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Knowledge, Attitude and Acceptability of Assisted Reproductive Technology among Infertile Women

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Abstract: **The aim of the present study was to assess knowledge, attitude, and acceptability of assisted reproductive technology among infertile women. Design: A descriptive research design was used. Setting: This study was conducted at the Fertility Care Unit at Mansoura University Hospital in Daqahliya governorate, Egypt. Subjects: A total of 130 women who are attending to the fertility care unit for infertility treatment. Tools of data collection: A Structured interview schedule, knowledge of women about assisted reproductive technology Questionnaire sheet, attitude of women toward assisted reproductive technology Likert scale and acceptability of women toward assisted reproductive technology Likert scale. Results: Around two third (63.8%) of the studied group had a poor knowledge about assisted reproductive technology, most of the studied group (97%, 97.7% respectively) had a neutral attitude and accepted assisted reproductive technology. Also, the study results revealed that the median knowledge score was significantly difference by age and education, being higher among older age above 25 years and those with high education and longer duration of infertility. There was negligible relationship between knowledge and attitude scores (p= 0.403), while there was significant, positive, mild relationship between acceptability score in both knowledge and attitude scores (P=0.044, P=0.001) respectively. Conclusion: It was evident that infertile women had poor knowledge about assisted reproductive technology; most of them had a neutral attitude and was accepted assisted reproductive technology. Recommendation: Developing assisted reproductive technology programs to increase infertile women's knowledge and attitude regarding assisted reproductive technology.**

Keywords: **Acceptability, Assisted Reproductive Technology, Attitude, Infertile Women, Knowledge.**

1. INTRODUCTION

Infertility is defined as the inability to conceive normally after one year of normal unprotected intercourse. Most of the time, infertility is a certain degree of subfertility in which one out of every 7 couples needs specialized help in pregnancy ***(Anwar & Anwar, (2016)*.**

Moreover, Epidemiological data indicate that infertility is estimated to include up to 186 million people worldwide. Experts on the battlefield are seen as a problem affecting 15% to 20% of couples ***(Inhorn&Patrizio, 2015).*** The Egyptian Fertility Care Society and sponsored by the world health organization (WHO) explored that infertility affects 12% of Egyptian couples, 4.3 percent suffer from primary infertility and 7.7 percent suffer from secondary infertility. The number of women between the ages of 15 and 49 exceeds 25 million, meaning that at least 3 million women are infertile in Egypt ***(Ismail &Moussa, 2017).***

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Assisted reproductive technology (ART) is one of the safest health cares against infertility, which is associated with treatment procedures that include the in vitro fertilization, intra-cytoplasmic sperm injection, Intrauterine insemination, gamete intra-fallopian transfer, zygote fallopian transfer, gamete and embryo cryopreservation, oocyte and embryo donation, and gestational surrogacy(**Omokanye, et al., 2017).**

Furthermore, ART is a big technology services that are performed to treat infertility. It includes all fertility treatment procedures that deal with both women's ovaries and men's sperm. It works by removing the eggs from the woman's body then mixed with sperm to achieve fertilization. The embryos which result from fertilization are placed in the woman's body. In vitro fertilization is the most common and effective type of ART ***(Paulson, 2018).***

Knowledge about ART procedures and the chance of failure or success of it help the patients to accept treatments realistically and provide proper readiness and expectation. More knowledge about ART and their process lead to better self-consciousness and mental relaxation. A few studies were done to show the effect of knowledge training programs and positive attitude of individuals ***(Pourmasumi, et al., 2016).***

In addition, fertility, and having children have always been considered as the blessings from God in the traditional societies and has cultural importance. Also, making decisions about it is affected by the people's perceptions and expectations as well as attitudes toward the use of these technologies ***(Afshani, et al., 2016).***

Despite high success rates of ART, there are a several barriers faced accessibility such as cost and availability. Researchers explored that a greater percentage of infertile patients are poor and the government health services doesn't involve ART (**Adenik, et al., 2014**). In addition, Although advances in laboratory technology and clinical practice have permitted IVF to progress in low-resource setting, it still remains out of reach of many infertile couples as the service is largely in private sectors (**Omokanye, et al., 2017**).

Finally, the recent developments in ART expand options available to both doctors and patients, and at the same time creating a series of new ethical issues published have mainly focus on birth outcomes and child development through infertility treatments. Religion is likely to be a factor that influences the attitude of infertile couple toward ART. Yet the nurse need to be aware that socio-demographic characteristics are associated with women's attitudes towards ART, including education, religion, income, and age. Also, knowledge of ART has been explored to be more specific to the study of infertility treatments (**Fortin & Abele, 2016**).

