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RESEARCH ARTICLE

SOCIO-DEMOGRAPHIC FACTORS AFFECTING WOMEN'S ATTITUDES TOWARDS ASSISTED REPRODUCTIVE TECHNOLOGY IN SAUDI ARABIA

Mona S. Khojah[1], Almaha A. Atafi[1], Ethar M. Banamah[1], Slwan A. Alrabaei[1], Sondos A. Kenani[1] and Hassan Salah Abduljabbar[2]

1. Faculty of Medicine, King Abdulaziz University, Jeddah, Saudi Arabia.
2. Department of Obstetrics and Gynecology, King Abdulaziz University Hospital, Jeddah, Saudi Arabia.

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Abstract

Background: To determine the socio-demographic factors affecting women's attitudes toward assisted reproductive technology (ART) in Saudi Arabia.

Methods: This questionnaire-based study was conducted between February and May 2018 and targeted females living across all regions of Saudi Arabia. The questionnaire was designed to investigate the knowledge, attitudes, practice and quality of life of women towards ART and consisted of three parts including 35 questions. Pearson Chi-square test was used to compare qualitative differences between variables.

Results: A total of 730 women accepted to participate in this survey (response rate, 94.4%). Approximately 94.5% of the respondents had heard about ART. The knowledge, altitude, practice and quality of life scores were good in 99.0%, 90.5%, 55.9% and 48.8%, respectively. Respondents with a longer marriage duration ($p = 0.038$) or those who felt bad about having ART ($p = 0.008$) were more likely to believe that ART more frequently fails than succeeds. Conversely, educated women ($p = 0.001$), those who believed regulations for infertility treatment were lax ($p = 0.022$), those working in the medical field ($p = 0.003$), and women who had heard about ART ($p = 0.007$) were more likely to believe that ART more frequently succeeds than fails.

Conclusion: According to our findings, ART is largely acceptable among population included in this study. Socio-demographic factors such as marriage duration, educational level, or profession should be considered when treating couples with infertility problems.

Introduction:-

Infertility is "a condition of the reproductive system in which there is a failure to achieve a clinical pregnancy after 12 months of regular unprotected sexual intercourse"[1]. The global prevalence of infertility has increased from 42 million in 1990 to 48.5 million in 2010, with the Middle East having one of the highest prevalence rates[2]. The World Health Organization (WHO) stated that out of every four couples in developing countries, one is affected by infertility[3].

Corresponding Author: - Mona S. Khojah
Address**:-** Medical Student, Faculty of Medicine, King Abdulaziz University, Jeddah, Saudi Arabia.

One of the most effective treatments for infertility is assisted reproductive technology (ART), which consists of all fertility treatments in which either eggs or embryos are handled[4]. ART covers a wide spectrum of treatments depending on the cause of infertility. Several options are available for infertility treatment, including ovulation induction, donor conception, in vitro fertilization (IVF), gamete intrafallopian transfer, intracytoplasmic sperm injection, preimplantation genetic diagnosis, and surrogacy[5].In vitro fertilization is one of the most common and widely used type of ART; IVF involves the surgical removal of the eggs from a woman's ovaries, combining them with sperm outside the woman's body, and then transferring them to the uterus or fallopian tube[4].

The first successful ART was that of a girl named Louise Brown born on July 25, 1978 by IVF[6]. In 2014, approximately 1.6% of deliveries in the United States were a result of ART[7]. In the Middle East, the first center for assisted reproduction was not started until the mid-1980s due to religious and cultural factors[8].

Several studies have investigated the impact of infertility on a couple's life, job, health, personality, and other aspects such as their emotional condition, self-esteem, and matrimonial fulfillment.[9, 10] According to these reports, infertility can affect women's attitudes towards ART depending on different factors, including age, educational level, etc[9, 10].

However, few studies have discussed the factors that affect women's attitudes toward ART. One study conducted in the United States in December 2015 showed a significant association between women's attitudes toward ART and factors such as the length of time that they were aware of ART and their general attitude toward ART, political affiliation, and religion. On the other hand, age did not appear to be a significant factor[11]. Another study conducted in the Midwest region of United States found that age and education level significantly affected the women's ethical concerns toward ART[12]. Moreover, it was reported that women with a longer length of awareness of ART were significantly more likely to have a favorable attitude toward ART[11]. Additionally, in Iran, a cross-sectional study conducted in 2014 among 184 infertile couples showed that the couple's attitude, their family's attitude, and applied knowledge of ART can be important factors affecting their decision of having ART; however, there was no significant relationship between gender and socioeconomic status toward having ART[13].

