

Care given to Women Undergoing Intracytoplasmic Sperm Injection (Embryo Transfer Phase)

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Abstract:

Background Infertility is a significantly health, social, and emotional problem. Intracytoplasmic sperm injection (ICSI) becomes the most common way to treat infertility. **This study aimed to** assess the care given to women undergoing Intracytoplasmic sperm injection (embryos transfer phase) in Al-azhar university assisted reproduction unit in cairo. A Descriptive **design** was utilized in this study.. A purposive **sample** including 90 women undergoing Intracytoplasmic sperm injection in embryo transfer stage were recruited in the current study.

Methods: Data were collected from the beginning of January, 2014 till the beginning of June, 2014. Each woman was interviewed and then the nursing care was observed.

Results: The care during all stages of Intracytoplasmic sperm injection was given to women in with highly percentage and achieved level of satisfaction, but there are defects in some items related to infection control precaution (defect in procedures of hand washing (11.1%) and use of gloves (26.7)) and psychological aspects (nurse don't accompanies women to the recovery room (4.4%).)

Conclusion: Embryos transfer is crucial stage; the nurse had a great role in this stage as any defect may influence the success of the whole process of Intracytoplasmic sperm injection.

Keywords : Embryos transfer, Intracytoplasmic sperm injection, Infertility, nursing care, Preparations.

I. Introduction

Infertility is the failure to conceive after one year or more with regular unprotected sexual intercourse. Primary infertility is the failure of couple to have one child. While, secondary infertility is the failure to conceive following a previous pregnancy (**World Health Organization (WHO), 2013**). In 2010, approximately about 50 million couples worldwide were unable to have a child and seeking treatment (**Maya et al., 2012**).

Assisted Reproductive Technology (ART) is methods used to achieve pregnancy by artificial or partially artificial means. In general, ART procedures involve surgically eggs removing from a woman's ovary, then combining them with sperm in the laboratory, and after that returning them to woman's body or donating them to another woman (**Centers for Disease Control and Prevention (CDC), 2014**). According to census, approximately one million children have been born as a result of ART since 1978 (**Payne, & Goedeke, 2007**).

Intracytoplasmic Sperm Injection (ICSI) is one method of ART and has become the method of choice to achieve fertilization. ICSI is a method of micromanipulation used to deposit a spermatozoon directly into oocyte cytoplasm (**Codreanu et al., 2013**).

Embryo Transfer (ET) is the final and the most vulnerable step in ICSI treatment and has three stages. Woman needs special preparations prior to embryos transfer; embryo transfer and post-transfer phase. These preparations include; straightening of the utero-cervical angle (by changing patient position, full bladder when transferring and using a tenaculum), cervical preparation, performance of a dummy or mock transfer, catheter's choice, use of ultrasound guidance, removing the mucus or blood on the catheter and embryo after loading (by psychological intervention and post-transfer intervention) (**Mansour, 2005; Sallam, 2005**).

As embryos transfer is a very important stage; fertility nurses needs to build a good relation with couples based on trust, honesty and sympathy (**Cowan, 2003**). Nurses are a part of the medical team that consists of physicians, scientists, embryologists and counselors, but in comparison with the other members, who move in and out at particular points along ART cycle; nurses maintain more constant contact with woman than other medical team members (**Payne, & Goedeke, 2007**).

1.1 Significance of the study:

Infertility becomes a common problem, which affecting many couples. Globally, about 8.0% of couples are experience any form of infertility problems during their reproductive lives(Eyo et al., 2012). The majority of the population treated by assisted reproductive technologies (Nachtigall, 2006). Intracytoplasmic sperm injection become one of important methods for treating infertile couples and the recent research has focused on improving the embryo transfer techniques in the hope of increasing the success rates of ICSI. So, the current study was conducted to assess the care given for women in embryo transfer phase to enhance the success rates of ICSI.

1.2 Aim: The aim of this study was:To assess the care given for women undergoing intracytoplasmic sperm injection during embryos transfer stage.

1.3 Research Question:

To achieve the aim of this study the following research questions are formulated:

- A. What is the care given for women undergoing intracytoplasmic sperm injection in embryos transfer stage?
- B. What are preparations for embryos transfer stage?
- C. What is the role of fertility nurse in embryos transfer stage?

II. Material And Methods

1. Material

1.1 Research design: Descriptive design was used in this study to fulfill the aim of the study and answer the research questions.