Significance of the study:

Infertility represents a serious crisis for the infertile women. This crisis evokes many feelings due to the distress feeling regarding their fertility and the pressure of society which put a great stress on parenthood. Infertility is a source of emotional trauma for couples that cause many psychosexual problems as well as marital problem (**Yakout, et al., 2016**).

Even though, infertility affects 10-15% of all couples worldwide (**Dhont, &Ombelet, 2016**), about 2 million of Egyptian couples (**Amer, 2014**) and 10.4% of couples in Kafr Elshiekh (**Mohsen, et al., 2001**).

Moreover, knowledge and attitude of infertile women about assisted reproductive technology is a basic parameter for improving infertility treatment and decreases these problems (**Mohammed, 2015**). Lack of access to service, and lack of awareness of treatment options make ART an area especially prone to treatment disparities. Factors of socioeconomic status, household income and education have all been studied as barriers to ART (**Armstrong & Plowden, 2012**). But patient factors, such knowledge, attitude and acceptability of ART remain poorly understood so the researcher decides to conduct this study.

Aim of the study:

The aim of the study was to assess knowledge, attitude, and acceptability of assisted reproductive technology among infertile women.

Research questions:

1. Do infertile women have knowledge about ART?
2. What is the attitude of the infertile women about ART?
3. What is the acceptability of ART among infertile women?

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2. SUBJECTS AND METHOD

Study Design: A descriptive research design was used.

Study Setting: The study was conducted at the Fertility Care Unit at Mansoura University Hospital in Daqahliya governorate, Egypt. It consists of a big clinic for patient's admission, a clinic for ultrasound, and internal section contains two patient ward, laboratory, and operating room. Nearly more than 200 patients per week visit the unit for treatment and care.

Sample type: A convenient sample was used.

Subjects of the study: This study consists of one hundred and thirty women who are attending to the fertility care unit for infertility treatment and accept to participate in the study**.**

Sample size:

The calculated sample size of the study for studying the knowledge, attitude, and acceptability of infertile women to assisted reproductive technology, through DSS research.com sample size calculator software, at 5% ∞ error (95.0% significance) and 20.0 β error (80.0% power of the study), assuming positive towards ART is 76.8% **(Olugbenga, et al., 2014)** and it was expected to be two thirds in our community (66.6%). The calculated sample size was 117 and adding 10.0% for better quality of data collection so the field sample size was 130.

Tools of data collection:

Four tools were used for data collection:

Tool I: A Structured Interview Schedule: It includes two parts. **Part one:** Covers general characteristics of the women as age, height**,** weight, BMI, level of education, occupation**,** residence, family income, religion and duration of the marriage. **Part two:** It includes menstrual history as (age of menarche, regularity, frequency, duration**,** and amount), obstetric history as (gravid, para, abortion, still births and number of live children), duration and type of the infertility, causes of infertility, previous investigations and tests for the male and female and medication used.

Tool II: Knowledge of women about ART Questionnaire sheet: This tool addresses women knowledge about ART, types of ART, definition of IVF, definition of ICSI, definition of IUI, investigation before ART, suitable couples for doing ART, steps of IVF, success factors for ART, frequency number of doing IVF, complications of IVF, the number of embryos implantation.

Scoring system of tool II:

Every correct answer was given a score of "two" mark, partial answer "one" and wrong answer "zero" score. The total knowledge score was poor if < 50%, fair is ≤ 75% and good if ≥ 75%.

Tool III: Attitude of women toward ART Likert scale: It was adopt from ***Afshani, et al., (2016)*** to assess attitude of women toward ART as ART is supposed to give us peace of life, after bearing a child through ART, we will be full of vitality, after bearing a child through ART, a lot of our problems will be resolved, i would feel bad about applying ART, ART process usually fails, I'm sure of the secrecy about the ART project, applying ART is my last hope, applying ART makes me feel guilty, most of couples, who used ART, were not satisfied with that.

Scoring system for the tool III:

The tool consist of nine items each item were assessed on a five point likert scale, ranging from 1-5: where score (1) for strongly disagree, score (2) for disagree, score (3) for uncertain, score (4) for agree and score (5) for strongly agree. The total score of the women's Attitude toward ART = 45 and it was classified into negative, neutral and positive as follows: negative (9-21), neutral (22-33) and positive (34-45).

Tool IV: Acceptability of women toward ART Likert scale : It was adopted from ***Olugbenga, et al., (2014)*** to assess acceptability of women toward ART it includes: whether respondents religion is against ART, ART has no effect on reduction of infertility, ART is a good option for infertile couple desiring children, ART is against our culture, that side effects of ART are harmful to the fetus, that side effects of ART are harmful to the mother, husbands only should make decisions about ART, decision about ART should be joint-wife and husband and whether ART is too expensive to warrant neglecting it.

