Factors Affecting Pregnancy Rates of in Vitro Fertilization

*Hala Abd El-Fttah Ali, *Ola Mohamed Ebraheem, **Sahar Nagueb Mohamed

* Obstetrics and Gynecology Nursing Department, Faculty of Nursing, Minia University, Egypt.
** Obstetrics and Gynecology Nursing Department, Faculty of Nursing, Assuit University, Egypt.
dr.halafttah@yahoo.com

Abstract: Background: Infertility affects approximately 13-15% of reproductive-aged couples. It is defined as the inability to conceive after 1 year of properly timed, unprotected intercourse. This definition is based on the cumulative probability of pregnancy. While in vitro fertilization IVF is a process by which egg cells are fertilized by sperm outside the body: IVF is a major treatment in infertility when other methods of assisted reproductive technology have failed. Today, IVF is practically a household word. Several factors can affect pregnancy rate of IVF such as age, body mass index and quantity of eggs. Nurses can play important role in success of IVF procedures in the form of counseling to women before and after procedures of IVF. **Aim of study:** To determine factors affecting pregnancy rates of vitro fertilization including nursing role and evaluate the maternal and neonatal outcomes. **Design:** A prospective study. **Setting:** The subjects were treated for infertility by service of Assisted Reproductive Technology (ART) which operating with the same staff and procedures at El Ahram Fertility Center for infertility treatment at El Mansoura City. **Sample:** 120 simple random study sample studying women undergoing IVF cycle. **Tools**: Interviewing sheet used for data collection which included, socio demographic data, investigations for couple infertility, causes of couple infertility, maternal and neonatal outcomes. Also body mass index and level of satisfaction were used as a tools. **Results:** The pregnancy rate was 48 (40)%.While the live birth rate was 39 (81.3%).On the other hand there was significant differences between most factors which affect the success rate between pregnant and non pregnant groups such as age, obesity, some of female hormones and semen analysis parameters, some causes of infertility and nursing role. **Methods:** This study included (120) women undergoing IVF cycle which start from the second day of menstrual cycle. Starting study from first of October / 2009 to first of January/2011. Ovarian reserve screening tests are done by fertility specialists. **Conclusion and recommendations:** Of all factors evaluated in IVF process, age of patients, BMI, female hormones, number of fertilized oocytes and number of embryos transferred and nursing role have an effect on the cycle outcome. Length of time embryos are outside a controlled environment is an area that is largely unknown. Further evaluations with a larger number of cases may show a time, if exceeded, that reduces pregnancy outcome, and nursing role during IVF is an area that is largely important.

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1. Introduction

Infertility primarily refers to the biological inability of a person to contribute to conception. There are many biological causes of infertility, some which may be by passed with medical intervention. Couples with **primary infertility** have never been able to conceive. While, on the other hand, **secondary infertility** is difficulty conceiving after already having conceived (and either carried the pregnancy to term or had a miscarriage). The following factors that can cause male as well as female infertility are: Genetic,general (diabetes mellitus, thyroid disorders, adrenal disease, hypothalamic-pituitary, hyperprolactinemia, hypopituitarism), and environmental factors (such as smoking). **Combined infertility** includes some cases, both the couple may be infertile or sub-fertile, and the couple's infertility arises from the combination of these conditions. Up to 20% of infertile couples have **unexplained infertility**. In these cases abnormalities are likely to be present but not detected by current methods (Http://en.wikipedia.org/wiki/Infertility"Categories, 2010).

In vitro fertilization IVF is a process by which an egg is fertilized by sperm outside the body. In vitro fertilization is a major treatment for infertility when other methods of assisted reproductive technology have failed. The process involves monitoring a woman's ovulatory process, removing ovum or ova (egg or eggs) from the woman's ovaries and letting sperm fertilize them in a fluid medium in a laboratory(Advanced Fertility Center, 2010).

Factor affecting success rate of IVF: In vitro fertilization, the embryo transfer (ET) is thought to be one of the most critical procedures in a successful cycle (Hearns et al 2000). With little

change in procedure since its onset two decades ago, little emphasis has been placed on ET (Pope et al 2004). Identified several factors with potential importance to whom correspondence should be addressed. These factors include egg quantity and quality in an individual woman can be average for her age, better than average, or worse than average (Advanced Fertility Center, 2010).Women become less fertile as they get older (Http://en.wikipedia.org/wiki/Infertility"Categories, 2010). Women under 35 years have the highest success rates in all of the "egg number" groups. Women under 37 years have acceptable live birth rates even with only 3 to 6 eggs, and do better with more than 6 eggs, and best with more than 10 eggs. Women 38-40 and 41-42 years old have low live birth rates with low egg numbers. Success rates are much better when relatively high egg numbers are obtained. All age groups have very low success rates with less than 3 eggs retrieved. A woman's weight can affect her fertility. We know that at both extremes, very thin and obese, that there can be disruption of the normal process of regular, consistent ovulation. Obesity is associated with increased risk for several serious disease processes. Extreme obesity is associated with a dramatically increased risk for many serious diseases (Advanced Fertility Center, 2010) .