The purpose of this study was to determine the socio-demographic factors affecting women's attitudes toward ART in Saudi Arabia.

Methodology:-

This questionnaire-based cross-sectional study was conducted on 773 women between February and May 2018 and included females older than 14 years and not older than 45 years old, regardless of nationality or marital status. Study participants were selected using systematic sampling technique. All participants provided written informed consent before being recruited into this study. Excluded from the study, all females who refused to participate, people who did not understand the questionnaire due to language problems, and patients with chronic diseases or malignancy. The study was approved by the Institutional Review Board of King Abdulaziz University, Jeddah, Saudi Arabia and was made according to principles of Helsinki Declaration.

Sample size:

During the study period from February and May 2018, there were 33413660 total number of populations (Saudi and non-Saudi), of them 19240956 were male and 14172704 were female according to the general authority for statistics, Kingdom of Saudi Arabia.[14] The Raosoft software package was used for sample size calculation, and the single proportion method was used. By assuming that 50% of populations will have a positive attitude toward the questionnaire, the required sample size was 664 populations at a 99% confidence interval and a 5% margin of error, but a sample size of 730 was used to compensate for non-responses or incomplete answered questionnaire about ART.

All women who visit ART clinics were invited to complete an anonymous questionnaire (either on site or at home and returned in a reply-paid envelope) to clinic in the next days.

Research Questionnaire:

A previously used questionnaire[11] was redesigned according to our social situations and distributed through social networking platforms and targeted females living across all regions of Saudi Arabia. The questionnaire was prepared in English and translated into Arabic by well-trained medical students, and it was reviewed by an obstetrics-

gynecology expert (professor and consultant). The validity of the questionnaire was established by face validity through consultation with a panel of experts in the obstetrics and gynecology field. The reliability of questionnaire was evaluated using Cronbach's alpha index by SPSS software. Values more than 0.7 shows questionnaire reliability.

The questionnaire included 35 questions and consisted of three parts: part one (11 questions) designed to address the socio-demographic characteristics of the participants (e.g. age, marriage duration, nationality, residential area, education levels, employment status, monthly income, consanguinity, number of children, marital status and infertility period) ; part two designed to assess the participants' knowledge of ART (question 5) (e.g. definition of infertility, heard of ART and source of information,length of awareness of ART, when will a woman's physician recommend in IVF, do IVF children differ from the children who are conceived naturally), with maximum total score 5; altitude of life (11 questions) (e.g. age limit for infertility treatments, favor of infertility treatments, IVF an acceptable treatment for couples with fertility problems, infertility treatment involve tampering with nature, ART usually fail, IVF an acceptable option for couples with serious genetic diseases, acceptable for fertile couples to use IVF to choose the sex of their baby, tube babies socially acceptable, feel bad if you had ART, regulations on infertility treatment lax, cost for infertility treatment unreasonable) with a total score 11; questions about practice, 3 questions (e.g. treated for infertility before, recipient of ART,known recipient of ART), with total score 3; quality of life consists of 5 questions (satisfied with your quality of life, Rate your quality of life, How often did physical and emotional health problems interfere with your social life during the last 4 weeks?, satisfied with the support received from your family regarding fertility problems, think partners are affectionate with each other although they have fertility problems), with maximum total score 5.

Statistical analysis:

The data were entered into Microsoft Excel 2016, and the analysis was performed using IBM SPSS Statistics for Windows, version 21 (IBM Corp., Armonk, N.Y., USA). Quantitative data are presented as mean ± standard deviation (SD) (minimum – maximum), whereas qualitative data are presented as frequency and percent. The total scores of knowledge, and attitude, practice and quality of life were calculated and half or more score correct answer was consider good response while, less than half score was consider bad response. Binary logistic regression was made to assess the association between ART outcome and different parameters, odd's ratio (OR) and 95% confidence interval (95% CI) was calculated. A Pearson Chi-square test was used to compare differences between qualitativevariables, with a P-value < 0.05 used as the cutoff for significance.

