

## Original Article

### Short-term Outcome of In-vitro Fertilization Babies (IVF) In Sudan

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#### ABSTRACT

This is a prospective hospital based comparative study from Sudan including 96 IVF babies and 62 mothers compared with a control group. The objectives of the study include the assessment of birth parameters of IVF babies, common medical problems in neonatal period, incidence of multiple births and congenital malformations among them, it also analyses the psychosocial impact on mothers. The main finding is that IVF babies had lower birth weight compared to normal conception babies. 7(7.3%) were EBW, 18(18.7%) VLBW, 31(32.3%) LBW, 40(41.67%) normal weight for age. The study confirmed that IVF babies had higher incidence of multiple births, it also confirmed that IVF babies had higher incidence of multiple birth, 44(45.8%) were twins, 18(18.8%) were triplets the remainder 34(35.4%) were singletons. However in the control group 8(8.3%) were twins, 3(3.1%) were triplets and 85(88.5%) were singletons. The incidence of congenital malformations was equal in both groups. The common medical problems were due to prematurity. The mothers in this study had an increase in their self-esteem, their relation with their husbands became more intimate and also with their families and neighbors. 74.2% of the mothers refused to declare to the about their IVF baby.

key words: In-vitro Fertilization, LBW, prematurity, Sudan.

#### Introduction

In the Sudan, the prevalence of female infertility was 11.5%, 2.7% were primary infertility, 8.8% were secondary infertility (1). IVF is the most recent advances in infertility treatment besides ICSI. The first IVF baby born is Louise Brown, on 25th July 1978 in Oldham (2).

Khartoum Fertility Center is the first center in Sudan started in September 1999. The first IVF babies were twin females, delivered on 15th of April 2001, with birth weights of 2.56 and 2.5 kg. Since then 300 babies were delivered. Sudan Assisted Reproductive Center is

the second one in Sudan in 2000. The first babies were delivered on March 2004. The outcome was a twin, one a male and one female and a singleton male. Their weight were 2.1, 2.5, 2.5kg respectively.

#### Objectives

The study aims to assess the birth parameters, incidence of multiple births, detection of the congenital malformations and common medical problems encountered during the neonatal period among the IVF babies compared with the normal conception. Besides studying the psychosocial impact of the IVF babies on their mothers.

#### Material and methods.

This is a descriptive, prospective, comparative study done in Saheroon Specialized hospital and Soba University Hospital where most of the deliveries are conducted from January 2002 to January 2004. It includes all babies born after IVF done in Sudan and the mothers of those babies. It excludes IVF babies born outside Sudan and those whose parents refused to give consent to the study. Inclusive sample including all the IVF babies born during this period to complete the sample size.

The study tools included an interview using a detailed questionnaire after verbal consent obtained from the treating doctor and the parents.

Gestational assessment was done using Dubowitz chart in addition to clinical examination and measuring birth parameters and investigation by author.

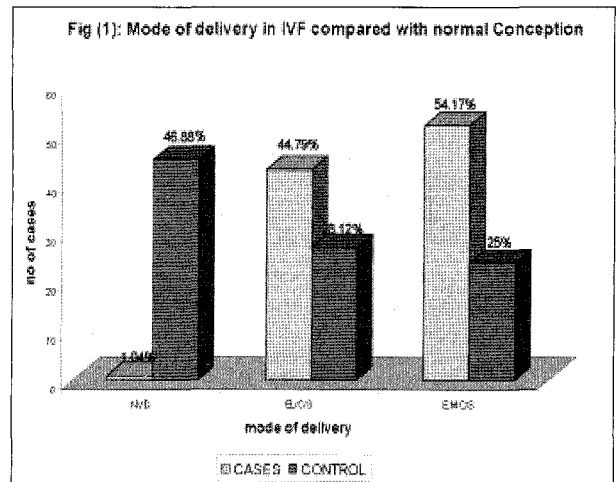
The data collected was analyzed by the computer using the Statistical Package for Social Studies (SPSS). Chi square test ( $\chi^2$ ) was used to determine statistical significance.

#### Results:

The median age of the mothers was 33 years with a range of (31-35 yrs) in the study group, compared to 28 years and a range of (26-30 years) in the control group. The difference between two groups is statistically significant ( $P < 0.001$ ). All mothers of IVF babies were educated with 6.5% were postgraduate compared to 98% mothers educated in the control group no one had

postgraduate education. The difference between two groups is statistically significant (P=0.000).

