The
Journal of Obstetrics & Gynaecology
of India

Vol. 40 No. 3 JUNE 1990

Editorial

INTRAUTERINE INSEMINATION

Although therapeutic introduction of semen in the vagina or cervix as a treatment for infertility is practiced since long, intrauterine injection of sperms is just three decades old. Yet, it is already an established mode of assisting reproduction in selected infertile couples. Basically, it consists of precise, painless, atraumatic and aseptic deposition of pretreated sperms near the uterine fundus at the time of anticipated ovulation.

The cervical canal plays a unique role in human reproduction. Besides offering a friendly abode to the sperms deposited in the hostile vaginal milleu it filters out subfertile sperms, stores sperms for a slow and sustained release into the uterine cavity and aids in capacitation of sperms. Since intrauterine insemination (IUI) bypasses the cervix, the functions of the cervix have to be carried out by suitably treating the sperms in the laboratory. This laboratory pretreatment of sperms consists of sperm washing, filtration through human serum albumin, utilising sperm migration or sperm rise technique and employing preincubation for in-vitro capacitation. Thus, debris and agglutinated, dead and subfertile sperms are removed, seminal plasma contained prostaglandins and antisperm antibodies is eliminated, viscocity is altered favourably and percentage of forward progressing sperms is markedly increased. In other words the fertilising potential of the sperms is remarkable enhanced. Untreated sperms should never be used for IUI for fear of cramping due to postaglandins and of infection.

The pretreated sperms are injected aseptically in the upper part of the uterine fundus on the day of expected ovulation as judged by serially using any two of the following methods - BBT, cervical mucous

studies, vaginal cytology, RIA of estradiol and LH and sonography. To prevent trauma to cervical epithelium and endometrium soft nonmetal catheters are used for sperm injection. Pediatric feeding catheter No.7, teflot IV catheter No.16 or 18, 18 gauge needle inserted in a find vinyl tubing moulded with a guide wire, special device designed by Meelar and Tomcat catheter used in IVF are used by different workers. Special care and skill are needed in handling acutely flexed uterus and stenosed cervix. Some workers advise removal of cervical mucus, especially if it is hostile and or contains antibodies, prior to insertion of the catheter. But most of the workers do not consider it necessary. About 0.5 ml of the sperm is usually deposited in the uterus.

Since IUI bypasses the cervix, infertility due to cervical factors like absent cervical mucus following conisation or amputation of the cervix, poor PCT and cervical stenosis is if its obvious indication. And so is male infertility resulting for oligospermia, poor sperm motility, high seminal viscocity, retrograde ejaculation etc. Other indications are immunological infertility and unexplained infertility. The rare woman who is allergic to seminal plasma needs IUI. Use of donor sperm necessitates screening for AIDS at the time of semen collection and again after 3 months and freezing of the sperms during the interval. Use of frozen sperm - donor sperm or-husband's sperm frozen before vasectomy - needs sperm wash and hence IUI.

IUI has hardly any significant complications. If properly carried out with perfect asepsis, infection should not be a problem. Prophylactic use of antibodies, given to the patient or added to the sperm, is not necessary. Uterine cramps may result if large volume of semen is deposited or unwashed sperm is used. Normally, only a few thousand sperms reach the peritoneal cavity while in IUI much larger number rreaches the peritoneum. It was feared that this would cause increase in sperm agglutination titres. But this is not proved to happen.

Pregnancy rates following IUI depend on the indication. Best results of 20% to 60% pregnancies are seen in cases of cervical infertility while 22 to 33% and 30% pregnancies are reported in immunologic infertility and unexplained infertility respectively. Oddly enough results are rather poor in male infertility with reported pregnancy rates ranging from 10 to 25%. While considering the pregnancy rates one must remember that treatment independent pregnancies can and do occur except in cases of azoospermia. Attempts are being made to improve the pregnancy rates by resorting to two inseminations in a cycle and inducing multiple ovulations. The mean duration of treatment with IUI needed to achieve pregnancy is 3.3 cycles while few patients conceive after 5 cycles. Lastly an abortion rate of 25% (compared to 15% in normal population) is reported in pregnancies following IUI. This higher abortion rate may be related to other factors like corpus luteum deficiency contributing to the couples infertility and is also seen in AIH.