Results:-

Of the 773 women who were invited to participate in this survey, 730 accepted, representing a response rate of 94.4%. The mean age of the participants was 35.1±9.7 years, and the participants had an average duration of marriage of 11.5±10.1 years. Approximately 86.7% (n= 633) were Saudi, and more than half of the participants were lived in the western region of the kingdom (n= 434, 59.5%) that can be explained by that the questionnaire was distributed among women who visits infertility clinics at King Abdulaziz Hospital, Jeddah that was present in the Western region of Saudi Arabia. Approximately 77.0% (n= 562) of the respondents had attended university, and 57.1% (n= 417) worked in the medical field. Other characteristics of the respondents are as shown in (Table 1).

Knowledge questions showed that right definition of infertility was answered by 4.5% (n= 33) only of participants. Most of the respondents (n= 690, 94.5%) had heard about ART, and their main source of information included friends (n= 197, 27.0%) and family members (n= 171, 23.4%). Only 15.1% (n= 110) of the respondents had heard about ART from a doctor. The corrected answers of the following knowledge question regarding length of awareness of ART was mostly > 10 years reported by 25.2% (n= 184), when physician recommend IVF, the corrected answers was all the above chosen by 67.1% (n= 490) and that the IVF children did not differ from those born naturally by 88.5% (n= 464). The mean of total knowledge score was 4.71; 99% of responses were good (≥ 2.5) and only 1% (poor response (< 2.5) (Table 2).

Regarding the altitude of life of participants towards ART, approximately half of the respondents (n= 366, 50.1%) reported that age limits ART treatment, 96.4% (n= 704) favor infertility treatments, 94.1% (n=687) accepted treatment for couples with infertility problems, 23.3% (n= 170) reported benefits of infertility treatment outweigh the risks, 57.4% (n= 419) reported that ART did not usually fail, 79.2% (n=578) reported that IVF is acceptable option for couples with serious genetic diseases, 39.7%) reported that it is acceptable for fertility couples to use IVF to choose the sex of their baby, 90.5% (n= 661) reported that tube babies are socially acceptable, 93.2% (n= 680)

disagrees that they feel bad if they had ART, 92.5 (n 675) agree that regulations on infertility treatment are lax, 7.5% (n= 55) disagrees that cost for infertility treatment unreasonable. The mean of the total altitude score was 7.24, with 90.5% (n= 660) response good (≥5.5) and 9.5% (n= 70) response bad (<2.5) (Table 3).

Regarding practice of participants towards ART, 86.4% (n=631) had not treated for infertility before, 77.4% (n= 565) are not ART recipient, 68.4% (n= 499) are known ART recipient. The mean of the total practice score was 1.6, with 55.9% (n= 408) response good (≥1.5) and 44.1% (n= 322) response bad (<1.5) (Table 4).

Regarding quality of life of participants towards ART, 96.0% (n=701) are satisfied with their life quality, 85.6% (n=625) had good rate of their life quality, 27.3% (n= 199) physical and emotional health problems interfere with their social life during last 4 weeks once a week, 31.1% (n= 227) are satisfied with their family support regarding fertility problems, 24.0% (n= 175) always think partners are affectionate with each other although they have fertility problems. The mean of the total quality of life score was 2.64, with 48.8% (n= 356) response good (≥2.5) and 51.2% (n= 374) response bad (<2.5) (Table 5).

Further analyses revealed a significant relation between ART outcome and marriage duration, education level, beliefs regarding the regulations for infertility treatment, working in the medical field, having heard about ART, and feeling bad about having ART. Respondents with a longer marriage duration ($p = 0.038$) or those who felt bad about having ART ($p = 0.008$) were more likely to believe that ART more frequently fails than succeeds. Conversely, educated women ($p = 0.001$), those who believed regulations for infertility treatment were lax ($p = 0.022$), those working in the medical field ($p = 0.003$), and women who had heard about ART ($p = 0.007$) were more likely to believe that ART more frequently succeeds than fails. No significant relation was found between women's beliefs of ART outcome and age, having a favorable view of infertility treatments, belief that treatment cost was unreasonable, number of children, quality of life, age limiting infertility treatment, and feeling bad about having ART (Table 6).