**Fig (1) : Mode of delivery in IVF compared with normal Conception**



**Fig (2): The outcome of IVF pregnancies compared to normal one**

**Fig (3) Gestational Weeks of IVF pregnancies compared to normal conception babies**

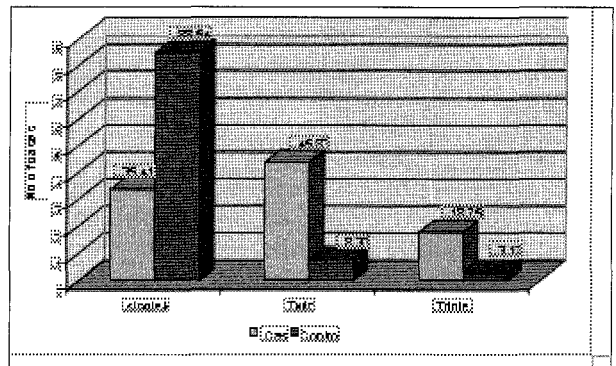
Concerning the sex ratio, 49(51.0%) of IVF babies were male while in the control group there were 57(59.38%) male. The difference between the two groups is statistically not significant (p=0.246).

Congenital malformations were detected in 3 children (3.1%) in the study and control group with no significant difference in the incidence (P>0.05). In the study group it included Down syndrome, trisomy 18 and hypospadias. In the control group jejunal atresia, albinism, clinodactyly of the 5th toe of the left foot.

**Table (1): The Medical Problems**

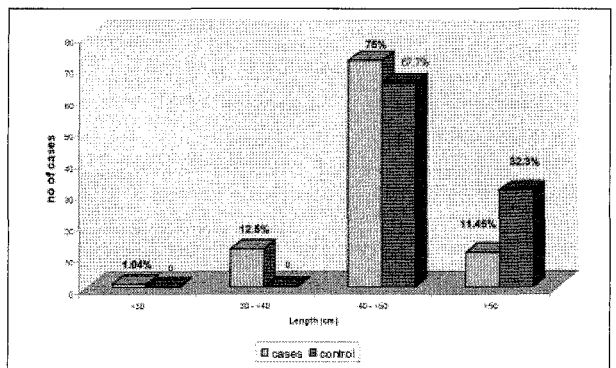
| Disease   | Study      | Control |
|-----------|------------|---------|
| RDS       | 15(15.63%) |         |
| TTN       | 12(12.50%) |         |
| NNJ       | 10(10.40%) |         |
| N. Sepsis | 2(2.08%)   |         |
| Caput     | 0(0.00%)   |         |
|           | 3(03.13%)  |         |

(P=0.002).



About 18 (29%) of the mothers knew about the IVF method from their treating doctors, 19(12.9%) from the television, 17(27.4%) from magazines and 8(12.9%) from their relatives and friends who had previous IVF pregnancies.

The decision taker to have an IVF baby is mainly by parents 58.1%, 12.9% taken by the wife, 11.4% by the husband, and 17.7% was suggested by the treating doctors at first. Concerning the consultation to have IVF baby 71% consulted the treating doctors, 4.8% of them consulted other family members, 4.8% consulted a maternal grandmother. 71% of the families considered religious opinion. 62.9% of those from the treating doctors, 6.5% from religious leaders and 1.6% from their family members and friends. Concerning their attitude towards the sex of the baby, 56.5% has wished male or female, 8.1% were disappointed especially if the baby is a female and they wanted a male, and 35.5% stated that they want just a baby male or female. 83.9%



of the mothers wished to have twins. The reasons of this wish were, 35.5% family completion, 35.5% spare time, 4.8% cost effective and 8.1% fear of possible failure to succeed again. The reasons for those who did not wish to have twins 14.5% thought that one baby was enough, 1.6% thought of problems in upbringing.

A considerable number (74.2%) of the mothers refused to declare the community about their IVF baby. The reasons cited for this are; 12.9% was for the baby future, 21% avoidance of social problems, 19.4% avoidance of family problems concerning the cause of infertility, 17.7% difficulty of the acceptance of the

community to the idea and 3.2% fear of the wrong consequence of the IVF method.

About 4(6.5%) babies from the study group died compared to non in the control group. The cause of death was the extreme prematurity which reflect the inadequate perinatal and neonatal care.

#### **Discussion**

The demographic characteristics of Mothers participating in the Study:

The median age of the mothers was 33 years (range 31-35-years) in the study group and 28years (range 26-30years) in the control group with a significant difference. This also can increase risk of congenital malformations, which is related to the maternal age and a decision of caesarean section delivery. As shown by Doyle et al that mothers who achieve a pregnancy after IVF are generally older and confers a higher risk of maternal and perinatal complications (3). Elferink et al demonstrated that maternal age tends to be higher than average and hypertension and placental insufficiency are more likely with high incidence of multiple pregnancy and high rate of caesarean section in the study group(4).

