STUDY OF THE IMPACT OF MICRONUTRIENT FOUND IN SPERAMAX® DURING PREGNANCY PERIODS ON EMBRYONIC DEVELOPMENT AND NEWBORN

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ABSTRACT

Objective: This paper aims at evaluating the benefits of vitamins and minerals found in the Speramax® supplement and the risks to mother and infants of additional supplementation and possible adverse interactions between micronutrients in pregnancy.

Method: A total of 30 male and 120 female albinos Swiss mice of 8–12 weeks of age weighing 25–35 g were used. Speramax® was administrated orally for 1, 2, and 4 weeks. Fertile female mice were classified into four main groups: Group 1 is spontaneously (SPO); Group 2 is administrated with Speramax® only; Group 3 is treated Speramax® with superovulation (SUO); and Group 4 is superovulated only without Speramax®.

Result: The results indicated that treatment with Speramax® showed a positive effect on neonatal development and an increase in the number of newborn SPO and SUO treated with Speramax® after 1 week and 2 weeks. The results showed high significance (p<0.000) compared with SPO and SUO mice not treated with Speramax® and with groups treated for 4 weeks.

Conclusion: Good nutrition found in Speramax® may, therefore, be especially important to this group of infants and must be instituted alongside other nutritional supplements.

Keyword: Speramax®, Infant growth, Antioxidant, Micronutrients, Nutritional, Requirements.

INTRODUCTION

Micronutrients are minerals and vitamins important, in minute sums, for ordinary working, development, and improvement. Vitamins and minerals bolster each phase of maternal, placental, and fetal connection to empower a solid incubation. Females in low-pay nations frequently eat lowered levels of micronutrients because they are limited to specific types of food and have little access to natural products, vegetables, and invigorated foods [1]. Micronutrients are very significant to pregnancy and regularly given as supplements such as Vitamins E, folate, zinc, and selenium [2]. Poor maternal health status, alongside maternal body synthesis, digestion, and placental supplement supply are the primary factors that can adversely impact fetal improvement and have been entirely identified with unfriendly pregnancy result and articulation of fetal hereditary potential [3]. Folic corrosive is a Vitamin B that assists the body in making solid new cells. The human body is in need of folic corrosive, particularly those females who may get pregnant [4]. It is also a cancer prevention agent, critical for DNA combination and cell replication, and diminishes risks of ovulatory barrenness [5]. Speramax® is a new medicine containing a number of various vitamins and L-carnitine, and all involved in cell metabolism and used for men. The L-carnitine is involved in fatty acid oxidation; the vitamins act as antioxidants in the anabolism of body [6].

Vitamins and antioxidant

In the female reproductive system, high convergences of ROS in the female reproductive tract could likewise adversely affect the preparation of oocytes and cause hindrance of embryonic implantation [7,8]. They play a significant role in the pathogenesis of subfertility in both men and women [9-11]. There is now a great deal of scientific knowledge about the use of nutritional complements and their advantageous effects on both female and male fertilities [12]. Studies have shown that vitamins and minerals can increase your chances of success of staying pregnant.

Studies on infertile woman have shown that pre-conception folic acid supplementation increases folate levels and decreases homocysteine level in follicular fluid (FF) [13], and it enhances embryo quality and the chance of pregnancy [14]. In addition, folate is vital for quality and development, implantation, placentation, fetal development, and organ advancement [15]. Selenium (Se) is a component of enormous significance for human health. It is effectively exchanged over the placenta into embryo amid gestation; the overall maternal selenium content is emphatically connected with fetal and infant selenium state [16]. Se plays a key role in the effectiveness of the reproductive system and male and female fertilities. Based on this purpose, supplementation in the case of selenium is of maximum significance [17]. Studies on animals and humans show that the use of hormones more efficiently may help to prevent miscarriage or fetal death [18,19].

Vitamin E is a vital antioxidant for reproduction and fertility; this powerful antioxidant can play a critical role in oocyte maturation because the FF found in oocyte is rich with Vitamin E. The environment of FF is thought to play a role in oocyte maturation and eventual development of an embryo [20].

L-carnitine-interceded beta-oxidation of unsaturated fats has a well-built-up part in vitality supply of oocytes and embryos [21] and the amount in the body peaks in your twenties and then decreases and becomes short supply as you age. It plays a role in increasing chances of pregnancy [22]. L-carnitine might be positive in advancing improvement in neonates [23,24].

METHODS

Fertile female mice were classified into four main groups: Group 1 is spontaneously (SPO); Group 2 is administrated with Speramax® only; Group 3 is treated Speramax® with superovulation (SUO); and Group 4 is superovulated only without Speramax®.

