysis

The study used SPSS version 25.0 (Chicago, USA) to analyze. An analysis of variance in mean \pm standard deviation was used to describe continuous variables (e.g., age). Standard descriptive statistics were used to summarize information about participants' sociodemographic characteristics and past gynecological history. All nominal variables were represented as number (percent). The chi-square test was used to analyze the relationship between all study parameters.

A binary logistic regression was carried out to identify possible predictors of treatment method selection. A t-test was used to compare the age and mean the number of children the participants have with the treatment method they are seeking. A *P* value of 0.05 was adopted as a threshold for significance levels.

Results

Demographics

A total of 481 participants met our inclusion criteria and were analyzed. The participants ranged from 21-50 years, with a mean of 34.8 ± 5.83 . The results showed that 53.5% of the respondents were ≥ 35 years and that nearly two-thirds (64.2%) lived in the central region of Jordan.

Most respondents (69.6%) have been married for more than 5 years, with more than two-thirds (70.7%) of the respondents having no children, with a mean of 0.51 ± 0.99 . Among participants who had no previous treatment trials, it was found that the duration before new patients first sought infertility treatment was 1-2 years in 24.2%, 2-3 years in 21.2%, 4-5 years in 22%, and >5 years in 32.6%.

Most participants (52.8%) had been trying to conceive for >5 years, with the most common cause of infertility being decreased sperm quality or count (36.8%). There was a significant relationship between the duration of infertility and the treatment method they are seeking ($P < 0.001$).

Factors Affecting the Treatment Method Selection

A total of 429 participants were seeking IVF as a treatment modality, while 52 participants seeking IUI as a treatment modality. Of those excluded from this analysis, 238 participants had not yet decided which treatment method

to seek despite trying to conceive for more than a year.

The relationship between the methods of treatment the participants seek and several factors were tested individually, as shown in detail in Table 1. There was no significant relationship with age, area of residence, education level of the participants and their husband, total family income, insurance, marriage duration, and having a history of miscarriage or ectopic pregnancy; however,

there was a significant relationship with the number of kids, years trying to conceive, prior IUI or IVF trial and cause of infertility.

Medical Factors and Health-Related Experience

When the cause of infertility was taken into account, it significantly impacted on the participants' decision to choose the treatment method ($P = 0.017$, Table 2).

Table 1. Sociodemographic and Clinical Variables

Variables	Seeking IVF (n = 429)	Seeking IUI (n = 52)	P Value
Age (y), mean \pm SD (range)	34.8 \pm 5.7 (21-50)	35.3 \pm 6.7 (23-47)	0.60
Area of residence, No. (%)			
Central	275 (64.1)	34 (65.4)	0.95
North	125 (29.1)	13 (25)	
South	29 (6.8)	5 (9.6)	
Level of educational, No. (%)			
Illiterate	1 (0.2)	0	0.30
Primary school	41 (9.6)	5 (9.6)	
Secondary school	127 (29.6)	14 (26.9)	
University and above	260 (60.6)	33 (63.5)	
Education level of the husband, No. (%)			
Illiterate	12 (2.8)	2 (3.8)	0.86
Primary school	104 (24.2)	9 (17.3)	
Secondary school	155 (36.1)	22 (42.3)	
University and above	158 (36.8)	19 (36.5)	
Family income per month (Jordanian Dinar), No. (%)			
<100	20 (4.7)	3 (5.8)	0.54
100-200	47 (11)	4 (7.7)	
200-300	150 (35)	24 (46.2)	
300-500	149 (34.7)	14 (26.9)	
>500	63 (14.7)	7 (13.5)	
Medical insurance, No. (%)			
Yes	324 (75.5)	12 (23.1)	0.63
No	105 (24.5)	40 (76.9)	
Years married, No. (%)			
1-2	15 (3.5)	5 (9.6)	0.11
2-3	56 (13.1)	4 (7.7)	
4-5	57 (13.3)	9 (17.3)	
>5	301 (70.2)	34 (65.4)	
Number of children, No. (%)			
0	314 (73.2)	26 (50)	0.010
1	63 (14.7)	12 (23.1)	
2	25 (5.8)	7 (13.5)	
≥ 3	27 (6.3)	7 (13.5)	
Years trying to conceive, No. (%)			
1-2	54 (12.6)	14 (26.9)	<0.001
2-3	71 (16.6)	10 (19.2)	
4-5	67 (15.6)	11 (21.2)	
>5	237 (55.2)	17 (32.7)	
Prior miscarriages, No. (%)			
0	265 (61.8)	24 (46.2)	0.14
1	81 (18.9)	15 (28.8)	
≥ 2	83 (19.3)	13 (25)	
Prior ectopic pregnancies, No. (%)			
0	400 (93.2)	49 (94.2)	0.15
1	28 (6.5)	2 (3.8)	
≥ 2	1 (0.2)	1 (1.9)	

IVF: in vitro fertilization; IUI: intrauterine insemination

However, the decision of participants who had a medical history of miscarriage or ectopic pregnancy was not affected ($P > 0.05$, Table 1).

