International Journal of Science and Research (IJSR)
ISSN: 2319-7064
SJIF (2022): 7.942

Study of Maternal Nutritional Antioxidants and Their Correlation with Birth Weight of the Newborn

Mamta[1], Dr Aditi Ranawat[2], Dr. Sandhya Mishra[3], Dr. Oby Nagar[4]

[1, 2]Assistant Professor, Department of Biochemistry, SMS Medical College, Jaipur (Rajasthan), India

[3]Senior Professor and Former HOD, Department of Biochemistry, SMS Medical College, Jaipur (Rajasthan), India

[4]Sr. Prof. Obs. and Gynaecology SMS Medical College, Jaipur (Rajasthan), India

Department of Biochemistry on Association with Department of Obstetrics and Gynaecology, SMS Medical College, Jaipur (Rajasthan)

[3]Corresponding Author Email id:*aditiranawat[at]yahoo.co.in*

Keywords: Pregnancy, oxidative stress ,Nutritional antioxidants, Birth weight, New-born

1. Introduction

Pregnancy is a period of increased metabolic needs, due to physiological changes of the pregnant woman and needs of the fetus. Vitamins, minerals and trace elements, commonly known as micronutrients (calcium, iron, zinc, magnesium, vitamins B9 and C), are major determinants of the health of the pregnant woman and her fetus [1, 2].

Vitamin C, or ascorbic acid is a vitamin that, plays important role in the stabilization of the membranes and antioxidant properties, it can play a role on birth weight but the effects are mostly demonstrated in developed countries [3]. Vitamin E which plays a role of antioxidant, protecting thus polyunsaturated fatty acids of oxidative destruction in cell membranes [4]. It participates in the formation and structure of membrane phospholipids (in particular in brain cells) [5]. The serum levels of tocopherol are two times higher than those observed in non- pregnant women. The recommended intake is 12 mg/day [6].

Deficiency in one or more of these minerals and trace elements can promote the appearance of some complications such as prematurity and intrauterine growth restriction [7]. Recent studies have shown that most micronutrients can be limiting factors of fetal growth. Some are essential for the formation of body tissues, while others are indispensable for energy metabolism and the transcription of genes [8].

This study was designed to correlate Maternal Nutritional Antioxidant (vitamin A, C, E) with birth weight of new-borns.

2. Aim and Objectives

1) To measure birth weight of newborns .
2) To measure level of vitamin A, C&E in maternal serum.
3) To study the correlation of Maternal antioxidants (Vitamin A, C, &E) with birth weight of new-borns .

3. Materials and Methods

This is a hospital-based cross-sectional observational study. In this study, 80 postpartum female admitted to zenana Hospital, attached to SMS Medical College Jaipur are included; out of which 40 female , having low birth weight baby, were selected as cases and control population that consisted of 40 postpartum female having normal birth weight baby and who are matched for age .

None of the women from cases and control had a positive medical history of cardiac and metabolic diseases. No participants smoked, used caffeine or alcohol, and had history of thyroid disease, diabetes mellitus, and hypertension. Written informed consent was obtained from all the participants, and the study was approved by institutional Ethics Committee.

Exclusion criteria included multiple pregnancies, preeclampsia, preterm delivery, caesarean delivery, and maternal chronic disease (hypertension, endocrine diseases, hyperlipidemia, acute or chronic hepatic diseases).

After obtaining written informed consent venous blood samples were taken and assayed for routine parameters and vitamin A, C, E by method of Bradley, Baker and Frank & S. T. O may Jo respectively(9,10,11)

4. Observation & Results

Result were presented as mean +_ SD. Students unpaired t-test was used for statistical analysis between case and control.

Result were presented as mean +_ SD. Students unpaired t-test was used for statistical analysis between case and control. And Pearson's correlation was used for correlation of vitamin A, C&E with birth weight of the newborn. $p<0.05$ was considered statistically significant.

Table 1 shows vitamin A, C& E is significantly decreased in cases as compared to controls and

Table 2 shows a positive correlation of vitamin A,C &E with birth weight of the new born.

Table 1: Comparison of serumvitamin A,C & E levelsin normal birth weight and Low birth weight newborns.

