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Deficiency of Serum Alphatocopherol among Oral Hormonal Based Contraceptives Users in Sokoto Metropolis, Nigeria

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Deficiency of Serum Alphatocopherol among Oral Hormonal Based Contraceptives Users in Sokoto Metropolis, Nigeria

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ABSTRACT

Alphatocopherol is the main naturally occurring antioxidant substance capable of scavenging free radicals induced by pathological conditions; evidence is accumulating regarding the involvement of oxidative stress among the contraceptive users. The current research consisted of 75 contraceptive users and 42 apparently healthy age-matched controls. Serum levels of alphatocopherol are measured in accordance with method of Neil and Pearson (1907). Statistically ($p<0.005$) significant higher levels of alphatocopherol was observed among the contraceptive users compared to the control groups, No statistical difference was detected in different age groups. Alphatocopherol and other antioxidant supplementation should be encouraged among contraceptive users to alleviate oxidative stress.

Key words: Alphatocopherol, Contraceptives, Oxidative Stress, Free radicals.

INTRODUCTION

Oxidative stress is caused by an imbalance between the free radicals generation and the body antioxidant defenses leading to oxidative stress (Os) (Halliwell, 2012; Kerksick, 2015: Lewis, *et al.,* 2015)and consequent apoptosis as a result of the excessive oxidation of lipids, nucleic acids, and/or proteins (Whitaker and Pierce, 2003; Agarwal *et al.,* 2010). Lipid-soluble alphatocopherol is the natural antioxidant vitamin hypothesized to have the potential to intervene with the oxidative damage due to the effects of radicalized molecules which contribute to the pathogenesis of many diseases (Cutler, 2005). Hormonal contraceptives are synthetic substances taken by women that allow sexual intercourse without resultant pregnancy (Ian and Malcolm, 2004; Mosher and Jones, 2010), this is achieve by preventing ovulation, inhibition of sperm migration through hardening and altering cervical mucus and by interfering with implantation of fertilized egg into the endometrium (Kaunitz and Andrew, 2004; Ash, *et al.,* 2006). Use of hormonal based contraceptives remains one of the leading methods for birth control, it has been estimated that over 100million women are using some form of hormonal contraceptives worldwide (Amy and Tripath, 2009), and the rate of contraceptives used in Nigeria hit about 18% in 2012 (NHDS, 2013). Contraceptives (compounds with oestrogen-progestrogen-like actions) have been used by women in Nigeria for birth control and this contributes to the disturbance with absorption of some vitamins and trace elements (Olaniyan and Taylor, 2004; Fallah *et al.,* 2009). However, there is dearth of information and data with regards to effects of oxidative stress on women using contraceptives in Nigeria. The current study reports serum levels of alphatocopherol among the contraceptives users in Sokoto.

2.0. METHODOLOGY:

Study Population: The present study consists of seventy six contraceptive users and forty two non contraceptive users attending family planning in the obstetrics and gynecology department at Usmanu Danfodiyo university teaching hospital Sokoto.

Participants: The study population comprise of women on oral hormonal based contraceptives who had no acute or chronic health condition and apparently healthy age-matched non contraceptives users with regular menstrual cycle were used as controls. Pregnant women, post menopausal women and patients with hypertension, diabetes and any other acute or chronic illness were excluded from the study.

Sampling Techniques: Seventy-six consecutive, counseling oral contraceptive users who came for follow up at the family planning clinic formed the study population.

Blood Specimen Collection: Venous samples were collected from the oral contraceptive users (COCPs) and controls using standard venopuncture and delivered into well labeled clean test tubes. The blood samples were allowed to clot for 30minutes and then centrifuged at 5,000 rpm for 5minutes to obtain the serum, the separated sera were stored at -20^0c .

Alphatocopherol Determination: It was determined using the Method of Neil and Pearson, (1907), the assay was based on the oxidization of alphatocopherol to tocopherolquinone by $FeCl_3$ and Fe^{2+}. The resultant Fe^{2+} forms complex with αα-dipyridyl to produce a red colour complex which is measured at 520nm after addition of ferric chloride. Tubes were labeled as test, blank and standard, 1.5ml of distilled water, 1.5ml of vitamin E standard and 1.5ml of serum was added into blank, standard and test respectively, 1.5ml of ethanol was added into the test and blank tubes only. 1.5ml of distilled water was added into the blank tube only and 1.5ml of xylene in to all tubes. The tubes were then mixed and allowed to stand for the reaction to take place, and then centrifuged at 2500 r.p.m for 10 minutes. After centrifugation 1.0ml of xylene layer was pipetted into another set of identically labeled tubes. 1.0ml of αα-dipyridyl was then added again. The tubes were then mixed and absorbance was read at 520nm, then after 3 minutes 0.3ml of ferric chloride was added and another absorbance was taken at 520nm. This procedure was done for all test and control samples.

