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The role of Omega 3 Supplementation on Pregnancy and Fetal Outcomes

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Abstract

Objectives:
The main objective of this study was to evaluate the effects of supplementation of omega 3 oral capsules on the prolongation of pregnancy and fetal outcome improvement by the increase in birth weight and reduced hospital admissions.
Study design:Interventional, controlled – clinical trial.
Stetting: Gynecology and Obstetrics department, Bint – Alhuda teaching hospital, Dhi – Qar.
Patients and methods:Two hundred and eighty singleton pregnant women, between (20 – 22) weeks of gestation who were expected to deliver preterm were included in the study. They were divided randomly into two equal groups, the first received omega 3 oral capsule as a supplement in a daily dose of 1000 milligram and the other group not (control group). Both groups were followed up until the time of delivery. The gestational age of delivery, infant weight and, hospital admissions were recorded.
Results: Omega 3 oral supplementation was significantly prolong pregnancy, improve birth weight and reduce hospital admission.
Conclusions:A better pregnancy duration and fetal outcomes have been found in women after the oral supplementation with omega 3 as compared to the other group.

Key words : Omega 3, Pregnancy , Fetal Outcomes **.**

I. Introduction

The preterm birth includes all deliveries happen between 24 and 36^{+6} weeks [1]. Preterm labour occurs in roughly 7% of pregnancies. The etiology of this type of labour is unknown in 50% of cases [2].

Many mechanisms are described for the pathogenesis of the preterm labour with possible exception of the true cervical weakness or incompetency. These mechanisms seem to share a final common pathway that involves the upregulation of prostaglandin production and the production of uterotonic agents and enzymes that weaken the fetal membrane degrade cervical stroma [1].

The risk factors for preterm labour include; malnutrition, smoking, poor socioeconomic status, genitourinary infections, multiple gestations, uterine abnormalities, previous preterm labour and previous preterm rupture fetal membrane [3]. More than 50% of women with painful uterine contractions will not deliver preterm [2]. Vague complaints such as increased vaginal discharge, pelvic pressure or low backache are sometimes reported, with the latter two often revealing cyclical pattern [4]. Fetal fibronectins and transvaginal ultrasound may help in diagnosis [2].

Owing to the limited resources and capacity of beneficial interventions in the low risk women, most aspects of prematurity prevention should be targeted at women with major risk factors for the preterm birth. Prevention measures for the preterm labour are treatment of bacterial vaginosis, use of progesterones, cervical cerculage and cervical pessary [1].

The mechanism of action by which polyunsaturated fatty acids supplementation prevents the preterm labour is unknown. There is an increasing evidence that prostaglandins with series 2 might play a central role in such event. Prostaglandins derived from the conversion of arachidonic acid (AA) an omega 6 fatty acid, whereas eicosapentaenoic acid (EPA) an omega 3 fatty acid originates prostaglandins belonging to series 3. The later one does not possess any uterotonic activity. During the normal pregnancy, plasma docosahexaenoic acid (DHA) level of pregnant women decrease progressively and considerably with the lowest mean values recorded between the 30^{th} and 40^{th} weeks [5].

Low or deficient fatty acid amidehydrolase activity has been linked to the early uterine stimulation, loss of pregnancy and labour onset [6]

II. Patients And Methods

An interventional controlled trial, conducted at Bint – Alhuda teaching hospital, south of Iraq, during the period of December 2014 to December 2017.

Two hundred and eighty (280) singleton pregnant women, gestational age (20 – 22) weeks of pregnancy who were expected to deliver preterm, were enrolled in this study. Preterm birth was anticipated on the basis of:

1. previous preterm labour,
2. unexplained second trimester loss,
3. placenta Previa,
4. structural uterine anomalies.

Patients with moderate to severe vaginal bleeding, rupture of fetal membrane, preeclampsia, severe maternal disease like cardiovascular disease, diabetes mellitus, severe anemia, and fetal congenital anomalies were excluded from the study.