Primary Infertility and Treatment Method

When comparing the number of participants' children with the treatment method they are seeking right now, participants seeking the IUI method had a significant increase in the average number of children, 0.88 ± 1.11 compared to those seeking the IVF method 0.46 ± 0.96 ($P = 0.012$).

Treatment Method Preferences

Decreased sperm quality or count (36.8%) was the most common indication for seeking treatment, followed by a poor ovarian reserve (14.1%), having more than one of the mentioned indications (10.2%), and polycystic ovary syndrome (8.3%) (Table 2). Table 3 shows the treatment method the patient is looking for and previous IVF and

Table 2. Causes of Infertility and Type of Intervention Seeking

Causes of Infertility	IVF (n = 429)	IUI (n = 52)
Sperm count or quality	161 (37.5)	16 (30.8)
Unexplained	23 (5.4)	6 (11.5)
Poor ovarian reserve	63 (14.7)	5 (9.6)
PCOS	30 (7)	10 (19.2)
Tubal factor	14 (3.3)	0
Endometriosis	9 (2.1)	1 (1.9)
More than one factor	47 (11)	2 (3.8)
Did not complete all tests	55 (12.8)	10 (19.2)
Other	27 (6.3)	2 (3.8)

$P = 0.017$, Data are presented as No. (%).

IVF: In vitro fertilization; IUI: intrauterine insemination; PCOS: polycystic ovary syndrome.

Table 3. Prior IVF and IUI Trials and Type of Intervention Seeking

	Intervention Seeking		P Value
	IVF (n = 429)	IUI (n = 52)	
Prior IVF trials			
0	151 (35.2)	38 (73.1)	<0.001
1	114 (26.6)	8 (15.4)	
2	60 (14)	4 (7.7)	
3	26 (6.1)	0	
>3	78 (18.2)	2 (3.8)	
Prior IUI trials			
0	209 (48.7)	36 (69.2)	0.030
1	106 (24.7)	4 (7.7)	
2	58 (13.5)	5 (9.6)	
3	24 (5.6)	3 (5.8)	
>3	32 (7.5)	4 (7.7)	

Data are presented as No. (%).

IVF: In vitro fertilization; IUI: intrauterine insemination.

^a P values were calculated by Chi-square test.

IUI trials. It was found that 48.7% of the participants sought IVF without first trying IUI as a treatment method. While only 30.8% of those who had already used the IUI method chose to try it again as a treatment method, 26.9% decided to try the IUI method after having had a previous IVF trial.

When analyzed to predict the method of treatment-seeking based on the prior trial of IVF and IUI, it indicated that IVF prior trial is a significant predictor method of treatment selection ($\chi^2 = 28.73$, $df = 2$ and $P < 0.001$). Prior IUI trial was not significant. Both predictors explain 11.7% of the variability in the treatment selection method. IVF is significant at the 5% level (IVF Wald = 18.11, $P < 0.001$). The model's overall percentage correct prediction rate is 89.2%.

Discussion

IVF and IUI were the two treatment modalities of choice for our sample, with IVF being the more sought-after method when considering the clinical indications. Our results found that income was not related to treatment modality choice. One study on the conceptual framework of fertility treatment found that the effectiveness of treatment methods was vital for selecting treatment and that the higher effectiveness of IVF outweighed its financial, physical, and emotional burden (11). This is of particular interest since the cost of IVF in Jordan is, on average, 2750 JOD (1 JOD equals 1.41 USD), which is not covered by insurance plans, and the vast majority (71.8%) of our sample have a monthly salary of <500 JOD. One reason behind our finding could be that the social, marital, and personal stressors placed on the female and the desire to have children leads to the preference for the more expensive yet more effective method. In addition, the number of children and the IUI decision had a significant association ($P = 0.012$), meaning that those who had already achieved the goal of parenthood chose IUI for its lower cost at the expense of lower effectiveness. This is contrary to a study by Maxwell et al, where many women chose IUI over IVF to avoid higher costs (12).

Our study found that previous gynecological experiences impacted the current treatment modality choice. A trend was observed where people who had a previous IVF trial were more likely to choose IVF again than IUI. When calculating the binary logistic regression to predict the treatment-seeking method based on a previous experience of IVF and IUI. We found that a previous IVF experience is an important predictor for choosing a treatment method. This association might be explained by the fact that IVF is the most effective treatment option, and there is no clinical rationale to try IUI again following IVF because it is considered a downgrade unless patients insist on doing IUI due to financial concerns. In the Netherlands, a multi-center, randomized experiment demonstrated that IUI with controlled ovarian hyperstimulation, the less expensive technique, is the first-line therapy in patients

with moderate male infertility and a poor prognosis of unexplained infertility (13). On the contrary, our study showed that 48.7% of participants were currently seeking IVF treatment without having tried IUI as a treatment method.