Table 1:- Demographic characteristics of the respondents.

Variables	Frequency	Percent
Nationality		
Saudi	633	86.7
Non-Saudi	97	13.3
Residential area		
Northern Region	72	9.9
Western Region	434	59.5
Eastern Region	72	9.9
Southern Region	106	14.5
Central Region	46	6.3
Education level		
School	168	23.0
University	562	77.0
Employment status		
Employed	311	42.6
Unemployed	135	18.5
Student	89	12.2
Housewife	195	26.7
Monthly income		
< 6000 SR	221	30.3
6000–9999 SR	218	29.9
10000-14999 SR	168	23.0
15 000–19 999 SR	70	9.6
≥ 20 000 SR	53	7.3
Consanguinity		
Yes	189	25.9
No	475	65.1
Not applicable	66	9.0
Number of children		

Not applicable	71	9.7
0	197	27.0
1	117	16.0
2	125	17.1
3	98	13.4
4	68	9.3
≥ 5	124	17.0
Marital status		
Single	71	9.7
Married	619	84.8
Divorced	30	4.1
Widow	10	1.4
Medical field (Yes)	417	57.1

Table 2:- Knowledge of participants about assisted reproductive technology.

Variables	**Frequency**	**Percent**
Q1. Infertility period		
6 months to < 1 year	33	4.5
1–2 years	75	10.3
> 2 years	157	21.5
Unable to conceive at all	465	63.7
Q2. Have you ever heard about ART*? (Yes)	690	94.5
Q2.1 Source of information		
Doctor	110	15.1
Friend	197	27.0
Family	171	23.4
Internet	155	21.3
Others	97	13.3
Q3. Length of awareness about ART		
None	165	22.6
< 1 year	62	8.5
1–5 years	180	24.7
6–10 years	139	19.0
> 10 years	184	25.2
Q4. When does a physician recommend IVF?**		
If a woman has been diagnosed with unexplained infertility	42	5.8
If a woman's Fallopian tubes have been blocked	13	1.8
If other techniques such as fertility drugs or artificial insemination have not been successful	175	24.0
All of the above	490	67.1
None of the above	10	1.4
Not applicable	474	65.0
Q5. Do IVF children differ from those born naturally?(No)	646	88.5
Total knowledge score (mean±SD, minimum - maximum)	4.71±**0.84 (2.00-6.00)**	
Knowledge score category		
Good (≥ 2.5)	723	99.0
Poor (<2.5)	7	1.0

***** ART, assisted reproductive technology; **IVF, in vitro fertilization.

Table 3:- Altitude of life of participants towards assisted reproductive technology.

Variables	**Frequency**	**Percent**
Q1. Does age limit infertility treatment? (Yes)	366	50.1
Q2. Are you in favor of infertility treatments? (Yes)	704	96.4
Q3. Is IVF an acceptable treatment for couples with fertility problems? (Yes)	687	94.1

Q4. Does having infertility treatment involve tampering with nature?		
It makes me uneasy so I would not consider it for myself	42	5.8
It is unethical and should not be performed	4	0.5
The benefits of infertility treatment outweigh the risks	170	23.3
Infertility treatments carry unknown consequences	39	5.3
Not applicable	475	65.1
Q5. Does ART usually fail? (No)	419	57.4
Q6. Is IVF an acceptable option for couples with serious genetic diseases?(Yes)	578	79.2
Q7. Is it acceptable for fertile couples to use IVF to choose the sex of their baby? (Yes)	290	39.7
Q8. Are tube babies socially acceptable?(Yes)	661	90.5
Q9. Would you feel bad if you had ART?(Disagree)	680	93.2
Q10. Are regulations on infertility treatment lax?(Agree)	675	92.5
Q11. Is the cost for infertility treatment unreasonable?(Disagree)	55	7.5
Total altitude score (mean±SD, minimum - maximum)	7.24±1.43 (0.00-11.00)	
Altitude score category		
Good (≥ 5.5)	660	90.5
Poor (<5.5)	70	9.5

***** ART, assisted reproductive technology; **IVF, in vitro fertilization.

Table 4:- Practiceof participants towards assisted reproductive technology.