Other factors include, quality of transfer, endometrial thickness, and number of embryos transferred (Meriano et al 2000), (Urman et al 2000), (Burke, et al 2000), (De Placido et al 2002). Blood on the outside of the catheter after an embryo transfer and multiple attempts at ET have been associated with a decrease in pregnancy rate (Goudas et al 1998). To determine if these variables are significant factors in the ET process, we compare catheter type and blood and mucous on the catheter to pregnant and non pregnant cycles. Furthermore in this study, tradition has dictated that embryos be deposited 5–10 mm from the uterine funds (Pope et al 2004). Until recently, the literature lacked large studies to determine the most appropriate transfer depth. Coroleu et al 2002 demonstrated that depths between10 and 20 mm from the fundus resulted in significantly higher pregnancy rates than depths <10mm or>20mm from this structure. Pope et al 2004 reported that for every additional millimeter from the fundus an embryo was deposited, the pregnancy rate increased by 11%. The data from Van De Pas et al2003 , indicate that equal pregnancy rates among providers is obtained by using fixed distance ET and suggest that the avoidance of the uterine funds contributes to a successful embryo transfer. Because of these potential variations, we examine the effect of placement of the embryo in the uterus on pregnancy rate. Several research projects have tried to identify an endometrial pattern and thickness that contribute to a receptive uterus for implantation, but without a clear answer to the question. An endometrial thickness<6mm almost universally has been associated with unsuccessful IVF attempts, but the optimal thickness of the endometrium at the time of ET has not been a consistent finding in the literature (Coulam, et al 1994), (Schwartz, et al 1997). Dickey et al 1993 postulated in a stimulated intra uterine insemination cycle an optimal thickness of endometrium at the time human chorionic gonadotropine HCG is administered, while Lesny et al 1999 and Schild et al 2001 reported that pregnancy rate based on endometrial thickness does not differ for ET (Dickey et al 1993), (Lesny et al 1999), (Schild et al 2001), (Yuval et al 1999). Endometrial thickness evaluated at the time of oocyte retrieval and compare the results for pregnant and nonpregnant cycles. The IVF pregnancy rate is influenced by the number of oocytes and the embryos transferred, with the risk of increased multiple fetuses as the number of embryos transferred increases (Franco, 2002), (Centers for Disease Control and Prevention, 2002). Minaretzis et al, 1998 suggested that pregnancy rate and multiple rate may be maintained by transferring one additional good quality embryo for every 5 years of incremental increase in maternal age. Hu et al 1998 reported that women less than 40 years of age should have 2–4 embryos transferred depending on embryo quality, while women more than or equal to 40 years of age should have 5 embryos transferred regardless of quality. Guidelines established by the American Society for Reproductive Medicine for the number of embryos to be transferred divides patients into six groups. It concluded that the age of the donor should be used to determine the appropriate number of embryos to transfer (American Society for Reproductive Medicine et al, 2004).

Nursing responsibilities of IVF will include: Coordinate all infertility diagnostic tests and treatment plans between patients and physicians, telephone triage with patients regarding patient medication, treatment plans and test results, physician assistance in examinations and various procedures, perform thorough infertility evaluation to include ultrasonography, routine gynecological exams, post-coital testing, endometrial biopsy, and interpretation of laboratory values, collaborate with physician in developing and implementing treatment plan appropriate to individual patient, perform transvaginal ultrasounds for measurement of follicles and endometrial lining, preferred but not required, monitor established pregnancies via ultrasonography and laboratory values through the first trimester, preferred but not required, perform intra-uterine insemination, preferred but not required, preparation of patients

preparing to undergo in-Vitro fertilization, frozen embryo transfers.- provide patient education on treatment protocols, medications and infertility procedures, responsible for the ongoing communication between the physician and the patient, assist with retrievals and transfers, pre and post operation care, as needed, providing compassion and emotional support and counseling to patients throughout the IVF experience (Http://houston.ebayclassifieds.com/medical-healthcare/houston/fertility-ivf-nurse, 2012).

Significant of the study:

Infertility affects approximately 10-16% of the couples in the reproductive age group which makes it an important component of gynecological practice. The prevalence varies depending on the following factors: The type of population studied, the usual age of marriage, and prevalence of reproductive tract infection. The concern about infertility varies indifferent cultures. In our culture, infertility considers as a reason for a divorce and second marriage. Infertile individual in Upper Egypt is described as functionless person. Infertility and factors affecting it forms an important sector of the work of a gynecologists (klock, 2004).

2. Material and methods:

Aim of the study: To determine factors affecting pregnancy rates of in vitro fertilization including nursing role, and evaluate the maternal and neonatal outcomes.

Research hypothesis: There are factors can affecting pregnancy rates of in vitro fertilization.

Design: A prospective study.

Setting: The subjects were treated for infertility by service of Assisted Reproductive Technology (ART) which operating with the same staff and procedures at El Ahram Fertility Center for infertility treatment at El Mansoura City.

Sample: 120 simple random sample studying women undergoing IVF cycle**.**

Tools:

1-Interviewing sheet used for data collection which included, socio demographic data, investigations for infertile couples, major known causes of female and male infertility, maternal and neonatal outcomes, nursing role items.

2-Body Mass Index (BMI) was measured for women by Weight/kg/(Height/m)2, according to (WHO,2000) as follows: Underweight < 18.5, normal 18.5-24.9, overweight 25.0-29.9, obese 30.0-35.0, morbid obese>35 (WHO, 2000).

