

Role of Nurse in Administrating Induction of Ovulation Medications at Assisted Reproduction Center versus at Home

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Abstract

Background: The response of ovaries during controlled ovarian stimulation is the most important factor for evaluating the pregnancy outcome in assisted reproductive techniques. **Aim:** The study is to assess the role of a nurse in giving induction of ovulation medications at assisted reproduction university center versus home medications by private In Vitro Fertilization and infertility center on clinical outcomes and patient satisfaction. **Subjects and Methods:** Case-control research design, conducted at two centers (Banon private center for IVF and Assisted Reproductive Unit at Women health hospital, Assiut University) during the period from February 2018 to November 2018. The sample size included 150 women undergoing IVF for each group. **Results:** There is no statistically significant difference between women given IVF medications by the nurse at the public IVF center and women take IVF medication in the home at Banon IVF center as regards the outcome of IVF. Majority of infertile patients are satisfied with the care, they received and nearly third of them are satisfied with outcome of IVF in both groups, and there is statistically significant difference between satisfaction in public IVF center and satisfaction in private center in relation to information provided about IVF procedure, staff willingness to listen carefully and help patients; regular progress update on condition is in place with p value (0.000, 0.005, 0.003) respectively. **Conclusion:** IVF outcome isn't significantly related to where induction medication was taken either at IVF center or at the home because infertile couples are keen to comply with all instructions on how to take medications with correct route, correct dose and on time. **Recommendations:** Empower the role of nurse as a health educator for women under-

going IVF about importance of stage of induction and take medications with correct route, correct dose and on time on outcome of IVF; other studies should also be conducted in other centers to further investigate the issue.

Keywords

Induction of Ovulation, IVF, Patient' Satisfaction

1. Introduction

After more than 20 years of research, the first IVF child was conceived in England in 1978 and as a result of using IVF technique; more than 250,000 children were conceived from this point forward [1].

The response of ovaries during controlled ovarian stimulation is the most significant factor in evaluating the pregnancy outcome in assisted reproductive technique [2].

The response of ovaries to stimulation with exogenous gonadotropins during IVF is a critical determining factor of live birth rates and adverse outcomes [3].

Poor response to ovarian stimulation, which resulted in cycle cancelation, was defined as a serum E2 level of ≤ 500 pg/mL and \leq two follicles > 16 mm seen on transvaginal ultrasonography on the day of human chorionic gonadotropin (hCG) administration [4].

Patients' satisfaction with medical care is increasingly acknowledged to be one of the fundamental dimensions of quality of care, and particularly so when it comes to treatment in aid of infertility [5].

Patient satisfaction is an important and commonly used indicator for measuring quality in health care. Patient satisfaction affects clinical outcomes, patient retention, and medical malpractice claims. It affects the timely, efficient, and patient-centered delivery of quality health care. Patient satisfaction is thus a proxy but a very effective indicator to measure the success of doctors and hospitals [6].

Although infertile couples are consulting gynecologists for therapy, a nurse-midwife is the first care provider to contact the couples. Nurse-midwives are responsible to provide holistic care to couples with infertility problems [7].

The IVF nurse performs a significant role in the care received by both recipient and donor, as a coordinator for IVF cycles and provides direct care to both patients. According to one study, the nurse is the professional who spends the most time with donors compared with doctors and mental health professionals. They also play a major role in matching donors/recipients. In another study, 73% of nurses practicing in infertility settings described their primary role in direct patient care [1].

Morris studied the role of infertility nurses in ovulation induction programs and found that nurses performed intrauterine inseminations in 39% of units and

23% of units decided to institute hormonal therapy such as the administration of human chorionic gonadotrophin, and nurses performed transvaginal scans in 77% of units.

Significance of the study

Infertility is estimated to be as high as 186 million individuals globally. Recent global demographic surveys reveal that infertility continues to be a reproductive problem, in spite of the massive global increase of ART services over the past decade. It is estimated that infertility affects 8 to 12 percent of reproductive-age couples around the world. However, the infertility rates are much higher in some regions of the world, reaching 30% in some regions [8].

Ovarian stimulation in IVF is considered to be a critical factor for clinical outcomes. Poor ovarian response (POR) to controlled ovarian hyperstimulation is one of the key problems in assisted reproductive technology and has been reported to occur in 9 - 24 percent of women with IVF that can result in cycle canceling [7].