Variables	**Frequency**	**Percent**
Q1 Have you been treated for infertility before?(No)	631	86.4
Q2 Are you a recipient of ART?(No)	565	77.4
PQ3 Are you a known recipient of ART?(Yes)	499	68.4
Total practice score (mean±SD, minimum - maximum)	1.6**±0.7 (0.0-3.0)**	
Practice score category		
Good (≥ 1.5)	408	55.9
Poor (<1.5)	322	44.1

***** ART, assisted reproductive technology; **IVF, in vitro fertilization.

Table 5:- Quality of lifeof participants towards assisted reproductive technology.

Variables	**Frequency**	**Percent**
Q1. Are you satisfied with your quality of life? (Yes)	701	96.0
Q2. Rate your quality of life		
Poor	7	0.9
Neither poor nor good	98	13.4
Good	625	85.6
Q3. How often did physical and emotional health problems interfere with your social life during the last 4 weeks?		
Every day	25	3.4
3–5 days/ week	80	11.0
Once a week	199	27.3
Once every 2 weeks	185	25.3
None of the time	241	33.0
Q4. Are you satisfied with the support received from your family regarding fertility problems?		
Yes	227	31.1
No	60	8.2
Not applicable	443	60.7
Q5. Do you think partners are affectionate with each other although they have fertility problems?		
Always	175	24.0
Often	100	13.7
Seldom	33	4.5
Never	12	1.6

Not applicable	410	56.2
Total Quality of life score (mean±SD, minimum - maximum)	2.64±1.02 (0.00-5.00)	
Quality of life score category		
Good (≥ 2.5)	356	48.8
Poor (< 2.5)	374	51.2

***** ART, assisted reproductive technology; **IVF, in vitro fertilization.

Table 6:- The association between assisted reproductive technology outcome and different variables.

Variables	**ART Fail (N = 311)**	**ART Success (N = 419)**	**OR** (95% CI***)**	**P-value**
Age (years)	35.7 ± 9.9	34.7 ± 9.5	0.994 (0.968-1.021)	0.144
Marriage duration (years)	12.5 ± 1.1	10.9 ± 9.8	1.020 (0.989-1.51)	**0.038***
No of children	2.4 ± 2.1	2.3 ± 2.0	1.004 (0.903-1.116)	0.556
Educational level				
School	94 (30.3%)	74 (17.7%)	2.029 (1.431–2.876)	**0.001*****
University	216 (69.7%)	345 (82.3%)		
In favor of infertility treatments				
Yes	300 (96.8%)	403 (96.2%)	1.191 (0.533–2.662)	0.415
No	10 (3.2%)	16 (3.8%)		
Cost of IVF**** is unreasonable				
Yes	290 (93.5%)	381 (90.9%)	1.446 (0.824–2.538)	0.124
No	20 (6.5%)	38 (9.1%)		
Regulations on infertility treatment are lax				
Yes	279 (90.0%)	395 (94.3%)	0.547 (0.314–0.952)	**0.022***
No	31 (10.0%)	24 (5.7%)		
Works in the medical field				
Yes	158 (51.0%)	258 (61.6%)	0.649 (0.482–0.873)	**0.003****
No	152 (49.0%)	161 (38.4%)		
Quality of life				
Poor	49 (15.8%)	55 (13.1%)	1.242 (0.819–1.885)	0.180
Good	261 (84.2%)	364 86.9%)		
Had heard about ART*****				
Yes	285 (91.9%)	404 (96.4%)	0.423 (0.219–0.817)	**0.007****
No	25 (8.9%)	15 (3.6%)		
Age limits infertility treatment				
Yes	164 (52.9%)	202 (48.2%)	1.207 (0.899–1.619)	0.119
No	146 (47.1%)	217 (51.8%)		
A test tube baby is socially acceptable				
Yes	278 (89.7%)	382 (91.2%)	0.841 (0.512–1.384)	0.289
No	32 (10.3%)	37 (8.8%)		
Would feel bad about having ART				
Yes	30 (9.7%)	20 (4.8%)	2.138 (1.190–3.841)	**0.008****
No	280 (90.3%)	399 (95.2%)		

* Data are presented as number (%) or mean +/- SD.