IUI, though expensive, is ideal treatment for certain cases of infertility and is reasonably effective if carried out meticulously. It is a valuable and indispensible tool in the management of infertility.

— Mahendra N. Parikh

EFFECT OF FOOD SUPPLEMENTATION ON MATERNAL WEIGHT GAIN, LOW BIRTH WEIGHT INCIDENCE, INFANT WEIGHT GAIN AND BREAST FEED PERFORMANCE

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SUMMARY

The effect of food supplementation on lower middle-class urban Indian women during the second half of pregnancy and until 6 weeks postpartum could be seen as improved maternal weight gain during pregnancy and improved infant weight at birth and at 6 weeks postpartum. However, the incidence of low birth weight babies was not significantly reduced. Food supplementation did not improve sole breast feeding but it did improve incidence of partial breast feeding. In this study, in addition to food supplementation, each pregnant woman was encouraged to take two hours of afternoon rest and 8 hours of sleep, nightly and also one tablet Iron-Folic Acid daily throughout pregnancy till 3 months after delivery.

Introduction

The quality of the diet has long been known to affect the foetal condition; a better maternal diet is associated with improved well-being of the newborn (Burke et al, 1943).

Investigations of the effect of additional calories or a high protein diet during pregnancy have given conflicting results. Some showed a substantial effect at Guatemala (Lechtig et al, 1975) and Colombia (Mora et al, 1979) whilst a study in Haarlem, New York, on poor black urban population showed only marginal effects of nutritional supplementation (Rush et al 1980). A study of Asian mothers, in the UK, of varying nutritional status showed on enhancement of intrauterine growth with balanced supplementation (Viegas et al, 1982). The present study was undertaken to evaluate the effect of food supplementation in Indian women during second half of pregnancy and until 6 weeks postpartum, on maternal weight gain, high risk pregnancy, infant weight at birth and at 6 weeks postpartum, and lacational performance.

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Accepted for publication on 8/11/1989.

Materials and Methods

Plan of Trial : Between February, 1985 and February, 1988 - 406 randomly selected, otherwise healthy primi and second gravid women aged 25-35 years, at 20-24 weeks gestation with normal obstetric histories, were enrolled in the study. All these women had volunteered for a 7 month continuous study and had an average height to weight proportion (Dawn 1987). They were randomly allocated to two groups, (a) "Supplemented" and (b) "Control". Both groups were matched in terms of age (25-35 years), number of primigravidae and second gravidae.

(a) *"Supplemented" Group:* This group, comprising 259 respondents, was given a food supplement specially prepared to provide the extra nutritional requirements of pregnancy and lcatation. The product was packed in sachets. Each sachet contained one day's supplement (two servings) of the following composition:

Nutrient	Per Sachet
Energy	445 kcal
Protein	17.5 g
Fat	19.7 g
Carbohydrate	49.5 g
Vitamin A	1500 IU
Vitamin D	300 IU
Vitamin B1	0.2 mg
Vitamin B2	0.4 mg
Vitamin B12	0.5 mcg
Vitamin C	20 mg
Nicotinic Acid	3.7 mg
Folic Acid	100 mcg
Calcium	0.6 g

(b) *"Control" Group :* This group, comprising 147 respondents, was given a Placebo in sachets having the following composition:

Nutrient	Per Sachet
Energy	155 kcal
Protein	3.5 g
Fat	0.6 g
Carbohydrate	34.4 g

Women in both groups were instructed to take a half sachet of the supplement, mixed in a glass of warm water (200 ml) as a drink, twice daily. Each woman was given 30 days' supply of the supplement and instructed to retain the empty sachets. These were returned when she received a new supply so that apparent consumption could be monitored. Supplementation continued until 6 weeks postpartum. The enrolled women were educated to breastfeed the baby.

Economic & Educational Background of Respondents : Respondents were urban and semi-urban, from lower-middle class with monthly family incomes between Rs.750/- to Rs. 2,000/-. The education level was 8-14 years schooling.