3-Level of satisfaction: A 5- point Likert Scale was used, where 1= strongly disagree, 2=disagree, 3= neutral, 4= agree, and 5= strongly agree. Then, the scale measures the overall level of satisfaction where 1= not satisfied, 2= not sure, and 3= satisfied (Mohamed, 2011).

Field of work:

Methods: This simple random study sample included (120) women from women undergoing IVF cycle which start from the second day of menstrual cycle. Starting study from first of October / 2009 to first of January/2011. The following ovarian reserve screening tests (Day 3 FSH testing,E2, LH, Prolactine levels, etc) are used by fertility specialists to predict the "remaining egg supply" and the ability (reserve) of the ovaries to respond to stimulation with drugs. These tests are helpful. However, they predict the quantity of eggs remaining - rather than the quality of those eggs. IVF program consists of a multi-disciplinary team of physicians, nurses, a nurse practitioner, embryologists and allied health staff utilizing state-of-the-ART technology and facilities to provide patients with the most comprehensive care to achieve a pregnancy. All couples are evaluated by physicians during an initial consultation to determine their suitability for entering the IVF program. During this meeting, we will review the medical history, likely perform a transvaginal ultrasound examination, and, if necessary, recommend further evaluation. If women have past medical records or results of previous investigations, obstetricians recommend bring all previous investigations. Women will also be given an opportunity to attend an IVF class where further information is provided by center's staff in a group setting. This will serve to increase your familiarity with program and staff. Nursing role and responsibilities are: The nurse assisted in taking history, instructions before and after IVF operation and calculating BMI, measure birth weight, co-operating with the other members of the team in the form of: Actively assist in the collection of data, actively assist in the teaching of patients and visitors to the unit, maintain professional development assessing individual patient needs, fears and anxieties, have empathy and concern for the patients and offer support on a clinical and psychological level, maintain confidentiality at all times and ensure patients' rights and dignity are maintained at all times, seek guidance from the senior nurse prior to offering support counseling following results of tests and investigative procedures, preparation for treatment cycles and follow up, matt end the lunchtime unit meeting to evaluate patients' progress and instructions regarding further management, liaise with senior staff in the planning and organization of blood tests and scans, take and collect blood samples and to assist in the interpretation and explanation of results, teach patients to give their own injections,administer subcutaneous and intra-muscular injections as required in the treatment cycle,perform ultrasound

scans for follicular tracking, support the clinical team in the management of early pregnancy, ensure that regulations and policies for the control of drugs are understood and observe,assist in surgical sperm recovery in place of a second doctor.,assist in clinical procedures, egg recovery, surgical sperm recovery and embryo transfer **(Http://IVFnurse/midwifejop,2012).**

In vitro fertilization protocol: All females underwent ovulatory induction with gonadotropins (fostimon and morunal), usually in concert with a mid-luteal leuprolide acetate suppression. Through transvaginal ultrasound and serum estradiol levels, we monitored responses to the gonadotropins. When three or more follicles reached ≥16 mm in size, the patient was administered 10,000 IU of gonadotropins HCG intramuscularly. Thirty-four to 36 hours after HCG administration, oocytes were harvested via transvaginal ultrasound guided oocyte aspiration. Fertilization of the oocytes was achieved with either co incubation of sperm or intracytoplasmic sperm injection. Immediately before ET, we evaluated the embryos for developmental stage and quality. To assess endometrial thickness, each patient had a transvaginal ultrasound during the previous cycle and again on the day of the oocyte retrieval. Patients arrived at the hospital with a moderately full bladder, she was placed in the lithotomic position after which a sterile bivalve speculum was inserted into her vagina and the vagina was opened to expose the cervix. The exocervix was cleaned with sterile cotton swabs and phosphate-buffered saline loading the transfer catheter with embryos (usually 0.5 to 1.0 cm from the funds), After the transfer, the patient was asked if she thought she would be comfortable for the next hour or if she would need her bladder drained. If the bladder was drained, the urine volume was recorded. If the bladder was not drained, this was noted. The patient lay in a Trendelenberg position on the operating room table for 15 min and then slid onto a gurney with a similar Trendelenberg angle. The patient was rolled to the outpatient recovery room where she remained in Trendelenberg position for 45 min. The patient then was allowed to go home and remain at bed rest with bathroom privileges for the next 24 hours. With the aid of a transvaginal ultrasound, clinical pregnancy rate was defined as the presence of a gestational sac at 6 to 7 weeks' gestation. All previous process were assisted by nurses.