II.1. Clinical assessment

- Detailed history and thorough clinical examination were performed.
- The gestational age was determined by obstetrical criteria depending on accurate dating of the last menstrual period and early ultrasound.
- Patients were investigated for hemoglobin concentration, random blood sugar, blood urea, general urine examination and obstetric ultrasound.
- All women were receiving weekly 17α-hydroxyprogesterone caproate, iron and folate supplements.
- A large number of participating women had cervical incompetence based on history and ultrasonography criteria of cervical incompetence.

The participated women were divided randomly in to two equal groups. The first group was received daily supplement of omega 3 oral soft-gelatin capsules in a single dose of 1000 mg from 20^{th} to 22^{nd} weeks till the 36^{th} week of pregnancy. Whereas the second group were not given the supplement. The women in both groups were followed up and assessed every two weeks.

The outcome of the study was timing of delivery (before or after 37 weeks), birth weight and hospital admission of neonate. After delivery, records of the participants and their neonates were received by study personnel. Pediatrician on call who unaware of treatment recorded the birth weight and whether normal or low

according to the gestational age of the newborn and whether admitted to the hospital or not.

We started with a larger number of women but who were not available for follow up were excluded from the study. The resulting data in this study were statistically analyzed by using *chi square* test.

III. Results

During the interval of study a total of 280 women who were at high risk of preterm labour were included and divided into two equal groups. The first group was supplied with omega 3 and the second was not.

The demographic characteristics of the study members regarding age and parity were demonstrated in table 1and figure 1, table 2 and figure 2, respectively. The age group and parity approximately the same in both groups.

Age	1st group	2nd group
< 20	35 (25%)	37 (26.4%)
20-30	66 (47.1%)	68 (48.5%)
>30	39 (27.8%)	35 (25%)

Table 1: The demographic characteristics of the study groups regarding the age.

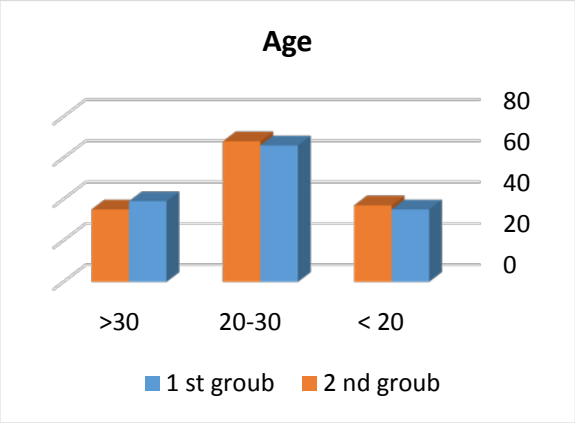

Figure 1: The demographic characteristics of study groups regarding age.

Parity		
Prime	33 (23.5%)	29 (20.7%)
Multiparous	107 (76.4%)	111 (79.2%)

Table 2: The demographic characteristics of the study groups regarding the parity.

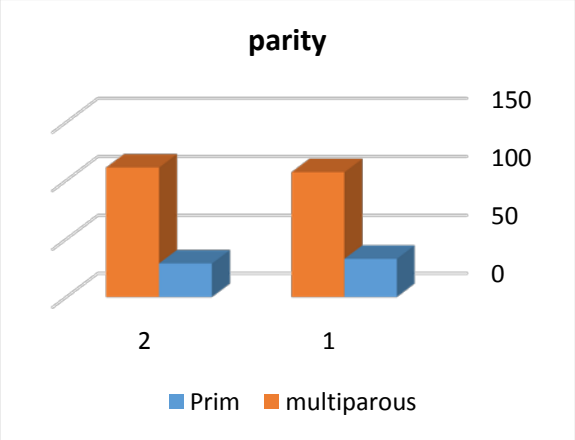

Figure 2: The demographic characteristics of study groups regarding parity.

Table 3 and figure 3 show obstetric histories according to which preterm labour was anticipated. The two groups were similar with respect to the risk factors of preterm labour.

Risk Factor	1st group	2nd group
previous preterm labour	93 (66.4%)	92 (65.7%)
unexplained second trimester loss	38 (27.1%)	38 (27.1%)
placenta Previa	7 (5%)	6 (4.2%)
structural uterine anomalies	2 (1.4%)	4 (2.8%)

Table 3: Obstetric histories of women in the study groups.