Prenatal Care: This was given in the clinic by specialists. Checkups were at every 4 weeks. All the women had iron and folic acid supplementation consisting of 200 mg of ferrous sulphate and 500 microgram of folic acid daily from the time of registration until 3 months after delivery.

Data Record : The following data were recorded in detail in the printed protocol:

(a) Full antenatal checkup with regular maternal weight record; (b) Development of high risk pregnancy like preterm labour, IUGR and PIH; (c) Labour record; (d) Infant weight at birth and at 6 weeks postpartum; (e) APGAR Score; (f) Lactational performance; (g) Dietary intake.

The daily dietary intake was established for both groups by interview using a 24 hour recall questionnaire method. Four such diet histories were recorded. On completion of the study the average daily food intakes were computed and nutrient intakes were calculated using The Nutritive Value of Indian Foods (Gopalan et al, 1980).

Data Analysis

Both groups were measured for the following:

(a) Maternal weight gain; (b) Incidence of low birth weight infants; (c) Birth weight; (d) Infant weight at 6 weeks postpartum; (e) APGAR Scores; (f) Lactational performance; (g) Breast milk composition.

Results

Subject compliance was good throughout the study.

Maternal Weight Gain during Pregnancy : Table I shows the maternal weight gain observed during the second half of pregnancy for both the "Supplemented" and the "Control" groups. It can be seen from the Table I that the main weight gain during the second half of pregnancy was 6.16 ± 1.83 kg for the "Supplemented" group and 4.92 ± 2.05 kg for the "Control" group.

The improved weight gain seen in the women in the "supplemented" group is statistically significant ($p<0.001$).

Incidence of Low Birth Weight Infants (LBW) : Table II shows the incidence of low birth weight infants (both preterm and intrauterine growth retarded) which was observed during the course of the study. The incidence of low birth weight infants born to mothers in the "Supplemented" group was lower than that observed in the "Control" grup, but the difference was not statistically significant. Prior to the present intervention studies, the observed incidence of low birth weight infants in the hospital was 21%.

Birth Weight : The effect of prenatal maternal food supplementation on infant birth weight is shown in Table III.

TABLE - I
MATERNAL WEIGHT GAIN DURING SECOND HALF OF PREGNANCY

Group	Weight Gain ± (S.D.) (KG)	n	p
"Supplemented"	6.16 ± 1.83	259	<0.001
"Control"	4.92 ± 2.05	145	

TABLE - II
LOW BIRTH WEIGHT

Group	LBW Infants (Preterm + IUGR)	N
"Supplemented"	32 (12.4%)	259
"Control"	22 (14.9%)	147

TABLE - III
BIRTH WEIGHT OBSERVED DURING STUDY

Group	Mean Birth Wt. ± (S.D.) (kg)	n	p
"Supplemented"	2.79 ± 0.43	259	<0.005
"Control"	2.66 ± 0.46	147	

The average birth weight of infants born to mothers in the "Supplemented" group of 2.79 ± 0.43 kg was significantly higher ($p<0.005$) than that observed in the "Control" group, 2.66 ± 0.46 kg.

Infant Weight at Six Weeks Postpartum : The effect of maternal food supplementation (both pre and postpartum) on the infant weight at 6 weeks after birth is shown in Table IV.

At six weeks postpartum, the average weight of infants born to mothers in the "Supplemented" group was 3.85 ± 0.61 kg. This is significantly greater ($P<0.005$) than the 6 weeks postnatal weight observed in infants of the mothers in the "Control" group, 3.67 ± 0.59 kg.

APGAR Scores : Table V shows the APGAR scores observed in infants born to mothers taking part in the study.

The "Supplemented" group mothers delivered 97.7% normal APGAR score babies while 97.2% of those in the "Control" group showed normal responses.

Lactational Performance : During the course of the study, lactational performance was measured in terms of the number of breast feeds given daily. Table VI shows the lactational performance of the mothers recruited on to the study.

From the table, it can be seen the percentage of mothers exclusively breast feeding is significantly higher in the "Supplemented" group. The figure 2.8% for the "Supplemented" and 1.4% for the "Control" groups represent, overall, very poor lactational performance.