Operational definitions: Assessment analysis such as: Day 3 FSH level is 3-8.1 MIU/ml, lutenizing hormone (LH) is 7 MIU/ml, day of LH surge is 15 MIU/ml, prolactine level is 25 ng/ml, day 3 estradiol testing is 21-251 picogram/ml, serum progesterone on day 22-24 of cycle is 1.5-20 ng/ml, (high anti-mullerian hormone (AMH) is over 3.0 ng/ml,normal is over 1.0 ng/ml, low normal is range from 0.7 to 0.9 ng/ml, low is 0.3 - 0.6 ng/ml, very low is less than 0.3 ng/ml). Thyroid stimulating hormone (TSH) is 0.4 to 3.8 IU/ml. Semen analysis parameter, volume is 2.0 ml or more, Ph is 7.2-8.0, sperm concentration is 20,000,000/ml or more, motility is 50% or more with forward progression,rapid forward progressive motility is 25% or more, morphology is 30% or more, normal forms (WHO criteria)-or-11% or more normal forms(Strict criteria),vitality is75% or more live, white blood cells is less than 1,000,000/ml. Embryo transfer quality was on the basis of the amount of blood or mucus distributed on/in the catheter after the transfer. Embryologists assigned each transfer one of the four grades. Grade I was defined as "excellent" and had no blood or observable mucus present on/in the catheter after transfer. Grade II was defined as "good" and specified that only a tinge of blood or mucus was present. A "fair"(Grade III) transfer had a moderate amount of blood or mucus present, while a "poor" (Grade IV) transfer contained extensive blood or mucus. Pregnancy test was positive when (ß-HCG) level is (10-30 MIU/ml).The average of follicle should be 16-18 ml for fertilization. These parameters reported according to laboratories of El Ahram Center at El Mansoura City, Egypt.

Pilot study: The tools were revised for content validity, clarity, relevance, comprehensiveness, and applicability. According to their suggestions, the modifications were applied.

Ethical and administrative consideration: Between first of October / 2009 to first of January/2011 women underwent 120 IVF cycles in our facility. All participants in this study signed verbal consent will be obtained after explain the natural of the study methodologies used in IVF. The study had the approval of Director of Ahram Center by an official letter.

Statistical Design: All statistical analyses were performed using SPSS for windows version 17.0 (SPSS, Chicago, IL). Continuous data were expressed as mean ± standard deviation (SD), while categorical data were expressed in number and percentage. The differences between groups were determined by independent samples t test for continuous data or chi square test for categorical data. The 95% confidence intervals (CI) for the difference in means were calculated. Statistical significance was set at $P<0.05$.

3. Results:

Figure I showed that pregnancy rate was 40%.

Table I displays univariate results for couples characteristics.The pregnant women were 48 (40%) while the non pregnant women were 72 (60%). The mean age of the non pregnant in this study was 33.9 years (SD =4.4) and for the pregnant group was 31.7 years (SD = 3.9). Non pregnant women were

significantly older than the pregnant group (p = 0.006). Between these groups, BMI, husband smoking appeared to be significant while psychological problems appeared to be insignificant.

Table II displays results for female hormones. Between both groups, day 3 follicular stimulating hormone, prolactine level, clomiphene challenge test, total number of antral follicles and anti-mullerian hormone appeared to be significant (p=0.019, 0.017,0.012, <0.001 and <0.000) respectively.

Table III displays results for characters of semen analysis. Between these two groups, sperm concentration and motility percentage with forward progression appeared to be significant (P= 0.007 and 0.01) respectively with 95% CI (-4.3696 – -0.6998 and -4.888 – 0.6676) respectively.

Table IV displays results for factors related to IVF procedures. Between both groups, endometrial thickness, number of eggs, number of fertilized oocytes, embryos transferred appeared to be significant.

Table V displays results for factors related to causes of female infertility. Between both groups, tubal causes and ovulation problems appeared to be significant.

Table VI displays results for factors related to causes of male infertility. Between both groups, male causes appeared to be significant related to immunological factors, previous varecocele and chronic diseases.

Table VII displays results for maternal and neonatal outcomes. Live birth rate was 39 (81.3%). Multiple gestation was 8 (20.5%), while ectopic pregnancy was 3 (6.3%) and cesarean section was 33 (84.6%).

Table VIII displays the level of maternal satisfaction related to nursing role. This table reveals significant difference between two groups, (p= 0.002).

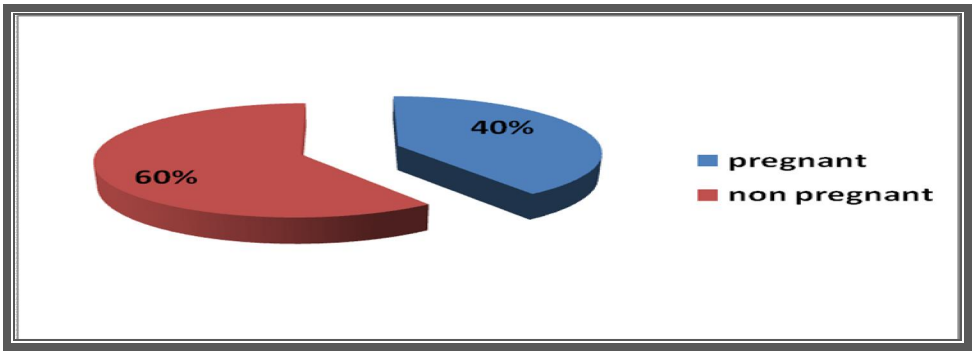

Figure I: Pregnancy rate of sample.

Table I: Distribution of socio demographic characteristics.