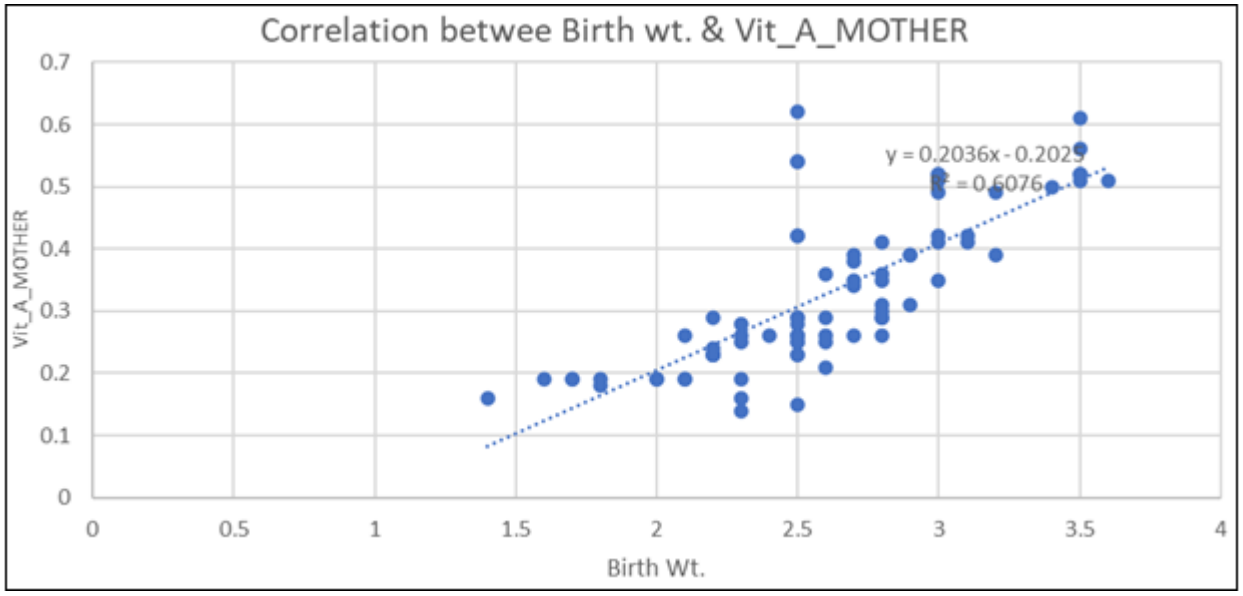
	LBW (Case)	NBW (Control)	p-value
Vitamin A (mg/l)	0.26 ± 0.11	0.40 ± 0.10	<0.05**
Vitamin C (mg/l)	6.76 ± 0.60	9.94 ± 1.36	<0.05**
Vitamin E (mg/l)	7.91 ± 0.77	10.09 ± 2.34	0.05**