TABLE - IV
INFANT WEIGHT AT SIX WEEKS POSTPARTUM

Group	Mean Weight ± (S.D.) (Kg)	n	p
"Supplemented"	3.85 ± 0.61	259	<0.005
"Control"	3.67 ± 0.59	147	

TABLE - V
APGAR SCORES

Group	Apgar Score		n
	Low	Normal	
"Supplemented"	6 (2.3%)	252 (97.7)	258
"Control"	4 (2.8%)	139 (97.2)	143

Table VI indicates that a very high percentage of the women in the study use a system of complementary feeding, but it is encouraging to note that those in the "Supplemented" group appear to offer more breast feeds within the complementary feeding regimen. There was a significantly lower number of women in the "Supplemented" group who did not breast feed.

tum, and lactational performance, was observed.

The supplement, a powder mixed with water and taken as a drink was well tolerated and subjected compliance was good. The supplement was specially formulated to supply a proportion of the nutrients for which pregnancy and lactation create an extra demand.

TABLE - VI
LACTATIONAL PERFORMANCE UPTO SIX WEEKS POSTPARTUM

Lactational Performance (% breast feeds/ 24 hours)	Group			
	"Supplemented"		"Control"	
	No.	%	No.	%
100	7	2.8	2	1.4
51-99	133	52.0	49	34.5
1-50	94	36.6	67	47.2
0	22	8.6	24	16.9
n	256		142	

Breast Milk Composition : During the course of the study breast milk samples were collected from respondents from both groups and analysed for fat, protein and lactose contents. The average chemical composition was found to be as follows:

Fat : 3.0 - 3.5%; Protein : 1.5 - 1.7%, Lactose : 6.5 - 7.1%

The composition of breast milk did not vary appreciably between respondents in the "Supplemented" and the "Control" groups.

Discussions

In this study the effect of food supplementation during the second half of pregnancy until 6 weeks postpartum, on maternal weight gain during pregnancy, infant weight at birth and 6 weeks postpar-

The data presented in this paper demonstrate for the group receiving supplementation, an increase in maternal weight gain during pregnancy and increased infant weight both at birth and at 6 weeks postpartum when compared with the "Control group".

The women who received supplement also showed an increased lactational performance when measured in terms of numbers of breast feeds per day. The incidence of breast feeding was increased both in terms of the numbers of sole breast feeders and the percentage of breast feeds in those who used a complementary feeding regimen.

Except for gestational age, the two strongest influences on birth weight are mother's pre-pregnancy weight and her

weight and her weight gain during pregnacy (Rosso, 1985). Several reports have shown that non-obese women who gained less than the recommended weight tend to have lighter infants (Eastman and Jackson, 1968). The effect of weight gain during pregnancy is even more pronounced in women who are underweight. Such women often deliver low birth weight infants at particular risk in the neonatal period. The present study showed an increased maternal gain and an increase in birth weight associated with supplement consumption.

Most studies in industrialised countries fail to find an association between nutrition and weight gain in pregnancy (Viegas et al, 1982; Rush et al, 1980).

The results of the present study are at variance with those from the studies mentioned above but are in agreement with those from several other intervention studies, carried out in developing countries, which demonstrated an association between maternal supplementation and weight gain and infant birth weight (Prentice et al, 1987; Lechtig et al, 1975; Herrera et al, 1980; Chavez, 1978; Adair et al 1985; Mardones-Santander et al, 1986).

It is clear from the present study that maternal nutrition is intimately involved with infant health and survival. The problem of maternal malnutrition during pregnancy and lactation represent a potential and very serious obstacle to social development.

Acknowledgements

The study was supported by HMM Limited, New Delhi by providing funds and sachets of food supplement. The authors are thankful to Mr. M.P. Rajan Pillai, Chief of Research & Development Division of HMM Limited for his endeavour, both administrative and academic during this study. The authors are also thankful to Dr. S.C. Kandu, Chief Hospital Superintendent, B.R. Singh Hospital, Calcutta, and other hospital authorities for their kind permission to conduct the studies.

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