#### **Outcome of IVF Pregnancies:**

There was a statistically significant high incidence of multiple births in the study group (65.6%) compared to the control which was (11.4%). This is similar to Ericson study, in which 27% of IVF pregnancies were multiple births in comparison with 1% in the control group (5).

There was no significant difference between sexes; the male/female ratio in the study group and control group is 1.04 and 1.46 respectively. This finding is different from Dr Thatcher and colleagues who reported a significant high sex ratio of male infants (male/female ratio 1.83) following IVF pregnancies. Mike Murphy and Valeric Seagroatt claimed that the striking excess of male births showed by Dr Thatcher was due to chance (7).

#### **4 The Birth Parameters and Gestational Age:**

In this study the median birth weight was 2370g (700-3800g), and 3000 (1300-4900-g) in the study group and control group respectively with no difference. This is similar to Wennerholma U B study which documented a median birth weight was 1670g (1635-1956-g) and 1515g (1455-1725-g), in the preserved and standard IVF groups respectively (7).

About 40% of the deliveries in the study group were preterm in comparison with the control, the difference is statistically significant; in addition there was a high rate of ELBW and LBW in the study group than the control group.

This goes with the finding of Jakson's study who found that there was a higher rate of preterm labour, LBW and SGA in the babies of women who conceived

via IVF(8). Verlaen on found that sixteen IVF pregnancies and two control pregnancies ended as preterm ( $p < 0.001$ ). While Ericson found that in IVF group, more babies were born as preterm ( $< 37$  wk) than controls and more had LBW (9.10).

However, Bernasko showed that there was no statistically significant difference in the preterm deliveries or mean gestational age between IVF pregnancies and normal conception. Olivennes F, also found no significant difference between the IVF singleton pregnancies and natural pregnancies concerning the prematurity, LBW, SGA and perinatal mortality (11,12).

#### **4.5 The Congenital Malformation:**

Most studies done previously confirmed that there was a high incidence of congenital malformation in the IVF group. Michele Hansen found that 9% of babies conceived through ART had a risk of a major birth defect(13). Vander Westerlaken reported a high incidence of sex chromosome anomalies and high incidence of structural and numerical chromosomal aberrations which reflects higher maternal age in IVF group. In our study we found one baby with Down syndrome, one with Edward syndrome which goes with Vander Westerlaken's report(14).

Vander Westerlaken and Silver et al demonstrated that male IVF babies had 5 fold increased risk of hypospadias, which may be related to paternal sub-fertility. Similarly in our study we found one baby with baby with hypospadias. In the control group we found one with albinism, one with jejunal atresia and one with minor malformation (clinodactyly of the 5th toe of the left foot) (15).

#### **The Medical Problems:**

In this study more neonatal complications were found in IVF group compared with the control. This contrasts with the study of Bernasko which showed that no statistically significant increase in the frequency of neonatal complications among infants born after IVF (16).

#### **The Psychosocial Impact of IVF Babies on the Mothers:**

The decision of IVF pregnancy is taken by both parents reflects the good and intimate relation between the couples.

80.6% of families considered another consultation to have an IVF baby, the treating doctor was consulted by 71% of the participant, while 4.8% consulted another family members, and 4.8% sought the opinion of the maternal mother for the decision.

Regarding the issue of having, 83% of the mothers wished to have multiple pregnancies. 35.5% of them because they want to have a quick complete family, 35.5% to spare of time, 4.8% think that it is cost effective and 8.1% for fear of failure in the future. On the other side 16.1% want only singleton pregnancy, 14.5% though it was enough and 1.6% thought of the rearing of the baby. Since the median age of them others was 33years, and that waited for a long time to have a baby, they have every right

to be worried about the time needed to complete their families bearing in mind the cost effectiveness.

Achman suggested that mothers are more prone to depression, anxiety, health complaints and lack of self-esteem (17).

Psychological stress of the IVF process includes the stress of the evaluation procedures and future emotional reactions with the partner, the family and the friends, and work relationships (18). But in our study we found that 75.8% of mothers had an intimate relation with their husbands, 72.6% had a better relation with their family and 71% felt a better relation with their friends and neighbours. Also in our study 64.5% felt that self-esteem become much more than usual and 77.4% of them were proud to have a kids. It was found that only 16.1% of the mothers were anxious and 6.5% had fears about this method.