Increasing patient satisfaction with IVF services, treatments and facilities has a positive effect on patients' psychological and mental state and, in turn, has an impact on the outcome of treatments and dropout rates of treatment [5]. So, this study will shed more light on whether outcomes of IVF in women taken IVF medications in IVF center better than women took IVF medications at the home and patient satisfaction with IVF services in two centers.

2. Aim of the Study

The aim of this study was to:

- 1) Assess role of the nurse in giving induction of ovulation medications at assisted reproduction center versus home medications by private IVF center on outcomes of IVF;
- 2) Evaluate patient satisfaction in both centers.

3. Material and Methods

Research design: It was a case-control design study.

The setting of the study: The study was conducted at two centers (Banon private center for IVF and Assisted Reproductive Unit at Women Health Hospital, Assiut University) during the period from February 2018 to November 2018.

3.1. Sample

A systematic random sample was used in this study. Random assignment was done by computer-generated tables. The Sample was calculated by using (Epi-info statistical package, version 7.2 which designed by CDC (center for disease control and prevention) with 80% power, a value of 2.5 is chosen at the acceptable limit of precision (D) at 95% confidence level (C1) with expected prevalence 10%, worst acceptable 25%. accordingly, sample size was estimated to be 150 for each group + 10% of individual to guard against non-despondence rate.

Inclusion criteria:

- 1) Women undergoing IVF treatment
- 2) Women who agree to participate in the study

Exclusion criteria:

- 1) Women who had any medical problems
- 2) Women who were older than 37 yrs
- 3) Women with signs of reduced ovarian reserve as elevated FSH levels

3.2. Tools

Tools of the study: Tool no. (1) Structured interviewing questionnaire include

Part I: Personal data that was included: Name, age, residence, educational level, occupation, and duration of the marriage.

Part II: clinical data:

1) **Medical history** was included: the history of diabetes, hypertension, renal disease, cardiac disease, hepatic disease, and any other diagnosed medical disease.

2) **Menstrual history** was included: Age of menarche, Duration, Interval, and rhythm

3) **Infertility history** was included: years of infertility, type of infertility, cause of it, previous trial for ART, previous failed IVF.

4) **Past obstetric history** was included: number of gravidities, number of parity, number of abortion, No of living children, time since last delivery or abortion.

Tool no. (2): Assessment questionnaire about IVF medications and outcomes of IVF treatment

Part I Data related to IVF medications

- Name of medication given -Person who gives it (doctor-nurse-others)
- Where IVF medications were taken -Any problems with medications
- Time of giving medications according to the followed protocol.

Part II Outcome of IVF treatment

- Cycle cancellation and why -Clinical pregnancy -Multiple pregnancy
- Do not achieve pregnancy -Early abortion -Ectopic pregnancy

Tool (3) Scale of patient satisfaction about IVF

- Satisfaction about information provided.
- Satisfaction about staff communications & counseling and support.
- Satisfaction about environmental conditions& waiting time.
- Satisfaction with the outcome of IVF.

The patients' evaluation of treatment questions about satisfaction was presented on a 7-point Likert scale.

1 represents "Completely dissatisfied"; 2 represents "Mostly dissatisfied"; 3 represents "Somewhat dissatisfied"; 4 represents "neither satisfied nor dissatisfied", 5 represents "Somewhat satisfied"; 6 represents "Mostly satisfied" and 7 represents "Completely satisfied".

3.3. Methods

Methods of data collection:

- ✚ A review of national and international related literature of the current study using textbooks, articles and scientific journals was done. Then the tool was prepared based on this literature and it was reviewed for validation by supervisors.
- ✚ Before conducting the study official permission was obtained from the manager of Banon center and Assisted Reproductive Unit of Women's Health Hospital after explaining the purpose of the study.
- ✚ The study was carried out during the period from February (2018) to November (2018).
- ✚ The study was conducted at Banon center and Assisted Reproductive Unit of Women health hospital and was included a simple random sample of Women undergoing IVF treatment.
- ✚ Every center follows a different protocol about where IVF medications of induction were taken, Assisted Reproductive Unit of Women health hospital follow the protocol of giving induction medication at the center by nurses to ensure that injections were given with correct route, dose and on time. But in Banon center women taken medications at the home. So the participants were divided into two groups.

Group one (case group) was given IVF medications by a nurse at the public IVF center.

Group two (control group) was given IVF medication at home at Banon IVF center.