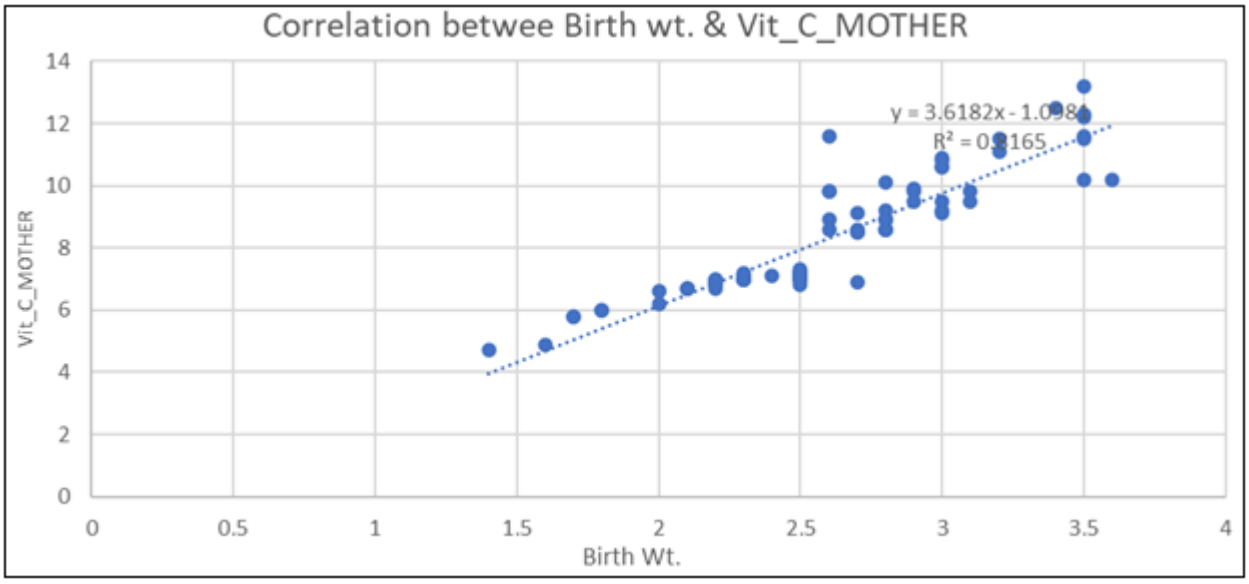
**significant

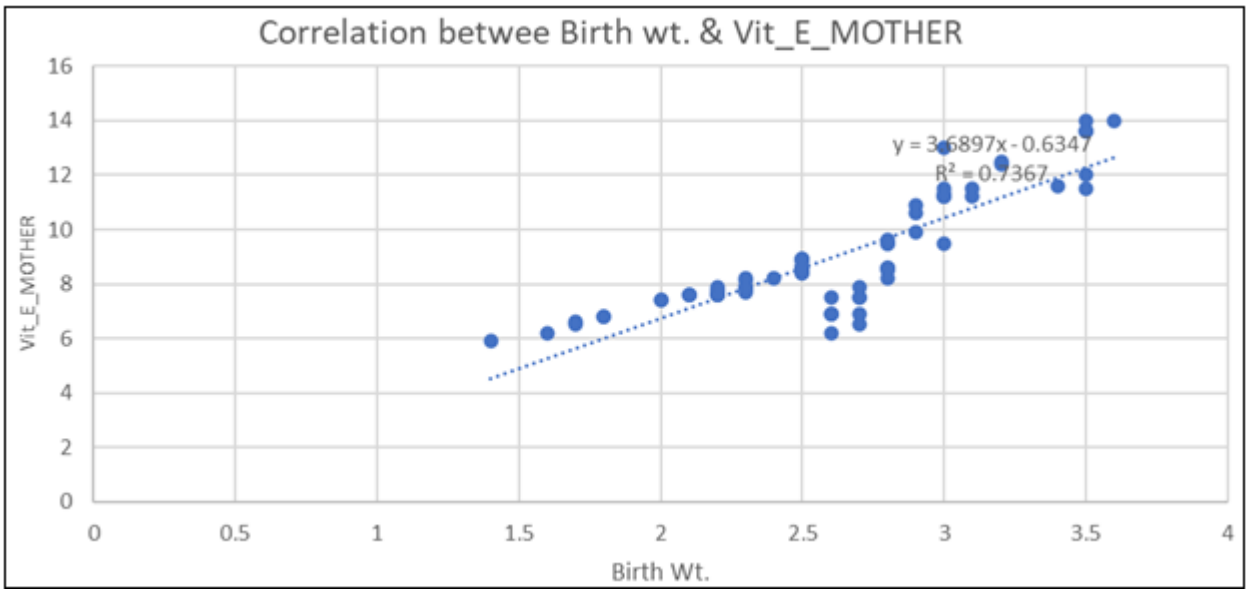
Table 2: Correlation of maternal antioxidant (vitamin A, C & E) with birth weight

	Birthweight Pearson's correlation (r)	p-value
Vitamin A(mg/l	492	0.000**
Vitamin C(mg/l	926	0.000**
Vitamin E(mg/l	979	0.000**

**significant







5. Discussion

Vitamin C acts as a reducing agent to protect cells against the adverse effects of oxidative stress [12]. Zhang et al. [13] reported that pregnant women who consumed vitamin C at levels lower than the recommended daily allowance had a 2-fold higher risk of developing preeclampsia, suggesting the importance of vitamin C supplementation in pregnant women. One randomized controlled clinical trial on patients with luteal phase defects reported that pregnancy rates were higher in the group supplemented with vitamin C(750mg/day) than in the control group(no treatment)[14]. Another double-blinded, placebo-controlled pilot study on the effect of supplementation containing vitamin E, iron, zinc, selenium and L-arginine resulted in an increase in ovulation and pregnancy rates [15].

In addition, vitamin functioning as a chain-breaking antioxidant was reported to protect cellular membranes against ROS, for example through defending polyunsaturated fatty acids (PUFAs) from auto-oxidation [16]. Antioxidants such as vitamin C and vitamin E have been reported to be efficient, and their uses in reproductive- and pregnancy-related disorders have been the subject of significant clinical trials [17,18].

6. Conclusion

The birth weight of the new-borns is positively correlated with maternal nutritional antioxidant (vitamin A, C & E). So further need to study maternal nutritional antioxidant (vitamin A,C &E) in 2nd or 3rd trimester, & by giving supplementation of antioxidants, birth weight of newborn can be improved.

Acknowledgement
I sincerely thank my guide (Dr Sandhya Mishra) co-guide (Dr Oby Nagar) and Head of the Department for guidance and support.

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