3.0. RESULTS

Table 1.0: Mean Serum levels of alphatocopherol in Oral contraceptive users Compared to the controls

Contraceptive Users	Non Contraceptive Users	P-value
0.47±0.04	1.03±0.18	0.01

Table 2.0: Age distribution of alphatocopherol among Oral contraceptive users

Age(yrs)	Alphatocopherol(mg/dl)
18-27(n=31)	0.46±0.03
28-36(n=23)	0.48±0.05
37-45(n=22)	0.47±0.05

n=Number of subjects

Table 3.0: Extent of Deficiency of alphatocopherol among Oral contraceptives

Defeciency	Mild	Moderate	Severe
Alphatocopherol(mg/dl)	(0.41-0.5 mg/ld)	(0.1-0.4mg/ld)	(<0.1mg/ld)
Percentage of OCPU	89.3%	9.3%	1.4%

*Concentration of alphatocopherol of <0.1 (mg/ld) is categorized as severe deficiency, 0.1-0.40 (mg/ld) as moderate deficiency and 0.4-0.5 (mg/ld) as mild deficiency.
OCPU=oral contraceptive users

4.0. DISCUSSION

According to the results obtained from the current research, the serum levels of alphatocopherol in oral contraceptive users was statistically lower ($p<0.005$) than the control groups (Table1.0). This is in line with the work of Prabhudas *et al.,* (2010), which stated decreased alphatocopherol and gamma tocopherol among women on contraceptive use

for at least 4 month compared to the control subjects. The decrease in alphatocopherol may be due to its consequent consumption in order to counterbalance the negative effects of radicals generated . Similarly decreased total antioxidant status (TAS) has been reported among the contraceptive users by Palan *et al*. (2010). The findings of this research are in accordance with the work of Akinloye *et al.,* (2011) who reported deficient trace elements and vitamins among the contraceptive users. Despite reduced alphatocopherol shown, however, no statistical differences were observed between the age groups (Table2.0.). Moaed *et al.,* (2014) revealed an elevated level of serum malondialdehyde (MDA) among the contraceptive users, increased MDA is an indicative of lipid peroxidation by free radicals which in turn signifying decreased antioxidant substances. Of the oral contraceptive users had severe alphatocopherol deficiency, 9.3% had moderate and 89.3 had mild deficiency of the vitamin (Table 3.0).

5.0. CONCLUSION

In conclusion, considerable decrease of alphatocopherol was observed among the contraceptive users compared to non contraceptive users in Sokoto metropolis Nigeria.

RECOMMENDATION

Supplementation of alphatocopherol should be advocated for women using oral contraceptives. There is need for further studies

REFERENCES

Agarwal, A, Gupta, S and Sharma, R. K. (2005) "Role of oxidative stress in female reproduction," *Reproductive Biology and Endocrinology*, vol. 14, pp. 3–28, 2005.

Akinloye, O., Adebayo, T.O., Oguntibeju, O.O., Oparinde, D.P. and Ogunyemi, E.O. (2011) Effects of Contraceptives on Serum Trace Elements, Calcium and Phosphorus Levels. *West Indian Medical Journal*, **60**, 308-315.

Amy, J.J., Tripath, V. (2009)."Contraception for Women. An evidence based overview". BMJ 339:b2895.

Ash M., Keith E., Ailsa E., et al. (2006). Fertility control. Gynecology by Ten Teachers; 18th ed. 8:59–66.

Cutler R. (2005). Oxidative stress profiling: part I. Its potential importance in the optimization of human health. Ann NY Acad Sci.; 1055: 93–135.

Fallah S, Sani FV, Firoozrai M. (2009). Effect of contraceptive pill on the selenium and zinc status of healthy subjects. Contracept;**80:**40-3.

Halliwell B. Free radicals and antioxidants: updating a personal view. Nutr Rev. 2012;70(5):257–65.

Ian M. and Malcolm E. (2004). Contraception and sterilization. Essential of Obstetrics and Gynecology; 4th ed. 21: 289.

Kaunitz and Andrew M. (2004). Enhancing oral contraceptive success. The Potential of New Formulations. American Journal of Obstetrics and Gynecology; 190 (4): 23–29.

Kerksick C, Zuhl M. Mechanisms of oxidative damage and their impact on contracting muscle. In: Lamprecht M, editor. Antioxidants in sport nutrition. Bota Raton: CRC Press, Taylor & Francis; 2015. p. Chapter 1.

Lewis NA, Howatson G, Morton K, Hill J, Pedlar CR. Alterations in redox homeostasis in the elite endurance athlete. Sports Med. 2015;45(3):379–409.

Mosher, W.D. and Jones, J. (2010) Use of Contraception in the United States. Vital and Health Statistics, 23, 1982-2008.

Moaed E. Al-Gazally, Melal M. Al-Jeborry,Ghufran M. Al-Asadi.(2014). The Effect of Combined Oral Contraceptive Pills and Copper Bearing Intrauterine Contraceptive Devices on The Oxidative Stress, Lipid Profile and Some Trace Elements in Women Sera in Hilla City. *Medical Journal of Babylon* 7:4 , 2014

Neil, J.H. and Pearson, C.A. (1907). *J. biol. Chem*; 165-169

Nigeria (2013) Demographic Health Survey; Key Findings. 67-69, 72-74.

Olaniyan DA, Taylor S.(2004). Vitamin and antioxidant: The body fluid is not water. Nig Med J;**16:**20-31.

Palan, P.R., Strube, F. and Mikhail, M.S. (2010) Effects of Oral, Vaginal and Transdermal Hormonal Contraception on Serum Levels of Coenzyme Q10, Vitamin E and Total Antioxidant Activity. *Obstetrics and Gynecology International*, **2010**, Article ID: 925635.

Prabhudas R. Palan, Felix Strube, Juraj Letko, Azra Sadikovic, andMagdy S.Mikhail (2010). Effects of Oral, Vaginal, and Transdermal Hormonal Contraception on Serum Levels of Coenzyme Q10, Vitamin E,and Total Antioxidant Activity. Obstetrics and Gynecology International Volume 2010, Article ID 925635, 4 pages

Whitaker, S. H. and Pierce, J. D.(2003) “Oxygen free radicals and the disease process,” Nurse Practitioner, vol. 28, no. 8, pp. 53–54.

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