❖ Assessment phase

- The researcher interviewed the women face to face; each interview took about 15 - 30 minutes with each woman, the researcher interviewed the woman at the stage of induction of ovulation, and at the beginning of each interview, the researcher greeted, introduced herself to the woman after that the researcher explained the nature and aim of study, and then an oral consent to participate in the study was obtained from each woman.
- Then, the researcher assessed the following data
 - 1) Personal data, menstrual history, infertility history & past obstetric history if present.
 - 2) Data related to IVF medications (Name of medication given, person who gave it (doctor-nurse-others), where IVF medications were taken, time of giving medications according to the followed protocol, any problems with medications).
 - 3) Patient's satisfaction scale
 - Satisfaction about information provided.
 - Satisfaction about staff communication & counseling and support.
 - Satisfaction about environmental conditions & waiting time.
 - Satisfaction with the outcome of IVF.

The patients' evaluation of treatment questions about satisfaction was presented on a 7-point Likert scale.

1 represents "Completely dissatisfied"; 2 represents "Mostly dissatisfied"; 3 represents "Somewhat dissatisfied"; 4 represents "neither satisfied nor dissatisfied", 5 represents "Somewhat satisfied"; 6 represents "Mostly satisfied" and 7 represents "Completely satisfied".

❖ **Follow up phase**

Follow-up of the women after implantation of the embryo was carried out through the phone.

1) **After 14 days from embryo transfer**, follow-up included the confirmation of pregnancy chemically by measuring the β subunit of the HCG in the blood after 14 days from embryo transfer.

2) **With in the first trimester**, follow-up included asking about the occurrence of any complications as ectopic pregnancy & early abortion.

❖ **Evaluation phase**

The researcher evaluated & compared the outcome of IVF in each group to detect the effect of giving IVF medications at public IVF center by nurses versus home medications by private IVF center on outcomes of IVF.

❖ **Pilot study**

A pilot study was carried out on 10% of cases to test the clarity of the questions and to detect any further problems or difficulties that help in making the necessary modification. There wasn't any modification on the tool and the pilot sample was included in the total sample.

❖ **Ethical considerations:**

1) Research proposal was approved from the Ethical Committee in the Faculty of Nursing.

2) There was no risk of study subjects during the application of the research.

3) The study was followed by common ethical principles in clinical research.

4) Written consent was obtained from each patient or guidance that was willing to participate in the study.

5) Confidentiality and anonymity were assured.

6) Patients privacy was considered during the collection of data.

❖ **Statistical design**

Data entry and statistical analysis were done using the statistical package for social science program (SPSS. version 22). Qualitative variables were presented as number and percentage. Quantitative variables were presented as mean \pm SD. A comparison between qualitative variables was done by using chi-square. A comparison between quantitative variables was done by using the student t-test.

4. Results

The socio-demographic (**Table 1**) characteristics of the study sample, nearly half of the women in both groups were 30 - 37 yrs old. As for residence, the vast

Table 1. Distribution of studied women according to their Socio-demographic characteristics of both groups.

| Sociodemographic characteristics | Where induction medications were taken | | | | P-value |
|----------------------------------|----------------------------------------|--------|-----------------|-------|---------|
| | At IVF Center N = 150 | | At home N = 150 | | |
| | N | % | N | % | |
| Age (years) | | | | | |
| <25 yrs | 19 | 12.7% | 27 | 18% | 0.440 |
| 25 - 30 yrs. | 52 | 34.7% | 49 | 32.7% | |
| 30 - 37 yrs | 79 | 52.7% | 74 | 49.3% | |
| Mean ± SD | 29.7 ± 4.3 | | 28.8±4.5 | | |
| Residence: | | | | | *0.009 |
| Urban | 32 | 21.3% | 55 | 36.7% | |
| Rural | 118 | 78.7% | 95 | 63.3% | |
| Educational level: | | | | | *0.002 |
| Illiterate & read and write | 31 | 20.7% | 16 | 10.7% | |
| Basic education | 22 | 14.7 % | 9 | 6% | |
| Secondary | 72 | 49 % | 99 | 66% | |
| High education | 25 | 16.7% | 26 | 17.3% | |
| Occupation: | | | | | 0.514 |
| Employee | 24 | 16 % | 20 | 13.3% | |
| House wife | 126 | 84 % | 130 | 86.7% | |
| Years of marriage: | | | | | 0.542 |
| Less than 1yr | 1 | 0.7% | 1 | 0.7% | |
| 1 - 5 yrs | 48 | 32% | 59 | 39.3% | |
| 5 - 10 yrs | 65 | 43.3% | 54 | 36% | |
| More than 10yrs | 36 | 24% | 36 | 24% | |

*means significant P value.

majority of women in assisted reproduction center in women health hospital were from rural areas (78%) versus nearly half of women in Banon center were from rural areas (63.3%). As for level of education, half of the women in the assisted reproduction center in women health hospital had secondary education (49%) while nearly two-thirds of women in Banon center had secondary education (66%) and the vast majority of the women in both groups were housewives (84%, 86.7%) respectively.