2.1 Setting: The present study was carried out at Assisted Reproduction Unit in Al-Azhar University in Cairo, Egypt. This particular setting was chosen because it is the main governmental specialized in providing maternity care for women with infertility.

3.1 Subjects: A Purposive sample of 90 wives undergoing ICSI was involved in this study without specific criteria for selection.

4.1 Tools of data collection: Two tools were used in the current study to collect the necessary data.

1.4.1 Tool I: Interview Questionnaire Sheet:

It was developed by the researcher; it was consisted of five parts:

Part I: General Characteristics of the couples such as; age, residence, occupation, income and educational level.

Part II: Medical history of couples such as; diabetes mellitus, hypertension or renal disease.

Part III: Surgical history of couples (any previous operations).

Part IV: Obstetrical history like; age of menarche, parity or abortion.

Part V: Causes of infertility whether male or female and ART trails.

2.4.1 Tool II: An observation checklist sheet addressing care for women in embryos transfer stage:

It was structured by the researcher after reviewing of related literature. The checklist was divided into four main parts, and each part subdivided into some items.

Part I: Preparation for women in pre-embryos transfer phase. It contains 15 items. Each item was a closed question, which answered as done or not done, except the items related to fifth question, it was consisted of instructions given by nurse to women and it form seven items each one scored as done or not done.

Part II: Care given to women during operation of embryos transfer. It contains nine items scored as done or not done.

Part III: Care given to women in post-operative, which extend from immediately postoperatively until discharge. It was included nine closed questions scored as done or not done.

Part IV: Women's instructions plan. It involves nine items describe the content of discharge plan such as; avoid douching. The items reported to be done were scored "1" and the items not done were scored "0". Sum the scores and calculate a percent. The practice was considered satisfactory if the percent score was 60.0% or more; and unsatisfactory if less than 60.0%.

2. Methods

1.2 Ethical Considerations: Written approval to conduct the research was obtained from Faculty of Nursing committee, Port Said University, Egypt and from the unit's manager after explaining the purpose of the study. The researcher clarified the objectives and aim of the study to each participant before applying the tool to gain their confidence and trust and take an oral consent from them to participate in the study, after ensuring confidentially that data collected used for research purpose only. The research tool do not entail any harmful effects on participants. Participants were informed that they have the right to withdraw from the study at any time without giving any reasons.

2.2 Content Validity and Reliability: Content validity was tested by six experts in nursing and by health team that provides the techniques. A pilot study was applied on 10% of women undergoing embryos transfer stage. The questionnaire was modified according to the expert's comment and recommendations and pilot study result.

3.2 Data collection procedure: The researcher was introduced herself and the nature of the study was explained to each participant in order to obtain their oral consent and gains their cooperation before data collection. Each couple was interviewed separately to give her a chance to talk freely and the questions were translated into Arabic. The interviewing questionnaire sheet was filled in by the researcher before embryo transfer in the waiting room, then the researcher accompanied women in all phases of embryo transfer stage until the women leave fertility unit to observe the care given to women and recorded it in observation checklist. Each interview and follow-up for women was completed within 100-120 minutes.

4.2 Statistical Data Analysis: The raw data were coded and entered into SPSS system files (SPSS package version 18). Analysis and interpretation of data were conducted. Descriptive statistics including frequency, distribution, mean, and standard deviation were used to describe different characteristics.

III. Results

Table 1: Number and Percent Distribution of the Women according to their Socio-Demographic Characteristics.

Socio-Demographic Characteristics	Studied Females (n=90)	
	No.	%
Age (years)		
<25	16	17.8
25- <30	35	38.9
30- <35	26	28.9
>35	13	14.4
Mean±SD	29.5±4.7	
Educational level		
Illiterate	3	3.3
Read and write	10	11.1
Technical education	43	47.8
University education	34	37.8
Occupation		
Not working	32	35.6
Work	58	64.4
Family income		
Enough	62	68.9
Not enough	24	26.7
More than enough	4	4.4
Residence		
Urban	62	68.9
Rural	28	31.1
Sponsor of treatment cost		
Health insurance	0	0.0
Private cost	90	100.0
Duration of marriage (years)		
<2	6	6.7
2- < 4	20	22.2
4- < 6	27	30.0
6- < 8	14	15.6
>8	23	25.6
Mean±SD	5.6±2.5	

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Table (1) presents general characteristics of women under study, the mean age of women was (29.5±4.7). The minority of them were illiterate (3.3%). Considering occupation, more than two thirds of women were employed (64.4%), 68.9% of them were from urban origin. In all samples the treatment cost was paid from the couples own money. Also, the mean duration of marriage was (5.6±2.5).