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Scoring system for the tool IV:

The tool consist of nine statement and each statement was assessed on a five point likert scale, ranging from 1 to 5, where score (1) for strongly disagree, score (2) for disagree, score (3) for uncertain, score (4) for agree and score (5) for strongly agree. The total score equal 45 and it was classified into acceptance and not acceptance as follows: acceptable ≥ 55% score = ≥ 24.75 not acceptable < 55% score = < 24.75.

Validity of the study tools:

The tools were reviewed by five juries of experts in maternity nursing to test the validity of the content. According to expert suggestions, tools have been modified. This modification included changing some words to be easy to understand.

Reliability of the tools

Internal consistency and a reliability coefficient (Cronbach's alpha) of (0.881) for the components of the knowledge questionnaire are tested by SPSS software. The Crobach's alpha for attitude and acceptability scales are (0.602 and 0.738) respectively and this indicate valid tools.

Ethical consideration

Written consent was obtained from the women who participated in the sample. They were reassured about the confidentiality of the information. They were informed about their rights to refuse participation or withdraw at any time. The study maneuvers couldn't entail any harm to participants. Privacy, safety and confidentiality of the collected data were absolutely assured the whole study. The result was used for the purpose of publication and education.

Pilot study

The pilot study was carried out on 10% (13 women) of the study sample to ascertain the clarity and applicability of the tool The tool were tested to confirm that the questions were suitable, easy to understand, cover the aim of the study and carry the same meaning that they designed for it. Also, the pilot study helped to estimate the time needed to complete the data collection. The result of pilot study indicated that the statement of the questionnaire was clear and relevant and few words were modified to be easily understood. The pilot sample excluded from the study based on modification.

Method

- An official letter from faculty of nursing, Mansoura University was directed to the director of Mansoura university hospitals and head of obstetrics and gynecology department to obtain the official permission to conduct the study after explaining its purpose.

- The researcher attended the fertility unit four days per week from 9 Am to 1 Pm until the calculated sample size was obtained.

- The researcher introduced herself to infertile women and obtained their consent to participate in the study after the aim of the study. The woman was informed of the voluntary nature of the study. After they provided informed consent.

- Each woman was interviewed separately to give her a chance to talk freely

- The researcher asked the women about socio-demographic data, medical and surgical history, menstrual history, duration and cause of infertility, their knowledge about ART practice, and their attitude and acceptance about ART practice.

- The researcher was being attending fertility care unit until the predetermined sample size was included in the study.

Statistical analysis

Data collected, computed and analyzed were statistically analyzed using SPSS (statistical package of social sciences), version 16. Data were presented as frequency and percentages (qualitative variables) and mean ± SD (quantitative continuous variables). The t-test was used to compare continuous quantitative variables and one way Anova (F test) was used for comparison of continuous quantitative variables. For continuous quantitative variables which were not normally distributed, Median was used as a central tendency measures and Mann Whitney test (Z) was used. Pearson's correlation was used to find correlation coefficient (r) of two quantitative variables. The difference was significant at $P \leq 0.05$.

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3. RESULTS

Table (1): Frequency distribution of the studied group according to their socio demographic characteristics.

Character	Items	n=130	%
Age (years)	<25 25-30 31-36 37-42	19 47 44 20	14.6 36.2 33.8 15.4
	Range: 18-42 years, Mean ± SD = 30.31 ± 5.48 years		
Education	Basic and less Secondary University Post graduate	36 66 27 1	27.7 50.8 20.8 0.8
Occupation	Working House wife	25 105	19.2 80.8
Residence	Rural Urban	104 26	80.0 20.0
Income	Not enough Enough Enough and save	11 107 12	8.5 82.3 9.2
Religion	Muslims Christians	122 8	93.8 6.2

Table (1) shows the frequency distribution of the studied group according to their socio demographic characteristics. It was revealed that mean age of the studied group was 30.31 ± 5.48 years. About one half (50.8%) were secondary education; the majority of studied group (80.8%, 80.0%, 82.3%) were house wife, from rural area and having enough income respectively. Most of them (93.8%) were Muslim.