Factors	*Non pregnant n=72 (%60)*	*Pregnant n=48(%40)*	*95% CI*	*P*
Female age (years)	33.9 ±4.4	31.7 ±3.9	0.6464 – 3.7286	0.006
Male age (years)	36.3 ±7.1	37.6 ±6.2	-3.7434 – 1.2295	0.319
Female BMI (kg/m2)	25.9 ±5.8	23.8 ±4.4	0.1129 – 4.0357	0.038
Weight classification (n,%)				
Underweight	6 (8.3%)	6 (12.5%)		*0.5398
Normal	36 (50%)	15 (31.3%)		*0.0591
Overweight	18 (25%)	21 (43.8%)		*0.0461
Obese	3 (4.2%)	6 (12.5%)		*0.1538
Morbid obesity	9 (12.5%)	0 (0%)		*0.0109
Psychological problems				
Presence of depression	69 (95.8%)	45 (93.8%)		* 0.608
Presence of fear and anxiety	69 (95.8%)	48 (100%)		*0.152
Husband smoking	57 (79.2%)	27 (56.3%)		*0.007
Wife smoking	0	0		-
* Chi square test				

Table II: Distribution of female hormones.

Factors	*Non pregnant n=72(%60)*	*Pregnant n=48 (%40)*	*95% CI*	*P*
Day3 follicular stimulating hormone FSH level (MUI/ml)	12.5 ±4	11.1 ±2.4	-2.5297– - 0.2328	0.019
Day of LH surge: (MIU/ml)	14.8 ±0.7	14.9 ±1	-0.4741– 0.1657	0.342
Prolactine level (ng/ml)	25 ±0.4	24.5 ±1.8	0.0951– 0.9716	0.017
Day 3 estradiol testing (pg/ml)	78.6 ±5.3	78 ±8.0	-1.8617– 2.9589	0.653
Serum progesterone on day 22-24 of cycle (ng/ml)	2.8 ±0.5	3 ±0.4	-0.30945– 0.0317	0.110
Clomiphene challenge test (ovarian reserve test)				
Poor ovarian reserve	12 (25%)	6 (8.3%)	-	0.012*
Good ovarian reserve	36 (75%)	66(91.7%)		
Total number of antral follicles	4.6 ±2.3	6.7 ±3.3	-3.1397 – -1.1242	<0.001
Anti-mullerian hormone AMH (ng/ml)	1.8 ±0.8	2.3 ±0.9	-0.8862 – -0.2693	<0.000
Thyroid stimulating hormone TSH (IU/ml)	2.1 ±1.1	1.9 ±1.2	-0.1859– 0.6387	0.279
* Chi square test				

Table III: Characters of semen analysis.

Factors	*Non pregnant n=72 (%60)*	*Pregnant n=48(%40)*	*95% CI*	*P*
Semen volume (ml)	3 ±1.4	3.2 ±1.4	-0.7489 – 0.2767	0.364
Semen Ph	7.2 ±0.8	7.7 ±0.3	-0.7223 – -0.4202	<0.001
Sperm concentration (millions/ml)	22.3 ±5.6	24.8 ±3.9	-4.3696 – -0.6998	0.007
Motility percentage with forward progression	51.3 ±5.7	54.1 ±5.7	-4.888 – 0.6676	0.01
Rapid forward progressive motility %	25.9 ±7.2	26.5 ±7.1	-3.2956 – 1.9901	0.626
Morphology	32.3 ±10.3	33.4 ±9.6	-4.785 – 2.6322	0.567
Vitality	76.1 ±11.2	78.6 ±9.3	-6.4324 – 1.2796	0.188
White blood cells WBCs count(Pus Cells) (thousands/ml)	665 ±145.2	608.3±101.1	8.939 – 104.4639	0.020

Table IV: Factors affecting IVF procedures.

Factors	*Non pregnant n=72 (60%)*	*Pregnant n=48 (40%)*	*95% CI*	*P*
Number of previous IVF	0.42 ±0.86	0.56 ±0.8	-0.4559 – 0.1642	0.354
Endometrial thickness (mm)	12.3 ±1.6	13±1.3	-1.2144 – -0.1189	0.017
Number of eggs	4.2 ±2.2	5.4 ±2.2	-2.0101 – -0.3927	0.004
Number of fertilized oocytes	2.1 ±1.9	3.7 ±2.7	-2.4011 – -0.7517	<0.001
Embryos transferred	2.4 ±1.9	3.3 ±2.4	-1.7066 – -0.1267	0.023
Embryo transfer quality	(Grade II,III) 9 (12.5%)	(Grade I, II) 10 (20.8)	-	0.3073

Table V: Distribution of causes of female infertility.

Female factors	*Non pregnant n=72 (60%)*	*Pregnant n=48 (40%)*	*P*
Unexplained infertility	10 (13.9%)	14 (29.2%)	0.*0611*
Tubal infertility	11 (15.3%)	1 (2.1%)	0.0265
Chronic diseases	9 (12.5%)	12 (25%)	0.0902
Ovulation problems and poly cystic ovaries	12 (16.7%)	2 (4.2%)	0.0438
Uterine factors (endometriosis, uterine polyps and uterine fibroids)	10 (13.9%)	10(20.8%)	0.3295
Cervical factors	12 (16.7%)	5 (10.4%)	0.4277
Immunological factors	8 (11.1%)	4 (8.3%)	0.7607

Table VI: Distribution of causes of male infertility.