There is a significant difference between women in assisted reproduction center in women health hospital and women in Banon center in relation to residence and level of education with p value (0.009, 0.002) respectively. Regarding Menstrual history (**Table 2**), the most of studied women (85.3%, 80%) had a regular menstrual cycle and it was observed that more than one-third of them had dysmenorrhea in both groups (39.4%, 43.2%) respectively. Regarding the

Table 2. Distribution of studied women according to their menstrual history among both groups.

| | Where induction medications were taken | | | | P-value |
|-----------------------------------------|----------------------------------------|-------|---------|-------|---------|
| | At IVF center | | At home | | |
| | N (150) | % | N (150) | % | |
| Age of menarche | | | | | |
| 10 - 13 yrs | 50 | 33.3% | 49 | 32.7% | 0.901 |
| More than 13 yr | 12 | 8% | 12 | 8% | |
| Don't remember | 88 | 58.7% | 89 | 59.3% | |
| Duration of menstrual blood flow | | | | | |
| Less than 3 days | 1 | 0.7% | 3 | 2% | 0.318 |
| 3 - 5 days | 117 | 78% | 123 | 82% | |
| More than 5 days | 32 | 21.3% | 24 | 16% | |
| Regularity: | | | | | |
| Regular | 128 | 85.3% | 120 | 80% | 0.222 |
| Irregular | 22 | 14.7% | 30 | 20% | |
| Amount of menstrual blood flow | | | | | |
| Scanty | 5 | 3.3% | 7 | 4.7% | 0.607 |
| Moderate | 141 | 94% | 141 | 94% | |
| Heavy | 4 | 2.7% | 2 | 1.3% | |
| Presence of menstrual disorders | | | | | |
| Amenorrhea | 6 | 4% | 1 | 0.7% | 0.136 |
| menorrhagia | 3 | 2% | 1 | 0.7% | |
| Oligo & hypomenorrhea | 2 | 1.3% | 7 | 4.7% | |
| Polymenorrhea | 0 | 0 | 1 | 0.7% | |
| Dysmenorrhea | 59 | 39.4% | 65 | 43.2% | |
| No disorders | 80 | 53.3% | 75 | 50% | |

type of infertility and parity (**Table 3** and **Table 4**), more than two-thirds of studied women in both groups (80%, 71.3%) had primary infertility. Regarding to the causes of infertility it was observed that more than third of studied women (35.3%) in assisted reproduction unit in women health hospital and (32%) in Banon center had a male cause of infertility and the vast majority of studied women in both groups (91.3%, 89.3%) hadn't the previous attempt of IVF.

Regarding outcome of IVF in women in both groups (**Table 5** and **Table 10**), there is no Statistical significant difference between women given IVF medications by nurse at public IVF center and women take IVF medication in the home at Banon IVF center in relation to outcome of IVF and the Multinomial logistic regression (**Table 7**) to identify variables that effect on the outcome of IVF shows that the most variable that effects on pregnancy rate is previous gravidity odds ratio (2.235) followed by occupation and education odds ratio (1.697, 1.244).

Table 3. Distribution of studied women according to their infertility history among both groups.