Table (2): Frequency distribution of the studied group according to their reproductive history

Reproductive History	Items	n=130	%
Duration of marriage (years)	< 5 5-10 >10	36 58 36	27.7 44.6 27.7
	Range: 1-23 , Mean ± SD = 8.53 ± 5.15 , Median = 7.5 years		
Number of pregnancy	None 1-2 ≥ 3	59 61 10	45.4 46.9 7.7
Number of delivery	None 1-2 >2	87 42 1	66.9 32.3 0.8
Number of Abortion	None 1-2 ≥3	93 32 5	71.5 24.6 3.9
Number of live children	None 1-2	94 36	72.3 27.7
Number of still birth	None 1-2	121 9	93.1 6.9

Table (2) shows that the duration of marriage was less than 5 years in (27.7%), 5-10 years in (44.6%) and more than 10 years in (27.7%) with median 7.5 years. Nearly half (45.4%) of the studied group reported that they never get pregnant, (66.9%) never deliver at all. Only (27.7%) of the studied women had live children and (6.9%) reported still birth.

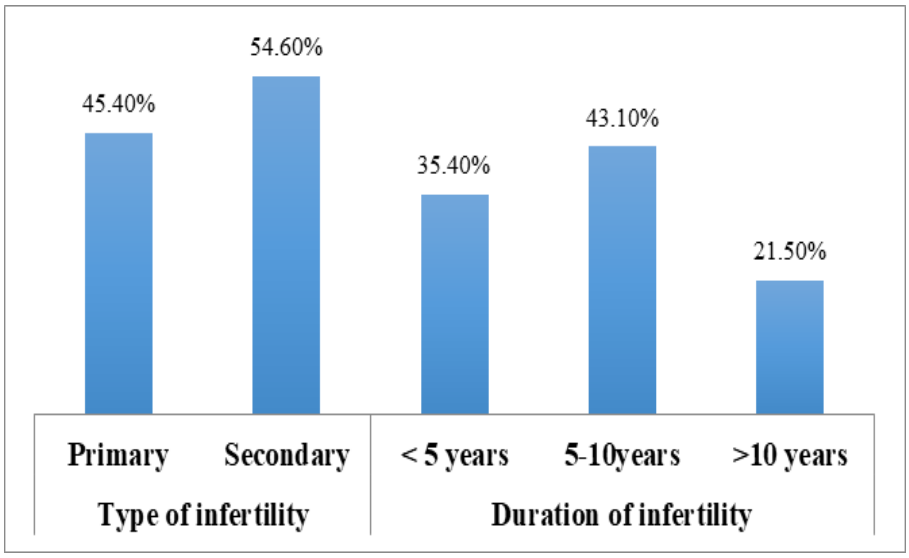

Figure (1): Frequency distribution of the studied group according to their type and duration of infertility

Figure (1) Shows frequency distribution of the studied group according to their type and duration of infertility. Primary infertility represents (45.4%) while secondary infertility represents (54.6%). Duration of infertility was less than 5 years in (35.4%), 5-10 years in (43.1%) and more than 10 years in (21.5%) of the studied women.

Table (3): Frequency distribution of the studied group according to their knowledge levels

Knowledge levels	No	%
Poor (<50.0%)	83	63.8
Fair (50.0 - <75.0%)	35	26.9
Good (≥ 75.0%)	12	9.2

Table (3): Show the frequency distribution of the studied group according their knowledge level about assisted reproductive technology. Around two third (63.8%) of the studied group had poor knowledge, while fair knowledge represented (26.9%) and good knowledge represented less (10.0%).

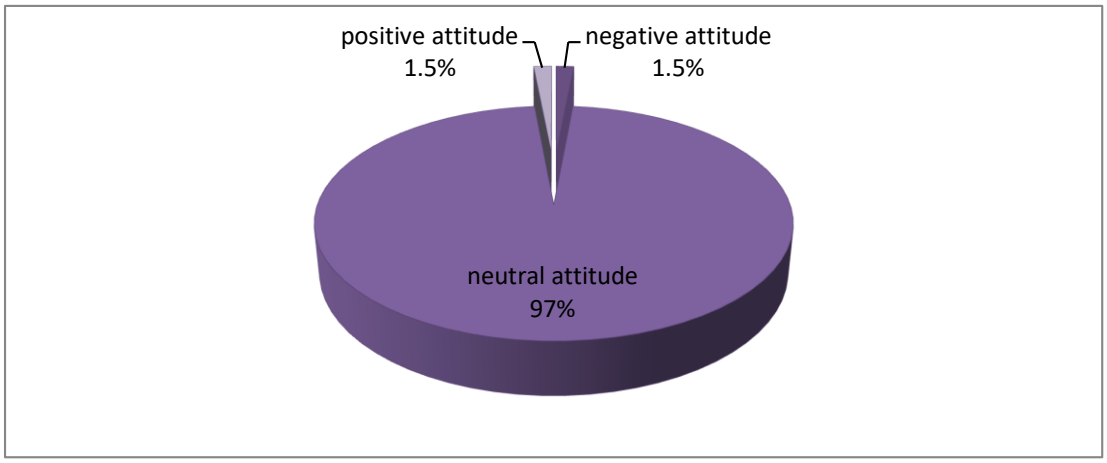

Figure (2): Attitude level of the studied group toward assisted reproductive technology

Figure (2) Shows that most of the studied group had a neutral attitude (97.0%), while the percentage of positive or negative attitude is 1.5% for each.