Table 2: Number and Percent Distribution of the Performance during Pre-Embryo Transfer Preparations done for Participants (n=90)

Preparations for the Pre Embryos Transfer Process				
	Done		Not Done	
	NO	%	NO	%
Before procedure				
Greeting couple	65	72.2	25	27.8
Inform couple about number of embryos to be transferred and the status of embryos.	90	100.0	0	0.0
Inform couple about number of embryos that will be frozen	90	100.0	0	0.0
Give women instructions before entering the operating room:				
Eat a light breakfast	90	100.0	0	0.0
Drink 2-3 liters of fluid before an hour from entering the operating room	67	74.4	23	25.6
Not to use cosmetics and perfumes	15	16.7	75	83.3
Take off contact lenses	25	27.8	65	72.2
Wear overhead and operation gown	89	98.8	1	1.1
Give psychological support	59	65.6	31	34.4
Not to urinate before embryos transfer	90	100.0	0	0.0
Procedures to prevent the spread of infection:				
Running water *	90	100.0	0	0.0
Wash basin for hands and instruments *	90	100.0	0	0.0
*Procedures of hand washing	10	11.1	80	88.9
*Procedures for use of gloves	24	26.7	66	73.3
*70% ethylic alcohol or betadine	89	98.9	1	1.1
Nurse accompanies women to the operating room	72	80.0	18	20.0
Nurse helps women to lie on the operating table in lithotomy position	90	100.0	0	0.0
Sure to fill the bladder using ultrasound	90	100.0	0	0.0
Evaluate the thickness of the uterus by using ultrasound	90	100.0	0	0.0
Measurement of the uterine cavity by using ultrasound	90	100.0	0	0.0
Make sure there are no fluid behind the uterus and abdominal cavity, indicative of excessive activation	90	100.0	0	0.0

Table (2) shows that preparations before embryos transfer was done to all women. The same table illustrates that, some items done in some cases such as; greeting couple, give psychological support, nurse accompanies women to the operating room (72.2%, 65.6%, & 80.0%) respectively. As regards procedures to prevent the spread of infection, the same table reveals defect in procedures of hand washing and use of gloves (11.1%, & 26.7%).

Table 3: Number and Percent Distribution of the Performance during Embryos Transfer Phase Preparations done for Participants (n=90)

Preparations for the embryos transfer process				
	Done		Not Done	
	NO	%	NO	%
During the process of embryos transfer				
Put speculum in the vagina to expand	90	100.0	0	0.0
Cleanse the vagina and perineum area using saline solution	9	10.0	81	90.0
Sprinkle the cervix by using IVF-media	90	100.0	0	0.0
Give painkillers and sedatives	70	77.8	20	22.2
Give medicine to reduce spasms of the cervix	3	3.3	87	96.7
survey for cervix	90	100.0	0	0.0
using cleaning to cervix	90	100.0	0	0.0
Suction of mucus from the cervix and uterus	90	100.0	0	0.0
Use ultrasound in transferring embryos to determine end of catheter and processed in line with position of uterus and length of uterine cavity	90	100.0	0	0.0

Table (3) illustrates preparations during the embryos transfer process, it was noticed that, all preparations during the embryos transfer were done in a perfect manner except give medicine to reduce spasms of the cervix to women during transfer, 3.3% of women was given this medicine. Also there are more than three quadrant of sample had not cleanse the vagina and perineum area by saline solution (81.0%).

Table 4: Number and Percent Distribution of the Performance after Embryos Transfer Preparations done for Participants (n=90)

Preparations after Embryos Transfer	Done		Not Done	
	NO	%	NO	%
After the process of embryos transfer				
Nurse accompanies women to the recovery room	4	4.4	86	95.6
Women lie in her back for 15 minutes	90	100.0	0	0.0
Emptying the bladder after 15 minutes of the transfer	90	100.0	0	0.0
Rest for an hour before leaving the unit	90	100.0	0	0.0
Procedures to prevent the spread of infection				
*Procedures of Cleanup and decontamination from instruments	77	85.6	13	14.4
*Procedures of Cleanup and decontamination from laboratory	90	100.0	0	0.0
*Brush cleaning for instruments	90	100.0	0	0.0
Autoclave or dry heat oven *	90	100.0	0	0.0
*Procedures for disposal of residual materials	90	100.0	0	0.0

Table (4) manifest the preparations were done after embryos transfer; it was observed that all preparations were excellently done except nurse accompanies women to the recovery room (4.4%).