| | Where induction medications were taken | | | | p-value |
|-------------------------------------------|----------------------------------------|------|---------|-------|--------------|
| | At IVF center | | At home | | |
| | N (150) | % | N (150) | % | |
| Types of infertility | | | | | |
| primary | 120 | 80% | 107 | 71.3% | 0.080 |
| Secondary | 30 | 20% | 43 | 28.7% | |
| Years of infertility | | | | | |
| 1 - 5 years | 58 | 38.7 | 73 | 48.7 | 0.151 |
| 5 - 10 years | 62 | 41.3 | 47 | 31.3 | |
| More than 10 years | 30 | 20 | 30 | 20 | |
| Causes of infertility | | | | | |
| tubal causes | 27 | 18 | 22 | 14.7 | 0.166 |
| ovarian causes | 20 | 13.3 | 25 | 16.6 | |
| Uterine causes | 9 | 6 | 17 | 11.3 | |
| male causes | 53 | 35.3 | 48 | 32 | |
| Unexplained | 40 | 26.7 | 38 | 25.3 | |
| Both partners | 10 | 6.7 | 22 | 14.7 | |
| Previously attempt of IVF | | | | | |
| Yes | 13 | 8.7 | 16 | 10.7 | 0.300 |
| No | 137 | 91.3 | 134 | 89.3 | |
| Number of failed attempt of IVF | 13 | 8.7 | 16 | 10.7 | 0.300 |
| Previous Number of attempt | | | | | |
| 1 time | 6 | 46.1 | 10 | 62.5 | 0.459 |
| 2 times | 5 | 38.5 | 2 | 12.5 | |
| 3 times | 1 | 7.7 | 2 | 12.5 | |
| More than 3 times | 1 | 7.7 | 2 | 12.5 | |
| Duration since last attempt of IVF | | | | | |
| <1 year | 4 | 30.7 | 7 | 43.7 | 0.421 |
| 1 - 5 year | 6 | 46.2 | 7 | 43.7 | |
| >5 years | 3 | 23.1 | 2 | 12.5 | |

Table 4. Distribution of studied women according to their Obstetric history among both groups.

| | Where induction medications were taken | | | | P-value |
|----------------------------|----------------------------------------|-----|---------|-------|--------------|
| | At IVF center | | At home | | |
| | N (150) | % | N (150) | % | |
| Number of gravidity | | | | | |
| No | 120 | 80% | 110 | 73.3% | 0.100 |
| One | 21 | 14% | 20 | 13.3% | |

Continued

| | | | | | |
|------------------------------|-----|-------|-----|-------|-------|
| Two | 6 | 4 % | 14 | 9.3% | |
| Three or more | 3 | 2.1% | 6 | 4% | |
| Number of parity | | | | | |
| One | 7 | 4.7% | 15 | 10% | 0.080 |
| Two | 3 | 2% | 7 | 4.7% | |
| No history of parity | 140 | 93.3% | 128 | 85.3% | |
| Number of abortion | | | | | |
| One - Two | 20 | 13.3% | 23 | 15.3% | 0.242 |
| Three | 1 | 0.7% | 4 | 2.7% | |
| More than three | 1 | 0.7% | 0 | 0 | |
| No abortion | 128 | 85.3% | 123 | 82% | |
| No of living children | | | | | |
| One | 8 | 5.3% | 17 | 11.3% | 0.113 |
| Two | 2 | 1.3% | 4 | 2.7% | |
| No living children | 140 | 93.3% | 129 | 86% | |

Table 5. Outcome of IVF in both groups.

| Outcome | Where induction medications were taken | | | | P-Value |
|-----------------------------|----------------------------------------|-------|------------------------|-------|---------|
| | At IVF center | | At home | | |
| | N = 136 Missed (14) | % | N = 139 Missed (11) | % | |
| 1) Cycle cancellation | 7 | 5.1% | 9 | 6.5% | 0.638 |
| 2) Do not achieve pregnancy | 78 | 56.6 | 68 | 49.3% | 0.223 |
| 3) Clinical pregnancy | 40 | 29.4% | 45 | 32.4% | 0.595 |
| 4) Early abortion | 9 | 6.6% | 13 | 9.4% | 0.403 |
| 5) Multiple pregnancy | 2 | 1.5% | 3 | 2.2% | 0.670 |
| 6) Ectopic pregnancy | 0 | 0 | 1 | 0.7% | 0.322 |

Table 6. Distribution of women's satisfaction about outcome of IVF.

| Outcome of IVF | At public IVF center | | At private IVF center | | p-value |
|------------------------------------|------------------------|-------|------------------------|-------|---------|
| | N = 139 Missed (11) | % | N = 136 Missed (14) | % | |
| Completely dissatisfied | 82 | 60.7% | 73 | 52.5% | 0.149 |
| Mostly dissatisfied | 3 | 2.2% | 1 | 0.7% | |
| Somewhat dissatisfied | 1 | 0.7% | 7 | 5.0% | |
| Neither satisfied nor dissatisfied | 7 | 5.2% | 9 | 6.5% | |
| Completely satisfied | 42 | 31.1% | 49 | 35.3% | |