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Table (4): Frequency distribution of the studied group according to their acceptability toward assisted reproductive technology (n=130)

No	Items	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
		1	2	3	4	5
1	Religion is against assisted reproductive technology	43 33.1	62 47.7	21 16.2	4 3.1	0 0.0
2	Assisted reproductive technology has no effect on reduction of infertility	0 0.0	8 6.2	30 23.1	80 61.5	12 9.2
3	Assisted reproductive technology is a good option for infertile couple desiring children	6 4.6	24 18.5	30 23.1	54 41.5	16 12.3
4	Assisted reproductive technology is against our culture	1 0.8	4 3.1	33 25.4	73 56.2	19 14.6
5	Side effects of assisted reproductive technology are harmful to the fetus	4 3.1	29 22.3	87 66.9	9 6.9	1 0.8
6	Side effects of assisted reproductive technology are harmful to the mother	3 2.3	33 25.4	82 63.1	9 6.9	3 2.3
7	Husbands only should make decisions about assisted reproductive technology	4 3.1	46 35.4	37 28.5	35 26.9	8 6.2
8	Decision about assisted reproductive technology should be joint-wife and husband	1 0.8	2 1.5	4 3.1	56 43.1	67 51.5
9	Assisted reproductive technology is too expensive to warrant neglecting it	0 0.0	3 2.3	5 3.8	38 29.2	84 64.6
Total attitude score		Range = 23.0 – 38.0		Mean ± SD= 30.41 ± 2.66		

Table (4) shows the frequency distribution of the studied group according to their acceptability of assisted reproductive technology. The response agree and strongly agree of varies to different statements; being highest for statement "Decision about Assisted Reproductive Technology should be joint-wife and husband" (94.4%) and lowest for the statement "Religion is against Assisted Reproductive Technology" and "Side effects of Assisted Reproductive Technology are harmful to the fetus" (3.1 to 7.7%). The total average score = 30.41 ± 2.66**.**

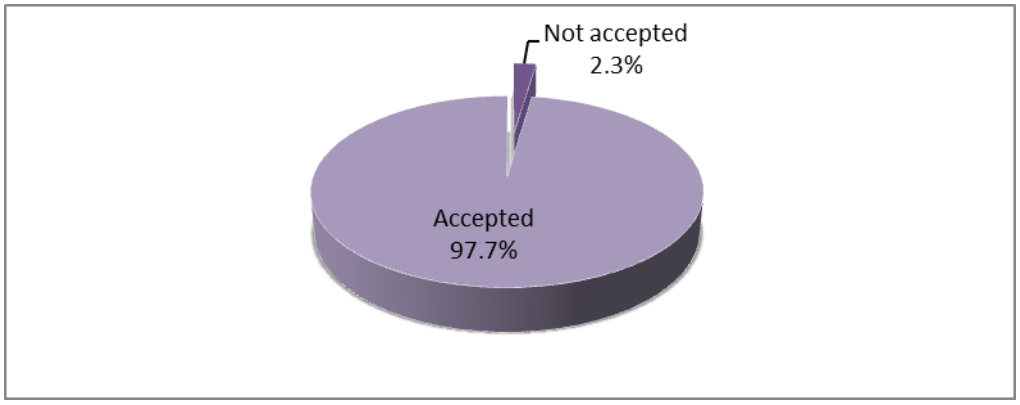

Figure (3): Acceptability level of the studied group toward assisted reproductive technology

Figure (3) Shows that most of the studied group accepted them (97.7%), while the percentage of not accepted is (2.3%) only.