Ovarian stimulation (SUO induction)

SUO was performed by intraperitoneal (IP) shot of 7-point five international unite (IU) of pregnant mare’s serum gonadotropin
(Folligon, Holland) and then followed 48 h later by IP injection of 7-point five IU. of human chorionic gonadotropin (Pregnyl, Serono company).

**Mating of the animals**

After isolation of the sexually mature females which at the estrous stage by examining the vaginal smears under a light microscope, the isolated females were put in breeding cages, each two females with one mature male and left overnight.

Early in the next morning, copulation was confirmed by examining the females and noticing the incidence of the vaginal plug or the sperm in slides microscopically in the vaginal swabs.

In this work, the gestational day 0 was characterized as the day when spermatozoa were seen in a spread of the vaginal substance or potentially a copulatory attachment and/or sperm under a light microscope.

**Statistical analysis**

All statistical analysis was achieved using version 16.0 Minitab statistical program. Chi-square test was also utilized. p<0.05 was considered statistically significant in this study [25].

**RESULT**

Table 1 shows the number of newborn SPO and SUO mice treated with Speramax® after 1, 2, and 4 weeks.

**DISCUSSION**

This paper evaluates the supplementation of vitamins and minerals found in Speramax® on pregnancy. The study shows a significant increase in the number of neonatal with healthy feature. It does not record any state of congenital anomalies in groups treated with Speramax® supplements for 1 and 2 weeks in pregnant animals compared with an untreated group. The explanation for this feature is that the pregnant requires folic acid during and before pregnancy. The World Health Organization prescribes utilization of folic corrosive supplementation in females among pregnancy as a piece of regular antenatal care [26-28]. Its increase helps in expansion of red platelet mass, augmentation of the uterus, and the development of the placenta and embryo [29]. Another research found that the folic acid is of much importance to the synthesis of DNA and RNA [30]. Moreover, the previous study explained pregnant women treated with folic acid to prevent the occurrence of neural tube defect [31].

The paper also shows the importance of zinc oxide supplement during pregnancy for healthy neonatal. Several studies of investigational animals and humans reveal that severe zinc lack can have deep effects on pregnancy outcome [32]. Zinc is an important factor required for fertilization and pre-implantation development [33]. All instances of low birth weight could be counteracted by daily utilization of a multivitamin containing 15–20 mg of zinc among the main trimester of pregnancy [34].

Selenium also plays a role in reproduction rates in humans as well as animals [35]. Selenium is one of the minerals whose insufficiency is known to prompt confusions of female reproduction [36-42]. Selenium insufficiency has been related with a number of unfavorable pregnancy results, for example, preterm conveyances and miscarriages [43]. Several studies reported that selenium is important for normal reproductive function and for the prevention of compromised pregnancies as it reduces the risk of miscarriage, pre-eclampsia, gestational diabetes, pregnancy-induced hypertension, and early rupture of membranes [44,45].

Another study found that the decrease of selenium during pregnancy would lead to decrease of the weight of neonatal [46].

L-carnitine (L-Cn) is a fundamental compound to the cell delivering long 48 anchor unsaturated fatty acid to the β-oxidation pathway in the mitochondrial network for catabolism [47]. Various studies have shown a significant effect of L-carnitine supplement in embryogenesis and improving embryo development [48].

The importance of L-carnitine supplied to the maternal organism enhances intrauterine growth [49]. Carnitine can cross the placenta; therefore, a low carnitine level of the neonate can reflect both neonatal deficiency and maternal deficiency [50-52]. The significance of L-carnitine in enhancing oocyte quality and regenerative execution has been exhibited in creature and human investigations [53-58]. The umbilical string blood contains altogether larger amounts of free and aggregate L-carnitine than the relating maternal levels [59,60].

Vitamin E, the environment of the FF, is thought to play a pivotal role in oocyte maturation and later the eventual development of an embryo [61-63]. Furthermore, there are many antioxidants found in FF including Vitamin E, which promotes healthy oocyte maturation and oocyte viability; however, the results are conflicting [64-66].

Increased ROS levels have been related with poor oocyte quality, low fertilization rate, and impaired embryo development [67].

In a creature display, Train et al. [68] have demonstrated that oral organization of antioxidant (Vitamin E) decreased the negative impact of female maturing on the number and nature of oocytes.

**CONCLUSION**

This study concludes that Speramax® is not only used for male infertility but can also be used for female fertility potential because its contents are highly supplemental for oocyte maturation and embryonic development. Hence, good nutrition may, therefore, be especially important to this group of infants and must be administered alongside other nutritional supplements.

**AUTHOR’S CONTRIBUTIONS**

Speramax® is not only used for male infertility but can also be used for female fertility.

**CONFLICTS OF INTEREST**

The authors declared that they have no conflicts of interest.

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