Table 7. Multinomial logistic regression to identify variable that effects on outcome of IVF.

| Outcome of IVF | Variables | p-value | ODR |
|---------------------------|-----------------------------|---------|--------------|
| Clinical pregnancy | Age | 0.599 | 0.891 |
| | Education | 0.247 | 1.244 |
| | Occupation | 0.260 | 1.697 |
| | Residence | 0.771 | 0.907 |
| | Yrs. of marriage | 0.642 | 0.906 |
| | Gravidity | 0.004 | 2.235 |
| | parity | 0.194 | 0.567 |
| | cause of infertility | 0.091 | 0.810 |
| Early abortion | Age | 0.670 | 1.177 |
| | Education | 0.908 | 1.035 |
| | Occupation | 0.665 | 1.400 |
| | Residence | 0.609 | 0.758 |
| | Yrs. of marriage | 0.754 | 1.112 |
| | Gravidity | 0.777 | 1.169 |
| | parity | 0.580 | 0.611 |
| | Cause of infertility | 0.737 | 0.933 |
| Multiple pregnancy | Age | 0.196 | 0.390 |
| | Education | 0.569 | 0.666 |
| | Occupation | 0.158 | 0.118 |
| | Residence | 0.920 | 0.898 |
| | Yrs. of marriage | 0.633 | 0.698 |
| | Gravidity | 0.996 | 1.323 |
| | parity | 1.000 | 3.744 |
| | Cause of infertility | 0.922 | 0.959 |
| Ectopic pregnancy | Age | 0.490 | 0.230 |
| | Education | 0.457 | 7.827 |
| | Occupation | 0.196 | 1.272 |
| | Residence | 0.569 | 4.116 |
| | Yrs. of marriage | 0.458 | 5.985 |
| | gravidity | 0.998 | 1.723 |
| | parity | 1.000 | 0.216 |
| | Cause of infertility | 0.536 | 1.827 |

Regarding patient's satisfaction in both centers (**Table 8**), the majority of infertile patients are satisfied with the care they received and nearly third of them are satisfied with the outcome of IVF in both groups, and there is statistically

Table 8. Distribution of women's satisfaction about information provided among both groups.

| | Public IVF center | | Private IVF center | | p-value |
|---------------------------------------------------------------------------------------------------------------------------|-------------------|-------|--------------------|-------|---------|
| | N (150) | % | N (150) | % | |
| 1) Information on the chances of success | | | | | |
| Somewhat dissatisfied | 5 | 3.3% | 8 | 5.3% | 0.000* |
| Neither satisfied nor dissatisfied | 10 | 6.7% | 3 | 2.0% | |
| Somewhat satisfied | 38 | 25.3% | 7 | 4.7% | |
| Mostly satisfied | 16 | 10.7% | 20 | 13.3% | |
| Completely satisfied | 81 | 54% | 112 | 74.7% | |
| 2) Information on prognosis, different treatment options, clinical aspects, and possible side effects of treatment | | | | | |
| Completely dissatisfied | 4 | 2.7% | 0 | 0.0% | *0.000 |
| Mostly dissatisfied | 1 | 0.7% | 0 | 0.0% | |
| Somewhat dissatisfied | 33 | 22.0% | 16 | 10.7% | |
| Neither satisfied nor dissatisfied | 13 | 8.7% | 4 | 2.7% | |
| Somewhat satisfied | 19 | 12.7% | 14 | 9.3% | |
| Mostly satisfied | 7 | 4.7% | 38 | 25.3% | |
| Completely satisfied | 73 | 48.7% | 78 | 52.0% | |
| 3) Information about potential health problems of (defects, prematurity) | | | | | |
| Mostly dissatisfied | 6 | 4 % | 0 | 0% | *0.004 |
| Somewhat dissatisfied | 32 | 21.3% | 40 | 26.7% | |
| Neither satisfied or dissatisfied | 18 | 12.0% | 7 | 4.7% | |
| Somewhat satisfied | 17 | 11.3% | 11 | 7.3% | |
| Mostly satisfied | 6 | 4 | 15 | 10% | |
| Completely satisfied | 71 | 47.3% | 77 | 51.3% | |
| 4) Information about medical issues during pregnancy (multiple pregnancies, ectopic pregnancies, etc.) | | | | | |
| Completely dissatisfied | 4 | 2.7% | 0 | 0 | *0.026 |
| Mostly dissatisfied | 1 | 0.7% | 0 | 0 | |
| Somewhat dissatisfied | 36 | 24% | 40 | 26.7% | |
| Neither satisfied nor dissatisfied | 14 | 9.3% | 5 | 3.3% | |
| Somewhat satisfied | 18 | 12% | 13 | 8.7% | |
| Mostly satisfied | 6 | 4% | 15 | 10% | |
| Completely satisfied | 71 | 47.3% | 77 | 51.3% | |
| 5) Information on treatment costs | | | | | |
| Somewhat dissatisfied | 4 | 2.7% | 0 | 0% | *0.000 |
| Neither satisfied nor dissatisfied | 9 | 6.0% | 0 | 0% | |
| Somewhat satisfied | 32 | 21.3% | 5 | 3.3% | |
| Mostly satisfied | 14 | 9.3% | 19 | 12.7% | |
| Completely satisfied | 91 | 60.7% | 126 | 84% | |