Within our study sample, 53.5% of the participants were older than 35, and the majority (83.3%) had been married for >4 years. In addition, nearly two-thirds (69.0%) have been seeking infertility treatment for more than four years. Furthermore, it was observed in a previous study that the inability to conceive owing to a female factor had a detrimental impact on the durability of relationships compared to those of fertile females (14). This relationship is inversely related to infertility length and advanced age, independent of the type of infertility (14). Additionally, one study demonstrates that marital satisfaction is significantly lower during treatment than before and after treatment (15). As a result, couples receiving therapy will be placed under personal, marital, and social stressors that have a damaging effect on the household and national level. This is supported by a study done in Denmark, which found an odds ratio of 3.13 for divorce up to 12 years after being diagnosed with infertility compared to women who had a child (11). When considering the traditional, reserved culture of developing countries such as Jordan and the increased stigmatization for infertility, the effects are sure to be amplified (16).

Ristvedt and Trinkaus developed two rationales for seeking treatment in the medical context; the first blame the lack of knowledge of the possible hazards and their belief that their symptoms would go away with time. The second proposes that the individual avoid the stressful situation and become immobilized in fear of their serious complaint (17). In addition, a gap might exist where help is needed but is unattainable due to financial, physical, or social barriers that prevent patients from receiving the sought-after treatment (18).

The significance of this study lies in the fact that pursuing infertility treatment is no easy task for the patient, and it is life-changing and immensely personal. The first obstacle lies in the patient failing to admit the presence of a problem, which is particularly difficult in infertility since the presentation is not “new and undesired symptoms” but rather the absence of change (18). Secondly, in a study done by Chan et al, they found that most participants preferred to contribute to the decision-making process rather than solely entrusting their physicians with the task (19). Therefore, physicians having an idea of the reasoning behind patients choosing a treatment modality over another in the context of various factors may help make the decision-making process easier.

The strength of our study is that it addresses a sensitive yet crucial topic in a conservative society, which cannot be easily assessed differently. This is amplified by the fact that there is no regulating body concerned with the guidelines regarding treatment methods selection in Jordan.

However, there are some limitations. The participants were self-selected from social media platforms, resulting in those most open about their infertility. In addition, choosing social media as the platform for data collection has skewed the data towards higher-educated individuals.

Moreover, because our study being a cross-section design, it was not possible to infer the direction of causation. Although the data were retrospectively collected, which might have resulted in recall bias, most of the questions asked are related to key events in the participants' lives, thus minimizing the bias. Also, this study did not include the influence of anxiety as a variable that might impact decision-making. Further studies are needed to evaluate the factors affecting decision-making processes and understand treatment beliefs in real-time.

Conclusion

In conclusion, infertility is an emerging medical problem that has a significant negative impact on a woman's psychological health and wellbeing. There is a need to assess the factors that influence the treatment decision. The study highlights several important clinical implications for dealing with this problem. Firstly, treatment decisions should be shared between patients and healthcare professionals to increase the chances of a successful pregnancy while taking cost burden and other factors into account, which could lead to more effective care while minimizing time, emotional commitment, cost, and potential risks. Secondly, educational interventions should be directed towards improving knowledge about infertility in women of reproductive age to immediately seek infertility treatment to improve treatment outcomes and limit the stressors they are exposed to. We recommend that healthcare professionals consider the patients' socioeconomic status when recommending a treatment modality, including starting cheaper treatment modalities before IVF when clinically indicated.

Authors' Contribution

MAA, AMK, and NM designed the study and conducted the research. MAA, AMK, and NM monitored, evaluated, and analyzed the result of the study. Further, MAA, AMK, MIA, and NM reviewed the article. All authors approved the final manuscript and take responsibility for the integrity of the data.

Conflict of Interests

Authors declare that they have no conflict of interests.

Ethical Issues

Ethical approval was obtained by the Institutional Review Board of the University of Jordan (Approval No. 1012021/1530; 12 January 2020). The first page of the questionnaire contained an explanation of the aim of this study, voluntary participation, anonymity, and freedom to withdraw at any point. All participants provided consent by clicking on the “Next” button and continuing with the questionnaire. This study was conducted in accordance with the Declaration of Helsinki.