Table 5: Number and Percent Distribution of the Performance by given Discharged Instruction after Embryos Transfer for Participants (n=90)

Discharged Instructions	Studied Females (n=90)			
	Done		Not Done	
	NO	%	NO	%
Instructions given to females at leaving the unit				
Give written instructions	90	100.0	0	0.0
Described treatment for install pregnancy	90	100.0	0	0.0
Rest at home for 14 days before returning to work	90	100.0	0	0.0
Bathing in the next day to the process embryos transfer	0	0.0	90	100.0
Avoid vaginal douche	0	0.0	90	100.0
Avoid excessive exercise or violent effort	90	100.0	0	0.0
Avoid sexual intercourse for 14 days after transfer	90	100.0	0	0.0
Contact immediately with health team if found any danger sign	90	100.0	0	0.0
Communicate the medical team to perform pregnancy test after 14 days of transfer	90	100.0	0	0.0

Table (5) shows the content of all instruction given to women at discharge after embryo transfer. The table illustrates that all instructions was given, except the time of bathing and avoid vaginal douching.

Table 6: Frequency of Total Score (%) for Preparations of Embryos Transfer Stage done for Participants Preparations

Performance score (%)	Min-Max	Mean±SD	Studied females (n=90)			
			Unsatisfactory (<60%+)		Satisfactory (60%+)	
			No.	%	No.	%
Measures before procedure score	63.6-95.5	80.5±7.7	0	0.0	90	100.0
Measures during the process score	66.7-100.0	76.7±6.7	0	0.0	90	100.0
Measures after the process score	77.8-100.0	87.8±4.7	0	0.0	90	100.0
Score of instructions given to females at leaving the unit	77.8-77.8	77.8±0.0	0	0.0	90	100.0
Total score of performance	71.4-87.8	80.6±3.9	0	0.0	90	100.0

Table (6) represents total score of performance for preparations of all phases of embryos transfer. It was observed all preparations were done in satisfied manner with a mean (80.6±3.9).

IV. Discussion

The aim of the present study was to assess the care given for women undergoing intracytoplasmic sperm injection in embryos transfer stage, the aim of the present study was achieved through the findings of the present study, also the research questions was answered.

Pre-Embryos Preparation: Nurse should welcome the couple, reassure them, give emotional support, and give them the necessary instructions in a simple and familiar manner before entering to operation room. In the present study near to three quadrants of couples received a greeting and welcoming upon arrival to the center, more than two thirds received emotional and psychological support and more than three quadrants accompanied

by a nurse to operation room. Impact of psychological status for couple is very necessary because they suffering from anxiety and fear of treatment failure, the negligence of their feelings may lead to increase stress, anxiety, it has a negative effect on the response rate of couple to treatment and the success rate of ICSI; this was supported by **Palha and Lourenco (2011)** who were mentioned that, the outcome of infertility treatment may be influenced by anxiety and psychological factors.

The present study results were demonstrated that, the shortening on the side of the psychological and emotional support for couples may be due to the shortage in the number of nursing, and lack of skills to deal with infertile couple. This view supported by **Payne and Goedeke (2007)** who were mentioned that, the nurses need to be educated about the emotional reactions to those experiencing infertility and appropriate ways of responding. The present study finding goes in line with **Dhavan et al. (2010)** who stated that, the couples should be informed about numbers of embryos transfer and frozen and fill a consent for ET and consent for freezing of embryos. In addition, **Derks et al. (2009)** was advised each woman not to urinate before embryos transfer in order to fill the bladder to reduce the angle between the cervix and the uterus and to allow visualization in ultrasonographic scanning. In respect, **Lorusso et al. (2005)** were found that, no evidence effect on the pregnancy rate for women undergoing ET with a full bladder (38/133) compared with women undergoing ET with an empty bladder (38/140).