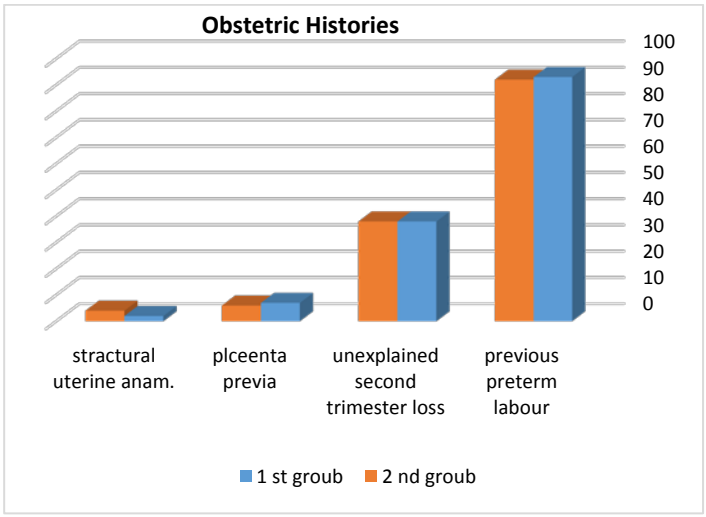

Figure 3: Obstetric histories of women in the study groups.

Table 4 and figure 4 compare those women who deliver before and after 37 weeks in both groups which is the primary aim of our study. The delivery before 37 weeks was less in the first group (treated group) than the second group (untreated group). In first group, 26 delivered preterm (before 37 weeks) versus 114 preterm delivery in second group.

Delivery Patterns	1st group	2nd group
Delivery before 37	26 (18.5%)	46 (32.8%)
Delivery after 37	114 (81.4%)	94 (67.1%)

Table 4: Delivery patterns of women in the study groups.

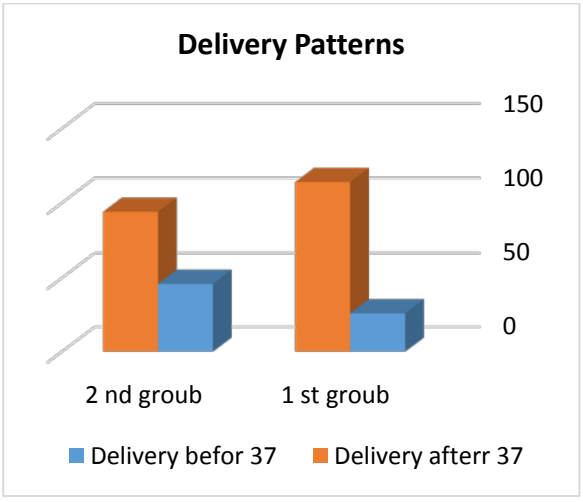

Figure 4: Delivery patterns of women in the study groups.

Table 5, figure 5 and figure 6 show the number of infants with average weight, low birth weight and hospital admission in both groups. Low birth weight and hospital admissions were lower in

the first group than the second group (11 infants with low birth weight in first group versus 44 in second group, 32 infants need hospital admission versus 65 in second group).

Fetal Outcome	1st group	2nd group
Normal according to gestational age (GA)	129 (92.1%)	96 (68.5%)
Low birth weight	11 (7.8%)	44 (31.4%)
Hospital admissions	32 (22.8%)	65 (46.4%)

Table 5: Fetal outcomes of pregnant women in the study groups.

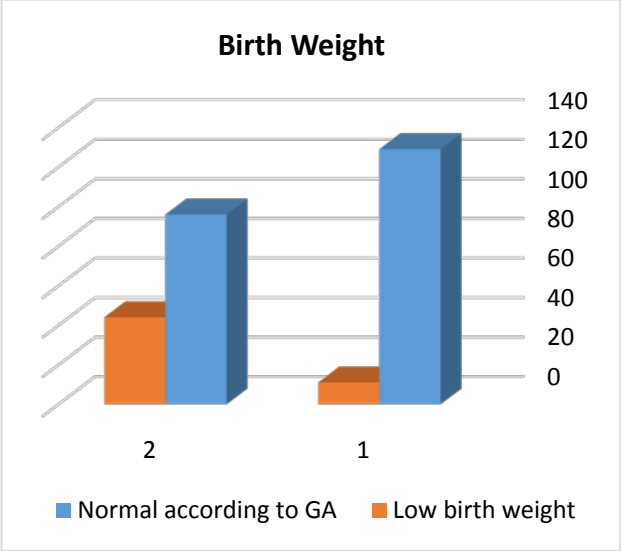

Figure 5: Fetal birth weight of women in the study groups.