Male factors	*Non pregnant n=72 (60%)*	*Pregnant n=48 (40%)*	*P*
Unexplained infertility	15 (20.8%)	18 (37.5%)	0.0603
Previous varecocele	12 (16.7%)	2 (4.2%)	0.0438
Chronic diseases	17 (23.6%)	4 (8.3%)	0.0480
Immunological factors	10 (13.9%)	1 (2.1%)	0.0483
Coital errors	9 (12.5%)	12 (25%)	0.0902
Weight abnormalities	9 (12.5%)	11 (22.9%)	0.1433

Table VII: Maternal and neonatal outcomes.

Items	*Pregnant / n=48 (40%)*
Live birth	39 (81.3%)
Abortion	0
Ectopic pregnancy	3 (6.3%)
Perinatal death	6 (12.5%)
Birth weight/(gm)	1563.5 ±725.7
Preterm labour	3 (7.7%)*
Gestational weeks	35.4 ±6.3
Sex of embryo	
Female	24 (61.5%)*
Male	15 (38.5%)*
Live embryo	
Single	26 (66.7%)*
Multiple	8 (20.5%)*
Triples or more	5 (12.8%)*
Congenital fetal malformations	3 (7.7%)*
Cesarean section	33 (84.6%)*
* The percentage is calculated out of 39.	

Table VIII: Level of maternal satisfaction related to nursing role:

Level of satisfaction related to nursing role	*Non pregnant n=72 (60%)*	*Pregnant n= 48 (40%)*	*P*
Not satisfied	26 (36.1)	8 (16.7)	0.002
Not sure	24 (33.3) 22 (30.5)	10 (20.8)	
Satisfied	22 (30.5)	30 (62.5)	

4. Discussion:

Related to figure I, in vitro fertilization success rates statistics for January 1, 2010 through December 31, 2010 at United States (USA) reported that, clinical pregnancy rate was 89.5% per embryo transfer (Advanced Fertility Center, 2010). This result disagreement with the present study which showed that pregnancy rate was 40%. Related to table I, in prospective study the female age (p value) 0.04, pregnant group mean = 32.1, SD = 3.7 (n = 112), non pregnant group mean = 33.2, SD = 3.9 (n = 93) (Tiffany et al 2005). This result at the same line with the present study which showed that female age was 33.9,31.7 respectively for non pregnant and pregnant women. In previous study BMI(p value) was 0.25, pregnant group mean = 25.1, SD = 3.3 (n = 111), non pregnant group mean = 25.0, SD = 4.0 (n = 93) (Tiffany et al 2005). In another study morbidly obese women (n = 19) had significantly lower clinical pregnancy rates after IVF. Their live birth rates were lower too (Emily et al 2009). These results in agreement with the present study which showed that female BMI was 25.9, 23.8 respectively for non pregnant and pregnant women. In prospective study smokers smokers: 3.0(%) (n=6) nonsmokers: 97.0(%) (n = 196), smokers pregnant: 50.0(%) (n = 3) (Tiffany et al 2005). On the other hand the impact of several life style factors including smoking. There is strong evidence that smoking impact on adversely on reproductive outcomes of IVF. It is concluded that smoking can assist couples to conceive spontaneously or optimize their chances of conception with in vitro fertilization (Collins, 2012). This result in agreement with the present study in relation to female partner

smoking.In another study, a significant relationship was shown between baseline psychological factors and the probability to become pregnant after IVF treatment, controlling for other factors. State anxiety had a slightly stronger correlation with IVF outcome than depression (Smeenk et al 2001). This result at the same line with the present study.

Regarding to table II, previous studies relating hormone in follicular fluid to oocyte fertilize ability were flawed by the uncertainty about the actual oocyte maturity status at the time of recovery. This is the first study in which oocyte maturity was assessed immediately after recovery and only mature oocytes were selected for treatment by intra cytoplasmic sperm injection. Fertilization outcomes were related to follicular fluid concentrations of estradiol, progesterone, follicle stimulating hormone, luteinizing hormone (LH), growth hormone (GH), prolactin (PRL). Those oocytes that subsequently showed normal fertilization were harvested from follicles with higher concentrations of progesterone, GH, PRL as compared with those of oocytes that failed to fertilize. Among the normally fertilized oocytes, low GH concentrations were associated with the failure of cleavage and with poor morphology of cleaving embryos, whereas rapidly cleaving embryos developed from oocytes recovered from follicles with high concentrations of LH. These data suggest important roles for GH and of residual LH after pituitary suppression, as positive regulators of the final phase of oocyte intra follicular development (Carmen et al 2012). On the other hand in another study, a significantly higher cancellation rate was noted in the study group (22.5%). The new regimen resulted in similar stimulation characteristic and clinical pregnancy rate (11%). In 13 patients with a basal FSH level that was not persistently high, the new regimen resulted in a significantly higher number of retrieved oocytes compared with the standard protocol (7.6 ± 1.03) in vitro fertilization (Martha et al 2012). If the estradiol response is poor, ovarian reserve and egg quantity are also likely to be poor. The woman is also less likely to be a "normal responder" to gonadotropine stimulation, if the day 3 FSH is elevated the egg quantity is reduced. In vitro fertilization IVF has high success in young women with normal ovarian reserve testing. Anti-mullerian hormone AMH and antral follicle counts are the best predictor of the response of the ovaries, and the number of eggs that will be retrieved (Advanced Fertility Center, 2010). These previous results at the same line with the present study which showed that female hormones had more normal levels for pregnant women than non pregnant.