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Table (5): Relationship between knowledge, attitude & acceptability scores of the studied group toward assisted reproductive technology and their socio- demographic characteristics (n=130)

Character	Items	No	Knowledge score	Attitude Score	Acceptability score
			Median (min-max)	Mean ± SD	Mean ± SD
Age (years)	<25 25-30 31-36 37-42	19 47 44 20	1.0 (0.0-20.0) 8.0 (0.0-19.0) 7.5 (0.0-19.0) 10.5 (0.0-18.0)	28.11 ± 2.08 27.43 ± 2.82 28.75 ± 2.75 28.65 ± 1.93	29.63 ± 2.52 30.04 ± 2.96 31.04 ± 2.10 30.06 ± 2.94
Significance test			χ^{2*}=9.897,P0.019	F=2.282,P0.082	F=1.749,P0.160
Education	Basic and less Secondary University	36 66 28	5.0 (0.0-19.0) 7.0 (0.0-20.0) 9.0(0.0-18.0)	28.92 ± 2.60 27.94 ± 2.32 27.70 ± 3.21	30.78 ± 3.03 30.35 ± 2.68 30.00 ± 2.04
Significance test			χ^{2}=5.768,P0.056	F=2.184,P0.117	F=0.587,P0.558
Occupation	Working House wife	25 105	8.0 (0.0-17.0) 7.0 (0.0-20.0)	26.68 ± 2.95 28.51 ± 2.41	30.76 ± 2.17 30.32 ± 2.76
Significance test			Z=0.678,P0.498	t=3.265,P0.001	t=0.737,P0.463
Residence	Rural Urban	104 26	6.5 (0.0-20.0) 9.0 (0.0-2180)	28.21 ± 2.64 27.96 ± 2.55	30.33 ± 2.72 30.73 ± 2.41
Significance test			Z=1.062,P0.288	t=0.434,P0.665	t=0.692,P0.490

Table (5) shows that the median knowledge score is significantly differ by age and education, being higher among older age above 25 years and those with high education, As regard the average total score of attitude, it is significantly lower among working women. As regard the average total score of acceptability, it is not significantly differ in relation to socio-demographic characteristics.

Table (6): Relationship between knowledge, attitude & acceptability scores of the studied group toward assisted reproductive technology and their reproductive history (n=130)

History	Items	No	Knowledge score	Attitude Score	Acceptability score
			Median (min-max)	Mean ± SD	Mean ± SD
Duration of marriage (years)	< 5 5-10 >10	36 58 36	4.5 (0.0-20.0) 8.0 (0.0-19.0) 8.5(0.0-19.0)	27.42 ± 2.60 28.02 ± 2.69 29.14 ± 2.26	30.03 ± 2.52 30.19 ± 2.69 31.14 ± 2.65
Significance test			χ^{2}=7.190,P0.027	F=4.261P0.016	F=1.988,P0.145
Number of delivery	None 1-2 >2	87 42 1	9.0 (0.0-20.0) 4.5 (0.0-18.0) 3.0(3.0-3.0)	28.13 ± 2.69 28.26 ± 2.51 27.00 ± 0.00	30.47 ± 2.60 30.19 ± 2.82 34.00 ± 0.00
Significance test			χ^{2}=6.111,P0.047	F=0.135,P0.016	F=1.082,P0.342
Number of live children	None 1-2	94 36	8.0 (0.0-20.0) 4.0 (0.0-17.0)	28.03 ± 2.67 28.50 ± 2.49	30.64 ± 2.57 29.80 ± 2.81
Significance test			Z=2.565,P0.010	t=0.912,P0.364	t=1.610,P0.110
Duration of infertility	< 5 years 5-10 years >10years	46 56 28	4.5 (0.0-20.0) 8.0 (0.0-19.0) 11.5(0.0-19.0)	27.24 ± 2.44 28.66 ± 2.57 28.68 ± 2.28	30.04 ± 2.52 30.32 ± 2.61 31.18 ± 2.88
Significance test			χ^{2}=10.970,P0.004	F=4.674,P0.011	F=1.659,P0.194

Table (6) shows that the median knowledge score is significantly higher among those with longer duration of marriage (>10 years), nulliparous, not having children and with longer duration of infertility (>10 years). As regard average total attitude score, is significantly higher among those with longer duration of marriage (>10 years), nulliparous & with 1-2 delivery, and with longer duration of infertility (>10 years).

Table (7): Relationship Between knowledge, attitude and acceptability scores of the studied group toward assisted reproductive technology (130)

Variables of correlation	R	P
Knowledge and attitudes scores	0.074	0.403
Knowledge and acceptability scores	0.177	0.044
Attitude and acceptability scores	0.292	0.001

Table (7) shows that there was negligible relationship between knowledge and attitude scores. While there was significant, positive, mild relationship between acceptability score in both knowledge (r=0.177, P0.044) and attitude scores (r=0.292, P0.001).

4. DISCUSSION

The aim of the present study was to assess the knowledge, attitude, and acceptability of assisted reproductive technology (ART) among infertile women .The findings of the present study revealed that around two third of the studied women had poor knowledge about ART, also the majority of the studied women had a neutral attitude regard ART, and Else, the majority of the studied women accepted ART, so the findings of the present study answered the research questions.