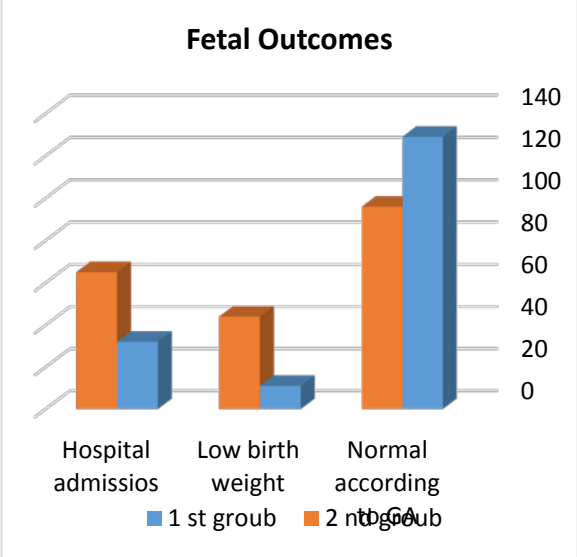

Figure 6: Fetal outcomes of women in the study groups.

IV. Discussion

Preterm birth increases both morbidity and mortality and can cause significant pathological consequences. It is associated with massive expenditure of neonatal resources and because there is limited role to prolong pregnancy or stop established preterm labour in low risk women. So it is better to try to avoid the occurrence of preterm delivery in high risk group [1].

Our aim in this study is not just to prolong pregnancy (if possible) but also to improve the quality of outcomes (healthy and heavier infant with lower rate of hospital admission). In this study, we divided the women randomly, but all of the patients have similar demographic criteria and have nearly the same risk factors for preterm labour.

All patients who included in the study were affected with and treated for possible risk of preterm labour (table 3 and figure 3), in the form of medical treatment (progesterone supplement) and surgical treatment (cervical cerclage) to those with possible cervical incompetence, because we used here omega 3 supplement and not medical treatment.

This supplement was safe with no noticeable adverse effects apart from tolerable gastrointestinal upset. There were significant improvement in the prolongation of pregnancy and improved outcomes of heavier fetus and less hospital admissions (table 5 and figure 5). Although our population expected not to be severely deficient with omega 3 fatty acids (south of Iraq with fish as major part of their diet), omega 3 supplementation here will lead to a significant prolongation of pregnancy (table 4 and figure 4). This possibly happens through the inhibition of prostaglandin E_2 and $F_{2\alpha}$ which have uterotonic activities and increase prostaglandin 3 series with no uterotonic activity. Omega 3 can also influence the quality and the composition of membrane phospholipids [5].

Conclusions And Recommendations

1- Omega 3 supplement is safe and beneficial in prolonging pregnancy, improves infant weight and, reduces hospital admissions.

2- Further studies with larger sample size and other types of patients' population to be involved (those with deficient fish in their diet).

References

1. David M. Luesley and Mark D. Kilby. An Evidence-based Text for the MRCOG. Third edition, 2016: 6: 337 – 372.
2. Collins S, Arulkumaran S, Dayes K. OXFORD Handbook of Obstetrics and Gynaecology. Third edition, 2013: 98 – 101.
3. Campbell S, Lees C. Obstetrics by ten teachers. Seventeenth edition, 2000: 273 – 281.
4. Philip N. Baker and Louise C. Kenny. Obstetrics by ten teachers. Nineteenth edition, 2011: 132 – 144.
5. Neuringer M, Anderson GJ, Connor WE. The essentiality of fatty acids for the development and function of the retina and brain. Ann Rev Nutr, 1988; 8: 517 – 541.
6. William Ledger and Justin Clark. Recent advances in Obstetrics & Gynaecology. 2005: 117 – 131.