As regard table III, the relationship of conventional semen parameters and the limits of these parameters for fertilization in vitro were analyzed. Sperm motility was the single most important parameter determining the fertilization rate. Fertilization failed when the initial and final motilities were less than 20% and 30%, respectively. The percentage of abnormal sperm forms was also significantly related to the fertilization rate; but even when there were greater than 60% abnormal spermatozoa, fertilization could be obtained. Sperm concentration in semen had no significant effect on the fertilization rate when the data were controlled for motility or abnormal sperm forms. The fertilization rate increased with reduced sperm numbers used for insemination in vitro but had no effect on the incidence of multiple pro nuclei in oocytes (Mahadevan et al 1984). This result at the same line with the present study which showed that semen parameters had more normal levels in parteners of pregnant women than non pregnant.

Concerning table IV, pregnancy and delivery rates for cycles 1, 2, 3, 4, and >4 were 33.7% and 27.0%, 33.9% and 27.4%, 28.9% and 23.4%, 25.9% and 16.1%, and 21.0% and 15.4%, respectively. The pregnancy rate decreased significantly for >4 cycle; delivery rate decreased significantly for cycles 4 and >4 (David et al 2012). This result disagreement with the present study which showed that the pregnant women were carried out more IVF cycles than non pregnant. To some extent, the more eggs we have to work with, the greater the chance that IVF will be successful. There are several issues involved with this: More eggs will give us more fertilized eggs will give us more likelihood of having 2 good quality embryos for the embryo transfer procedure. This is an embryo selection issue. Women under 35 years have the highest success rates in all of the "egg number" groups. Women under 37 in an IVF program have acceptable live birth rates even with only 3 to 6 eggs, and do better with more than 6 eggs, and best with more than 10 eggs. Women 38-40 and 41-42 years old have low live birth rates with low egg numbers. Success rates are much better when relatively high egg numbers are obtained. All age groups have very low success rates with less than 3 eggs retrieved (Advanced Fertility Center, 2010).This result agreement with the present study which showed that female eggs were 4.2,5.4 respectively for non pregnant and pregnant women. In previous study female was >37 years of age, her oocytes underwent IVF, and number of oocytes available for fertilization (if <10 oocytes, all underwent IVF) (Tiffany et al 2005). Among 1,280 immature oocytes (13.6 ± 7.5 oocytes per patient) retrieved, 89% (1,139) were morphologically normal, and 62.2% (708/1,139) of the normal oocytes matured in vitro after culture for 48 hours. Eighty-five ET cycles were conducted and

pregnancy was established in 23 cycles (27.1%), which consisted of 8 after uterine ET and 15 after a combined approach. Seventeen patients delivered 20 normal infants (Kwang et al 2000). These results disagreement with the present study which showed that female oocytes was only 2.1, 3.7 respectively for non pregnant and pregnant women and pregnancy rate was 40%.Like others indicates that the blood on catheter reduces the chance of achieving pregnancy. What is not certain is the effect of mucus on the catheter. It would appear from this study that mucus on the transfer catheter is not detrimental to pregnancy rate (Goudas et al 1998). In another study, number of embryos transferred (OR: 1.842), presence of blood on the catheter indicate quality of embryo altered pregnancy rate (Rhodes et al 2005). The last result agreement with the present study which showed that embryo quality was 12.5,20.8 respectively for non pregnant and pregnant women. Scientists have suggested that endometrial thickness of <6 mm to be predictive of a failed cycle, but no optimal thickness for success full cycle has been identified. The pregnant and non pregnant cycles in the study have an average thickness of 11mm (ranges of 6.8 mm to 19.0 mm for pregnant and 6.0mm to 21.5mm for non pregnant couples), which indicates endometrial thickness is not a good predictor of success (Coulam et al 1994), (Schwartz et al 1997). This study at the same line with the present study which had significantly differences between groups in relation to mean value of endometrial sickness which was (12.3 ±1.6 and 13±1.3) for non pregnant and pregnant women respectively.Scientists have reported IVF pregnancy rates to be influenced by the number of embryos transferred (Franco, 2002), (Centers for Disease Control and Prevention, 2002). In this study, for each embryo transferred the pregnancy increases by 84%. A greater risk of multiple gestation, which includes higher order multiples, also increases with the transfer of additional embryos (Centers for Disease Control and Prevention, 2002). Other factors affecting implantation rate and thus the number of embryos to transfer and percentage fertilization of embryos transferred. Several investigators have attempted to optimize pregnancy rate and to minimize multiple rate by examining number of embryos transferred (Hu et al 1998), (Roseboom et al 1995). Hu et al 1998 reported for number of embryos transferred did not significantly increase pregnancy rate, however, multiple rate did increase. In patients 36–39 years of age, pregnancy rate increased with more embryos transferred, but only when embryo quality was good or excellent. The number of multiple gestations in this age group did not increase until >2 good or excellent embryos were transferred or more than 3 fair quality embryos were transferred. Roseboom et al 1995 stating pregnancy rate per embryo increased by 72%, with a yearly decline in pregnancy rate of 21%. In the Roseboom report, from analyzing the data on the study, as well as others, it appears that age and embryo quality must be taken into account to determine the number of embryos to transfer to optimize pregnancy rate, and still limit the multiple rate. These results at the same line with the present study.