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References

- Zegers-Hochschild F, Adamson GD, Dyer S, et al. The international glossary on infertility and fertility care, 2017. *Fertil Steril.* 2017;108(3):393-406. doi:10.1016/j.fertnstert.2017.06.005
- Bos HMW, van Rooij FB, Esho T, et al. Fertility problems and fertility care in sub-Saharan Africa: the case of Kenya. In: Taubman-Ben-Ari O, ed. *Pathways and Barriers to Parenthood: Existential Concerns Regarding Fertility, Pregnancy, and Early Parenthood.* Cham: Springer; 2019:59-82. doi:10.1007/978-3-030-24864-2_4
- Kurabayashi T, Mizunuma H, Kubota T, Hayashi K. Ovarian infertility is associated with cardiovascular disease risk factors in later life: a Japanese cross-sectional study. *Maturitas.* 2016;83:33-39. doi:10.1016/j.maturitas.2015.08.015
- Rutstein SO, Shah IH. *Infecundity, Infertility, and Childlessness in Developing Countries.* DHS Comparative Reports No. 9. Calverton, Maryland: ORC Macro, WHO; 2004.
- Mahadeen A, Mansour A, Al-Halabi J, Al Habashneh S, Kenana AB. Psychosocial wellbeing of infertile couples in Jordan. *East Mediterr Health J.* 2018;24(2):169-176.
- Boivin J, Bunting L, Collins JA, Nygren KG. International estimates of infertility prevalence and treatment-seeking: potential need and demand for infertility medical care. *Hum Reprod.* 2007;22(6):1506-1512. doi:10.1093/humrep/dem046
- Whittier Olerich K, Summers K, Lewis AM, Stewart K, Ryan GL. Patient identified factors influencing decisions to seek fertility care: adaptation of a wellness model. *J Reprod Infant Psychol.* 2021;39(3):263-275. doi:10.1080/02646838.2019.1705263
- Konishi S, Kariya F, Hamasaki K, Takayasu L, Ohtsuki H. Fecundability and sterility by age: estimates using time to pregnancy data of Japanese couples trying to conceive their first child with and without fertility treatment. *Int J Environ Res Public Health.* 2021;18(10):5486. doi:10.3390/ijerph18105486
- Smith JF, Eisenberg ML, Glidden D, et al. Socioeconomic disparities in the use and success of fertility treatments: analysis of data from a prospective cohort in the United States. *Fertil Steril.* 2011;96(1):95-101. doi:10.1016/j.fertnstert.2011.04.054
- Kessler LM, Craig BM, Plosker SM, Reed DR, Quinn GP. Infertility evaluation and treatment among women in the United States. *Fertil Steril.* 2013;100(4):1025-1032. doi:10.1016/j.fertnstert.2013.05.040
- Kjaer T, Albieri V, Jensen A, Kjaer SK, Johansen C, Dalton SO. Divorce or end of cohabitation among Danish women evaluated for fertility problems. *Acta Obstet Gynecol Scand.* 2014;93(3):269-276. doi:10.1111/aogs.12317
- Maxwell E, Mathews M, Mulay S. The impact of access barriers on fertility treatment decision making: a qualitative study from the perspectives of patients and service providers. *J Obstet Gynaecol Can.* 2018;40(3):334-341. doi:10.1016/j.jogc.2017.08.025
- Bensdorp AJ, Tjon-Kon-Fat RI, Bossuyt PM, et al. Prevention of multiple pregnancies in couples with unexplained or mild male subfertility: randomised controlled trial of in vitro fertilisation with single embryo transfer or in vitro fertilisation in modified natural cycle compared with intrauterine insemination with controlled ovarian hyperstimulation. *BMJ.* 2015;350:g7771. doi:10.1136/bmj.g7771
- Tao P, Coates R, Maycock B. Investigating marital relationship in infertility: a systematic review of quantitative studies. *J Reprod Infertil.* 2012;13(2):71-80
- Pepe MV, Byrne TJ. Women's perceptions of immediate and long-term effects of failed infertility treatment on marital and sexual satisfaction. *Fam Relat.* 1991;40(3):303-309. doi:10.2307/585016
- Obeidat HM, Hamlan AM, Callister LC. Missing motherhood: Jordanian women's experiences with infertility. *Adv Psychiatry.* 2014;2014: 241075. doi:10.1155/2014/241075
- Ristvedt SL, Trinkaus KM. Psychological factors related to delay in consultation for cancer symptoms. *Psychooncology.* 2005;14(5):339-350. doi:10.1002/pon.850
- White L, McQuillan J, Greil AL. Explaining disparities in treatment seeking: the case of infertility. *Fertil Steril.* 2006;85(4):853-857. doi:10.1016/j.fertnstert.2005.11.039
- Chan CHY, Lau BHP, Tam MYJ, Ng EHY. Preferred problem solving and decision-making role in fertility treatment among women following an unsuccessful in vitro fertilization cycle. *BMC Womens Health.* 2019;19(1):153. doi:10.1186/s12905-019-0856-5

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