The present study results revealed that the age of the studied group ranged from18 to 42 years, about one half was secondary education and the majority of them were a housewife. These findings were in agreement with ***Adesiyun et al. (2011)*** who assess awareness and perception of assisted reproductive technology practice among women with infertility in Nigeria who explored that the age of the studied group ranged from 18 to 46years, nearly half were secondary education and majority were not working or partial working. This agreement may be due to the studies were done in a public setting which helps in the cost of diagnosis and treatment.

While the current study findings were in contrast with ***Adenik, et al., (2014)*** who assess level of awareness and perceptions of assisted reproductive technology in Nigeria who found that above half of study group had tertiary level education and near half were worked. Also, the present study findings were in contrast with ***Afshani, et al., (2016)*** who study the attitudes of infertile couples towards assisted reproductive techniques in Yazd, Iran who found that two-thirds of participants had a job. This contrast may be due to increasing social and financial pressure of infertility in the developing countries on housewives.

The present study showed that three-quarter of the studied groups never delivers at all. These findings of the present study were in agreement with ***Omokanye, et al., (2017)*** who assess utilization of assisted reproductive technology services in Ilorin, Nigeria who found that nearly three-quarter of study subjects never deliver at all. While the current study findings were in contrast with ***Dattijo, et al., (2016)*** who found that nearly half of respondents never deliver at all. This contrast may be due to the different distribution of infertility all over the world.

The present study revealed that nearly half of the studied group had primary infertility, above one-third of the studied group their duration of infertility was less than 5 years. This result was in a line with ***Omokanye, et al., (2017)*** who found that above one third had primary infertility and above one third their duration of infertility was less than 5 years.

While the current study findings were in contrast with ***Adenik, et al., (2014)*** who found that above two third had infertility for less than 5 years. This contrast may be due to increase infertility awareness in the urban countries and early seeking in the first years of diagnosis.

The current study findings revealed that nearly two-thirds of the studied group had a poor knowledge of assisted reproductive technology (ART). This finding was in agreement with ***Pourmasumi, et al., (2016)*** who study knowledge of infertile couples about assisted reproductive technology in Iran who found that about two-thirds of patients knew approximately half of the information about reproductive methods.

Similarly, the present study findings were in agreement with ***Abolfotouh, et al., (2013)*** who study knowledge, attitude, and practices of infertility among Saudi couples at King Abdul-Aziz medical city who revealed that two third had poor knowledge. This agreement in these studies may be due to ART is a neglected issue in community care, even in developed countries with high education; there is a lack of knowledge regarding this issue. Also, the lack of ART centers especially in rural areas.

While the present study was in contrast with ***Gundla, (2011)***who describe the knowledge and attitude of infertile women regarding assisted reproductive techniques in Bangalore, who found that above two third of the studied women had moderately adequate knowledge about assisted reproductive technologies. This contrast may be due to ART is an important issue for health public education in urban countries.

The present study findings revealed that the majority of the studied women had a neutral attitude. This finding was in a line with ***Gundla, (2011)*** who found that a majority had a neutral attitude regarding Assisted Reproductive Techniques.

While the present study was in disagreement with ***Mohamed, (2015)*** who found that the majority had a positive attitude toward ART. Also, these findings were in contrast with ***Wennberg, et al., (2016)*** who assess attitudes towards new assisted reproductive technologies in Sweden who demonstrated that majority of women were positive towards oocyte cryopreservation and most novels assisted reproductive technologies. This disagreement may be due to misconceptions regarding ART so different cultures refuse ART and prefer pregnancy naturally.

The current study findings revealed that most of the studied group accepted ART. This result was in agreement with ***Fabamwo & Akinola, (2013)*** who study the understanding and acceptability of assisted reproductive technology among infertile women in Nigeria who found that most of the studied groups accept ART. Also, this finding of the present study was supported by ***Obioha, et al., (2014)*** who study knowledge and attitude of nurses towards in-vitro fertilization in Nigeria who showed that most of the studied groups were accepted ART. Moreover, the present study results were in disagreement with ***Adenik, et al., (2014)*** who found that above three quarter were accepted ART.

While, the current study finding was in contrast with ***Ali, et al., (2011)*** who study knowledge, perceptions, and myths regarding infertility among the selected adult population in Pakistan who demonstrated that above half of the studied group was unacceptable. This contrast may be due to decrease ART service acceptability in different countries due to different causes such as the cost, lack of ART centers, and lack of ART knowledge.