Almost all wives and staff were wearing a gown, overhead and shoes, but there are major defects by nurses in procedures of hand washing and wear gloves and these may lead to spread of infection. **Cronin et al. (2008)** were mentioned that, the nursing shortage decreases the nurse-to-patient ratio, increasing workload for nurses and decreasing time for infection control precautions.

The current study in agreement with **Neelam et al. (2005)** who were mentioned that, all wives were placed in lithotomy position and no anesthesia was given. Evaluate the thickness of the uterus, measurement of the uterine cavity and sure that there are no fluid behind the uterus and abdominal cavity done for all wives by physician and nurse. These results were supported by **Osemwenkha and Osaikhuwuomwan (2012)**; thicker endometrial is associated with increase pregnancy rates, on the other hand, uterine cavity should be assessed to determine any abnormality and detect the best site to embryos implantation.

During Embryos Transfer:

All procedures were done perfectly to all women except administration of painkillers, sedatives and anti-spasmodics. These results in accordance with **Mansour (2005)** who stated that, mechanical closure of the cervix by loosening the screw of the vaginal speculum should be followed the introduction of the embryos transfer catheter. Also, **Eskandar et al (2007)** who mentioned that, the embryos may become embedded by the cervical mucus; therefore cervical mucus can be dislodged.

The current study reveals that, ultrasound guidance was used during transferring embryos inside uterus. **Brown et al. (2010)** were suggested that, the embryos transfer is a blind technique and clinicians must rely on their sense to introduced embryos in its proper place, therefore this method is often unreliable for evaluating the correct catheter location. The majority of participants in this study didn't received any medication to reduce uterine contraction. **Neelam et al. (2005)** disagreed with this finding; they were mentioned that, all women in their study given 5 mg of midazolam intramuscularly 30 minutes before the embryo transfer.

Post-Embryos Preparation:

The majority of nurses didn't accompany wives from operation room to the recovery room, but male cleaner was accompanied wives. So, wives were angered and felt uncomfortable; it had a negative impact on the psychological aspect of wives. Nurse should accompany wives in all procedures during embryos transfer because the wives feel comfortable and at ease when accompanied by a nurse.

The findings of this study in agree with **Matorras et al. (2002)** who stated that, wives were allowed to empty her bladder within 10-15 minutes after embryos transfer and lie on her back for the same time. Moreover, **Vedmedovska (2005)**, were advised that, women who have been resting for 20-60 min after embryo transfer were demonstrated a higher implantation rate than others. As well, wives in the current study rest for an half hour before leaving unit.

Discharge Instruction:

The current study findings were showed that, all women were given a written instructions containing prescribed treatment, avoid excessive exercise or violent effort, avoid sexual intercourse for 14 days after transferring, rest at home for 14 days before returning to work, contact immediately with health team if found any danger sign and finally communicate with medical team to perform pregnancy test after 14 days of transfer. These instructions were supported by the instructions, which mentioned at a very recent review by **Marcus (2014)**

V. Conclusion

Based on the findings of the present study, all preparations and techniques required for embryos transfer stage conducted by nurses were done in a standard way except some defect regarding precaution for some items about infection control and attention to psychological aspect for wives; it may be due to shortage in nursing staff.

VI. Recommendation

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

- Counseling classes should be conducted for infertile women by professional counselors to council them about their problem, and different ways of treatment and give emotional and psychological support.
- Training courses should be conducted for a health provider especially nurses to teach them infection control precaution, optimization deal with infertile couple and any new trend in ICSI or ET.

Further studies:

- ❖ It is advised to conduct the study on a large sample size, another population.
- ❖ It is imperative that further studies focus on educational programs for nurses about infection control precautions and new trends in ICSI or ET.