Concerning table V and VI, problems of the uterus and uterine lining that can cause or contribute to reproductive problems such as infertility or recurrent miscarriage and decrease the pregnancy rates: Uterine polyps, uterine fibroids, intrauterine adhesions, congenital uterine malformations, luteal phase defect, thin endometrial lining, endometriosis. In general, cumulative pregnancy success rates are high with treatment from a fertility specialist when the fertility issue is an ovulation problem. Factors that influence success rates are status of the tubes (Advanced Fertility Center, 2010). In vitro fertilization IVF has high success in young women with unexplained infertility and polycystic ovaries. Although the studies of in vitro fertilization for women with severe endometriosis do not all show similar results, pregnancy success rates are usually good if the woman is produces enough eggs during the ovarian stimulation. Success rates of IVF with tubal factors infertility and ovarian problems vary greatly according to the program of IVF. Some IVF programs have pregnancy rates with tubal factor infertility of over 50% per attempt in women under 40 years old. Other programs with the same type of patients report pregnancy rates of only 20 to 30%. The success rate will depend very much on the IVF live birth success rates of the particular in vitro fertilization laboratory. IVF success rates are also dependent on indirectly by coital errors as well as varecocele, chronic diseases of couples and unexplained infertility. Immunological problems are associated with decrease success rates and some cases of recurrent miscarriage after IVF (Advanced Fertility Center, 2010). These previous results at the same line with the present study which showed that female causes of infertility such as tubal causes and ovulation problems appeared to be significant. Male causes appeared to be significant related to immunological factors, previous varecocele and chronic diseases.

As regard table VII, in vitro fertilization success rates statistics for January 1, 2010 through December 31, 2010 at United States (USA) reported that, live birth rate per egg retrieval was 81.6% per embryo transfer (Advanced Fertility Center, 2010). This result at the same line with the present study which showed that live birth rate was (81.3%). Some prospective observational studies compare maternal

and perinatal outcomes in in-vitro fertilization pregnancies. Larger studies show that adverse pregnancy outcomes such as preterm delivery increased significantly with in-vitro fertilization. Perinatal adverse outcomes such as prematurity increased (Mukhopadhaya et al 2007). In vitro fertilization is responsible for the increasing number of multifetal pregnancies, multiplicity being an important risk factor for adverse neonatal outcomes due to preterm birth, low birth weight and small for gestational age. Most mortality rates were twice as high as national figures in the general population (Sari et al 2012). In previous study there were more preterm births and cases of very low or low birth weight in the IVF group. The perinatal mortality rate for IVF children in this study (16.2/1000). The malformation rate in the IVF group (6.6%) in this study was higher than most previously reported rates after IVF which range between 2.2–6.1%. The majority of later studies have been negative as far as congenital malformations are concerned. However, a few very recent studies have reported an increase in the prevalence of malformations among IVF children (Bergh et al 1999), (Ericson and Kallen, 2001). These previous results in disagreement with the present study because the congenital malformatiom represented only (7.7%) as well as the preterm labour which represented the same percentage while the perinatal mortality rate for IVF children was 12.5 % in this study. In past study on IVF, abortion was 1.9%, singleton 4.6%, twins 19.3% and 12 ectopic pregnancy (8.95% pregnancies (pregnancy rate)) occurred in the study group (Monika et al 2008). In previous study crude rate of cesarean section was 50.1 percent versus 28.9 percent for all other births were significantly higher (Elizabeth et al 2010). These results disagreement with the present study which showed that abortion was zero while the cesarean section was (84.6%). While multiple gestations achieved following in vitro fertilization IVF and six cases of triplet pregnancy. All women achieving clinical pregnancy by IVF were reviewed (n = 2433). A 37 year-old woman who delivered a healthy singleton after IVF, this pregnancy was electively terminated at nine weeks' gestation. An additional six cases of triplets established after fresh embryo transfer. Of these, one resulted in abortion at eight weeks' gestation and five patients have an ongoing pregnancy. This case series suggests the incidence of triplets following IVF is high (Atsushi et al 2007). This result disagreement with the present study which showed that the multiple pregnancy was 20.5 % while the triplets was 12.8 %.

Regarding to table VIII, in vitro fertilization success rates depended on good nursing role (Advanced Fertility Center, 2010). This was agreed with the present results.

The researcher opinion was that the sample size should be increase and in the future studies more sample size will be select from more centers and more geographic areas for variation and compare between them.

Conclusion: Of all factors evaluated in IVF process, concluded that, age and BMI of patients, female hormones, quality of semen analysis, number of fertilized oocytes, number of embryos transferred, and nursing role have an effect on the cycle and maternal and neonatal outcomes.

Recommendations: Recommended that, the role of embryo transfer technique and in vitro culture media in the twinning process requires further study. Length of time embryos are outside a controlled environment is an area that is largely unknown. Further evaluations with a larger number of cases may show a time, if exceeded, that reduces pregnancy outcome, nursing role during IVF is an area that is largely important.

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