significant difference between satisfaction in public IVF center and satisfaction in private center in relation to information provided about IVF procedure, staff willingness to listen carefully and help patients (**Table 9** and **Table 10**) & Regular progress update on condition is in place with p.v (**0.000, 0.005, 0.003**) respectively. There was not any significant difference regarding the patient satisfaction with the IVF outcome in both groups (**Table 6**).

Table 9. Distribution of women's satisfaction about staff communications & counseling and support among both groups.

| | Public IVF center | | Private IVF center | | p-value |
|-----------------------------------------------------------------------------------|-------------------|-------|--------------------|-------|---------|
| | N (150) | % | N (150) | % | |
| 1) Attitude of fertility clinic staff and their relationship with patients | | | | | |
| Somewhat satisfied | 2 | 1.3% | 0 | 0.0% | 0.110 |
| Mostly satisfied | 10 | 6.7% | 18 | 12.0% | |
| Completely satisfied | 138 | 92.0% | 132 | 88.0% | |
| 2) No change in the fertility clinic staff from start of treatment to end | | | | | |
| Mostly satisfied | 10 | 6.7% | 18 | 12.0% | 0.112 |
| Completely satisfied | 140 | 93.3% | 132 | 88.0% | |
| 3) Staff are willing to listen carefully and help patients | | | | | |
| Mostly satisfied | 37 | 24.7% | 18 | 12.0% | *0.005 |
| Completely satisfied | 113 | 75.3% | 132 | 88.0% | |
| 4) Regular progress update on condition is in place | | | | | |
| Somewhat satisfied | 2 | 1.3% | 0 | 0.0% | *0.003 |
| Mostly satisfied | 39 | 26.0% | 18 | 12.0% | |
| Completely satisfied | 109 | 72.7% | 132 | 88.0% | |
| 5) Medication is provided on time | | | | | |
| Mostly satisfied | 11 | 7.3% | 18 | 12.0% | 0.171 |
| Completely satisfied | 139 | 92.7% | 132 | 88.0% | |

(*) statistically significant difference.

Table 10. Distribution of women's satisfaction about environmental conditions & waiting time among both groups.

| | At public IVF center | | At private IVF center | | p-value |
|----------------------------------------------------------|----------------------|-------|-----------------------|-------|---------|
| | N (150) | % | N (150) | % | |
| 1) Environmental conditions in the operating room | | | | | |
| Neither satisfied nor dissatisfied | 2 | 1.3% | 0 | 0.0% | 0.281 |
| Mostly satisfied | 22 | 14.7% | 18 | 12.0% | |
| Completely satisfied | 126 | 84.0% | 132 | 88.0% | |

Continued

| 2) Environmental conditions in the recovery room (number of beds, personal bedside cabinet, location of bathroom, privacy) | | | | | |
|-----------------------------------------------------------------------------------------------------------------------------------|-----|-------|-----|-------|---------------|
| Completely dissatisfied | 0 | 0.0% | 2 | 1.3% | 0.118 |
| Mostly dissatisfied | 2 | 1.3% | 0 | 0.0% | |
| Neither satisfied nor dissatisfied | 2 | 1.3% | 0 | 0.0% | |
| Mostly satisfied | 27 | 18.0% | 20 | 13.3% | |
| Completely satisfied | 119 | 79.3% | 128 | 85.3% | |
| 3) Waiting time | | | | | |
| Completely dissatisfied | 0 | 0.0% | 6 | 4.0% | 0.000* |
| Mostly dissatisfied | 0 | 0% | 21 | 14.0% | |
| Somewhat dissatisfied | 27 | 18.0% | 26 | 17.3% | |
| Neither satisfied nor dissatisfied | 3 | 2.0% | 0 | 0.0% | |
| Somewhat satisfied | 24 | 16.0% | 31 | 20.7% | |
| Mostly satisfied | 50 | 33.3% | 7 | 4.7% | |
| Completely satisfied | 46 | 30.7% | 59 | 39.3% | |

(*) statistically significant difference.