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References

- [1]. Brown, J., Buckingham, K., Abou-Setta, A. M., & Buckett, W. (2010). Ultrasound versus 'clinical touch' for catheter guidance during embryo transfer in women. *Cochrane database of systematic reviews*; (1): CD006107.
- [2]. Centers for Disease Control and Prevention (CDC). (2012). Assisted reproductive technology. Available at: <http://www.cdc.gov/art/>.
- [3]. Codreanu, D., Coricovae, A., Dracea, L. & Boleac, I. (2013). Natural conception following total fertilization failure with intracytoplasmic sperm injection in a couple with unexplained infertility: A case report. *Rev Med Chir Med Nat*; 117(2): 431-438.
- [4]. Cowan, D. B. (2003). Assisted reproductive technology and the fertility clinic. In *Inconceivable Conceptions: Psychological Aspects of Infertility and Reproductive Technology* (Haynes, J. and Miller, J., eds). Brunner Routledge. New York: P.p. 11–16.
- [5]. Cronin, S., Leo, F., & McCleary, M. (2008). Linking nurse staffing to nosocomial infections: a potential patient safety threat. *The eorgetown undergraduate journal of health science*: 5 (2): 1-4.
- [6]. Derks, R. S., Farquhar, C., Mol, B. W., Buckingham, K., & Heineman, M. J. (2009). Techniques for preparation prior to embryo transfer. *Cochrane database of systematic reviews*; (4): CD007682.
- [7]. Dhavan, R., Acharya, B., Ray, A., Banker, M., Ambwani, K., Bhargava, P.M., Mehta, J.G. & Allahabadia, G. (2010). The assisted reproductive technology (regulations) rules. *Indian council of medical research*; P.p. 18-23.
- [8]. Eskandar, M. A., Abou-Setta, A. M., El-Amin, M., Almushait, M. A. & Sobande, A. A. (2007). Removal of cervical mucus prior to embryo transfer improves pregnancy rates in women undergoing assisted reproduction. *Reproductive biomedicine online*; 14(3): 308-13.
- [9]. Eyo, U. E., Upuji, F. I. & Ukpong, E. I. (2012). Termination of pregnancy (top) related infertility in women in Akwa Ibom state. *Academic Research International*; 3(3): 120-124.
- [10]. Lorusso, F., Depalo, R., Bettocchi, S., Vacca, M., Vimercati, A., & Selvaggi L. (2005). Outcome of in vitro fertilization after transabdominal ultrasound-assisted embryo transfer with a full or empty bladder. *Fertility and Sterility*; 84(4): 1046–8.
- [11]. Mansour, R.T. (2005). Minimizing embryo expulsion after embryo transfer: a randomized controlled study. *Human Reproduction*; 20(1): 170–4.
- [12]. Marcus. (2014). IVF procedure: details the embryo transfer procedure adopted during IVF treatment cycles. Available at: http://www.Ivf.com/IVF_procedure_Embryo_replacement.htm.
- [13]. Matorras, R., Urquijo, E., Mendoza, R., Corcostegui, B., Exposito, A., & Rodriguez, F., G. (2002). Ultrasound-guided embryo transfer improves pregnancy rate and increases the frequency of easy transfer. *Human reproduction*; 17(7): 1762-1766.
- [14]. Maya, N., Mascarenhas, Seth, R., Boerma, T., Sheryl Vanderpoel, S, & Gretchen A. (2012). National, regional, and global trends in infertility prevalence since 1990: A systematic analysis of 277 health surveys". *Public Library of Science*; 9(12).
- [15]. Nachtigall, R.D.(2008). International disparities in access to infertility services. *Fertil Steril*;85:871–875.
- [16]. Neelam, B., Mohanlal, M., Namita, K., & RiR, s. (2005). Embryo transfer technic – role of transfer catheter. *J Obstet Gynecol India*; 55(2): 146-150.
- [17]. Osemwenkha, A.P., & Osaikhuwuomwan, J., A. (2012). Correlation between endometrial thickness and IVF outcome in an African population. *Gynecol Obstet journal*; 2(119): 1-5.
- [18]. Palha, A., P., & Lourenco, M., F. (2011). Psychological and cross- cultural aspects of infertility and human sexuality. *Adv Psychosom Med. Basel. Karger*; 41:164–183.
- [19]. Payne, D., & Goedeke, S. (2007). Holding together: Caring for clients undergoing assisted reproductive technologies. *Journal of Advanced Nursing*; 60(6): 645–653.
- [20]. Sallam, H.N. (2005). Embryo transfer: factors involved in optimizing the success. *Current Opinion in Obstetrics & Gynecology*; 17(3): 289–98.
- [21]. Vedmedovska, N. (2005). Mobilization versus bed rest following embryo transfer. *Training in Reproductive Health Research; UNFPA/GFMER scholarship*.
- [22]. World Health Organization (WHO). (2013). infertility. Geneva. Available at: www.who.int/reproductivehealth/topics/infertility/definitions.