The present study findings revealed that there was a relationship between women's total knowledge score regarding ART and the age. The median knowledge score significantly differed by age, being higher among older age above 25 years. The current study findings were in the same line with ***Pourmasumi, et al., (2016)*** who found that there was a direct significant relationship between the general knowledge and age, the older the people are, the more is their general knowledge. This agreement may be due to the majority married in 25-34 and more concerned about infertility in terms of social and cultural impacts, thereby increasing their offer in fertility clinics and taking more knowledge about ART.

The present study results revealed that the median knowledge score is significantly differing by education being higher among high education. The present study findings were in agreement with ***Pourmasumi, et al., (2016)*** who found that there were significant correlations between general knowledge and education, in a way that the more the educational level, the more the knowledge.

Moreover, the present study finding was supported by ***Adenik, et al. (2014)*** who showed that there is a statistically significant relationship between awareness of ART and educational status, as the level of education increases the tendency for higher awareness. This agreement may be due to the ability of learners to recognize ART from many sources of information. Increased years of schooling have also been shown to lead to greater tolerance and acceptance of new ideas and technologies.

The present study results revealed that women's total knowledge score regarding ART is significantly higher among those with longer duration of infertility above 10 years. This result was parallel to ***Omokanye, et al., (2017)*** who found that duration of infertility had a significant influence on awareness of ART; the women who had a longer duration of infertility were more likely to have good knowledge of ART.

Furthermore, the present study finding was supported by ***Adenik, et al. (2014)*** who showed that There is a statistically significant relationship between ART awareness and the duration of infertility. This agreement may be due to women who have suffered for 5 years or more are more likely to choose ART, unlike women who have suffered less than 5 years. They know the period of their perception and seek before they deteriorate.

The present study findings revealed that there was a significant correlation between attitude toward ART and occupation of the studied group. These findings were at the same line with ***Gundla, (2011)*** who found that there was a statistically significant association between level of attitude and occupation.

The present study results reported that the average of total attitude score was significantly higher among those with longer duration of infertility. The present study findings were in contrast with ***Adenike, et al., (2014)*** who found that women who had been infertile for 5 years or more were less likely to choose ART, unlike women who had suffered less than 5 years. This contrast may be due to reflection of frustration and mistrust in medical services with infertility progress and thus calls for strong attention to new attendees.

The present study findings revealed that the average total attitude score of the studied group was significantly different with the number of delivery. This result was in agreement with ***Omokanye, et al., (2017)*** who demonstrated that parity significantly influenced the attitude of ART services.

The present study findings illustrated that the average total acceptability regarding ART was not significantly different in relation to socio-demographic characteristics. These study findings were in a line with ***Adenik, et al., (2014)*** who found that there were no statistically significant differences between couple's acceptability toward ART and socio-demographic characteristics.

The present study findings clarified that there was negligible relationship between knowledge and attitude scores. These study findings were in contrast with ***Gundla, (2011)*** who found that there was a positive correlation between the knowledge and attitude of infertile women.

The present study results reported that there was significant, positive, mild relationship between acceptability score in both knowledge and attitude scores. This result of the present study was supported by ***Fortin & Abele, (2016)*** who assess the increased length of awareness of assisted reproductive technologies fosters positive attitudes and acceptance among women in the united states who found that women with a longer length of awareness of ART had a significantly greater attitude and acceptability towards ART.

Else, this study finding was in agreement with ***Adenik, et al., (2014***) who found that there was a significant statistical relationship between the participant's awareness of ART and their acceptability to ART, as the infertile couples were more aware of the ART, their acceptability towards new therapeutic methods was more positive.

5. CONCLUSION

The study concluded that around two third of the studied group had poor knowledge about assisted reproductive technology**,** most of the studied group had a neutral attitude toward assisted reproductive technology and the most of them accepted assisted reproductive technology. Also, the study results revealed that the median knowledge score was significantly difference by age and education, being higher among older age above 25 years and those with high education and longer duration of infertility. There was negligible relationship between knowledge and attitude scores, while there was significant, positive, mild relationship between acceptability score in both knowledge and attitude scores.

6. RECOMMENDATIONS

In view of the findings arising from the present study, we recommend that:

1. Developing assisted reproductive technology programs to increase infertile women's knowledge and attitude regarding assisted reproductive technology.

2. Designing and applying different training methods, workshops, booklets, brochures and training videos by health care providers to increase the women's knowledge of infertility issues and ART.

Further research is proposed in this field to:

1. Investigate the effect of health education materials regarding ART on the women's knowledge and attitudes toward ART.

2. Investigate knowledge and attitude of nurses toward ART.

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CONFLICTS OF INTEREST DISCLOSURE

The authors declare that there is no conflict of interest.

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