IVF as a new method and introduced recently in Sudan and it was very difficult to obtain consent from the parents to participate in this study, and 74.2% of them asked for confidentiality. They didn't like their community to know about the IVF baby and opted not to tell their children how they were conceived. Considering their main reason secrecy, 12.9% of them for the sake of the baby's future later, not to remind him that he is a test tube baby, 21% wanted to avoid social problems and 19.4% wanted to avoid family problems concerning who was responsible for the infertility and the cost of this pregnancy. 17.7% though of the acceptance of the community to this new method and 3.2% were afraid of the wrong conception of the IVF method. This was not surprising, having in mind the social misconception, the religious and ethical debate concerning IVF (19).

### Conclusions

More IVF babies were born preterm in the study group than control group with low postnatal birth parameters and high percentage of multiple birth.

There is no difference in the incidence of CM between IVF group and control group. But chromosomal abnormalities were found more in IVF group. Knowledge, descion and religious opinion taken more from the treating doctors. The IVF mothers reflect more anxiety and fear and also over protection to their babies'.

### Recommendations

Education, information and communication activities at the level of community is recommended to raise awareness of people about IVF method and its religious and social aspects beside participation of the public sector in the IVF to be affordable.

### References

- (1) Elsheikh M. A., Gerais A. M., Rogia A. Prevalence of female infertility in four regions in the Sudan. *Eur J Obstet Gynecol* 2002; 5:165168-.
- (2) Rainbury PA, Viniker DA, editors. *Practical Guide to Reproductive Medicine: A short history of infertility, its investigations and treatment*. New York: Pathenon publishing; 1997. p. 8293-.
- (3) Doyle P, Beral V, Maconchie N. Preterm delivery, low birth

weight and small for gestational age in live born singleton babies resulting from in vitro fertilization. *Hum Reprod* 1992; 7: 42528-.

- (4) Elferink-Stinkens PM, Brand R, Van Hemel OJ. Trends in caesarean section rates among high and medium risk pregnancies in the Netherlands 1983-1992. *Gynecol Reprod Biol* 1995; 56:15967-.
- (5) Ericson A, Hillensjo T, Nygren KG, Wennerholm UB. Deliveries and children born after in vitro fertilization in Sweden. *Lancet* 1999; 354:1583.
- (6) Mike Murphy, Valeri SG. Sex ratio in singleton and multiple births after infertility treatment. *Lancet* 1989; 22: 215.
- (7) Wennerholm UB, Albertsson-Wikland K, Bergh C, Hamperger L, Niklanson A, Nilsson L, et al. Postnatal growth and health in children born after cryopreservation as embryos. *The Lancet* 1998; 351:108590-.
- (8) The Bertarelli foundation makes public the results of its multicentre study on five years old ICSI children, 2003. Available at: [http://www.resolve.org/main/national/media/pressrelease/PRIC\\_SIUS.htm](http://www.resolve.org/main/national/media/pressrelease/PRIC_SIUS.htm) Accessed Jan 2003.
- (9) Ericson A, Hillensjo T, Nygren KG, Wennerholm UB. Deliveries and children born after in vitro fertilization in Sweden. *Lancet* 1999; 354:1583.
- (10) Verlaenen H, Camm H, Derde M P, Amy J J. Singleton pregnancy after in vitro fertilization: Expectations and outcome. *Obstet Gynecol* 1995; 86:90610-.
- (11) Campbell AGM, Intosh MCI. *Forfar Text book of Paediatric History Taking and Physical Examination*. 5th ed. London: Churchill Livingstone; 1998. p. 4044-.
- (12) Olivennes F, Rufat P, Andre B, Pourade A, Quiros MC, Frydman R. The increased risk of complication observed in singleton pregnancies resulting from in vitro fertilization (IVF) dose not seem to be related to IVF method itself. *Hum Reprod* 1993; 8:297300-.
- (13) Michele H. The risk of major Birth Defects after intracytoplasmic sperm injection and in vitro fertilization. *New Eng Jor of Med* 2002; 346: 725- 30.
- (14) VanderWesterlaken L. Invasive prenatal diagnosis after intracytoplasmic sperm injection. *Fertil Steril* 2001; 75:1240-241.
- (15) Michele H. The risk of major Birth Defects after intracytoplasmic sperm injection and in vitro fertilization. *New Eng Jor of Med* 2002; 346: 725- 30.
- (16) Bernasko WA. Twin pregnancy after IVF GIFT. *Obstet Gynecol* 1997; 89: 36871-.
- (17) Lancaster PA. Congenital malformations in twins: A population study. *Acta Genet Med Gewell (Roma)* 1986; 35: 16778-.
- (18) In vitro fertilization. Psychological consent for Assisted Reproduction Participants, 2003. Available at: <http://www.IVF.com> Accessed Jun 15 2003.
- (19) Achman Y, Tadir Y, Fish B, Ovadia J. Emotional characteristics and attitude of couples during in vitro fertilization treatment. *Harefuab* 1989; 116:18992-.