5. Discussion

IVF cycle success depends on the ability to obtain a sufficient number of mature eggs. The ovarian response during controlled ovarian hyperstimulation (COH) is, therefore, the most important factor in evaluating the outcome of pregnancy in assisted reproductive technique [2].

The response of ovaries to stimulation with exogenous gonadotropins during IVF is a critical factor in determining of live birth rates and adverse outcomes [3].

The satisfaction of patients with medical care is increasingly recognized as one of the fundamental dimensions of quality of care, especially when it comes to infertility treatment [5].

Thus, the present study aimed to assess the role of the nurse in giving induction of ovulation medications at assisted reproduction center versus home medications by private IVF center on outcomes of IVF and to measure patient satisfaction toward the outcomes of IVF in both centers.

Regarding the type of infertility, the present study explored that more than two-thirds of studied women in both groups had primary infertility.

Regarding the causes of infertility, the study revealed that the malefactor of infertility was the common cause of infertility in both centers respectively.

Regarding the female causes of infertility, it was observed that the common female cause of studied women in both groups was blocked fallopian tubes followed by polycystic ovarian syndrome in both groups.

Regarding the outcome of IVF in women in both groups, this study found that there is no statistically significant difference between women given IVF medications by the nurse at public IVF center and women take IVF medication in the home at Banon IVF center in relation to the outcome of IVF. This research point is the first time to be studied and there are no previous studies have been studying it.

This result may be attributed to strict instructions from doctors about importance of this stage of induction on outcomes of IVF, along with strong compliance of infertile couple with all instructions to conduct the process, to realize their dream of having a child, especially how to take medications with correct route, correct dose, and on time regardless where they are taking it whether in IVF center or at home.

Regarding satisfaction in public IVF center and satisfaction in private IVF center, there is statistical significant difference between satisfaction in public IVF center and satisfaction in private center in relation to information on the chances of success, information on(prognosis, different treatment options, clinical aspects, and possible side effects of treatment), information about potential health problems of “test-tube babies”, information about medical issues during pregnancy, information on treatment costs, staff willingness to listen carefully and help patients, Regular progress update on condition is in place and waiting times with p.v (0.000, 0.000, 0.004, 0.026, 0.000, 0.005, 0.003, 0.000) respectively. Because the public IVF centers are very busy and pressured. Consequently, personal attention and the detailed information relevant to a specific individual cannot always be given as desired.

This is a first study compare satisfaction in public IVF center & satisfaction in private IVF center.

6. Study Strengths & Limitations

Merits

- 1) The prospective way of the study & two centers included.
- 2) The new idea and it doesn't apply in Egypt before.

Limitations

The difficulty of follow up (it was difficult to call some women for follow up and some of them were missed).

7. Conclusions

The present findings can be concluded that there was no statistically significant difference between women given IVF medications by nurse at public IVF center and women taking IVF medication at home at Banon IVF center in relation to outcome of IVF as all study sample are keen to comply with all instructions about how to take medications with correct route, correct dose and on time to realize their dream of having a child even those taking IVF medication at home.

The majority of infertile patients were satisfied with the care they received but

there was a statistically significant difference between satisfaction in public IVF center and satisfaction in the private center as regards information provided, staff willing to listen carefully and help patients, regular progress update on condition in place.

Recommendations

Based on the results of the present study, the researcher suggested the following recommendations:

- 1) Empower the role of the nurse as a health educator for women undergoing IVF about the importance of stage of induction and take medications with the correct route, correct dose and on time on the outcome of IVF.
- 2) More studies should be conducted in other centers to further investigate the issue and re-confirm the reliability and validity of the assessment instrument in evaluating patient's satisfaction, for it to be applied at IVF centers.
- 3) Medical staff should spend more time on consultation and explanation for women undergoing IVF to raise patient satisfaction.

Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

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