OR, odds ratio; ***CI, confidence interval; ****IVF, in vitro fertilization. ******ART, assisted reproductive technology. *: significance <0.05; **: significance <0.01; *: significance <0.001.

Discussion:-

In 2017, a study reported financial problems as a significant burden because infertility entails several additional expenses beyond the cost of IVF treatments (medication cost, commuting to fertility centers, and lost work time)[1]. These put an additional burden on infertile couples and may influence their attitudes toward ART[1]. In contrast, in the present study, most of the responders reported that the cost of infertility treatment was unreasonable (92.5%), but it did not affect their attitude toward ART. The mean score of attitude reported in this study was 7.24 and 90.5% of participants had good attitude towards ART. The disparity between our findings and those of Zegers-Hochschild et

al.[1] could be due to the fact that the majority of responders in our study fell within the same income range and so there was no statistical difference between their attitudes. Another study demonstrated that the higher the rate of participants' attitude to ART, the more positive their attitudes toward new therapeutic methods.[13] Similarly, we found that responders who had heard about ART were significantly more likely to believe in the success of ART (57.4%). This indicates that the more altitude women have about ART, the more likely they are to accept the procedure and its consequences. We found that an overwhelming proportion of the responders preferred and considered IVF treatment acceptable for couples with fertility problems (94.1%). Likewise, other investigators have reported that the majority of their responders would suggest IVF as the treatment of choice for infertility[11].

Educational level was previously reported as one of the strongest predictors of women's perceptions of the ethics of infertility treatments[12]. This finding is in line with our results, where educational level was significantly related to the participants' attitudes (OR: 2.029, 95% CI: 1.431-2.876, P <0.001). It is plausible that an increase in women's knowledge about ART improves their way of thinking about infertility as a condition. We believe that the availability of treatment options like ART may help women to understand the treatment and, consequently, make them more comfortable to go through the process and be willing to try to achieve pregnancy.

In this study, most of the responders thought that test tube babies were socially accepted (90.5%), and this reflected positively in their attitude toward ART (93.2%). Additionally, a large proportion of the minority that believed tube babies were socially unaccepted had a negative attitude toward ART. This finding is consistent with that of other investigators who reported a correlation between spousal attitude, family attitude, and the attitude of people surrounding infertile couples. This highlights the importance of social acceptance of ART, as an infertile couple is likely to get the full support from those surrounding them, thereby reducing their negative perceptions and increasing their likelihood to choose ART for treating infertility[13].

In the current study, age was not significantly related to the respondents' attitudes toward ART. A similar result was reported in a previous study where age did not seem to have an impact on people's beliefs about ART success or failure[11].Another study showed that a small proportion of their respondents believed that ART children had a higher risk of malformations[11]. Similarly, 5.3% of the respondents in our study believed that infertility treatment carried unknown consequences.

We found that women who worked in the medical field were most likely to believe in the success of ART for achieving pregnancy (OR: 0.648; 95% CI: 0.485-0.873; P =0.003). This could be explained by the fact that this group is more knowledgeable due to their exposition to this topic than other groups. In contrast, a study assessing certified and student midwives' attitudes toward various aspects of ART showed no difference between their attitudes compared to the general population.[15] This disparity could be due to differences in the period when these studies were conducted. Contrary to Papaharitou et al.[15] study, which was conducted in 2005, our study was conducted in this era when people have more knowledge, exposure to information and experience than before.

The study had several limitations. First, data collection was challenging due to some participants' refusal to answer the questionnaire, language barriers, or inapplicable age. Second, the sample size is small, implying that the results may not be representative of the female population in Saudi Arabia. We recruited only 730 participants, while women constitute about 42.5% of 33 million inhabitants in Saudi Arabia.[14] Finally, the paucity of researches on this topic made it difficult to make relevant comparisons.

Conclusion:-

Our analyses show that ART is largely acceptable in population included in this study. Most participants had good knowledge and attitude towards ART. Socio-demographic factors such as marriage duration, educational level, or profession should be considered when treating couples with infertility problems as these factors can affect the way women perceive the failure or success of ART. Finally, the lack of research on ART in Saudi Arabia highlights the importance of conducting further studies on a larger sample in different regions and cities.

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