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Short Communication

Evaluation of vitamin C and E levels in Nigerians with mycobacterium tuberclosis

Nnodim Johnkennedy[1]*, Ihim Augustin[2] and Nwobodo Emmanuel Ikechukwu[3]

[1]Department of medical laboratory science, faculty of health science, Imo State University owerri, Imo State, Nigeria.
[2]Department of medical laboratory Science,Nnamdi Azikiwe University,Nnewi campus,Anambra state, Nigeria.
[3]ThankGod medical laboratories Ihiala Anambra State.

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The vitamin C and E levels in *Mycobacterium tuberclosis* patients attending General Hospital Owerri, Nigeria were evaluated.Seventy confirmed tuberclosis patients ages 20-50 years were selected. Seventy normal subjects ages 20-50 years free from tuberclosis were used as control. Patients with complications such as renal disease and HIV Positive were excluded. The levels of plasma Vitamin C and E in tuberclosis were significantly decreased (54.91± 7.31mmo/l and 9.14± 2.83mgldl respectively) when compared with the control (76.29± 9.10mmol/l and 12.13± 1.54mg/dl) (P< 0.05). The results obtained show that plasma vitamin C and E are depleted in *Mycobacteria tuberclosis* patients.Hence, there could be an immense benefit in eating fruits and vegetable rich in vitamin C and E.

Keywords: Vitamin C, Vitamin E, *Mycobacteria tuberclosis*

INTRODUCTION

Mycobacterium tuberclosis is the aetiologic agent of tuberclosis, and it is of major socio-economic and public health importance in the developing countries (Blood and Murra, 1992., Ezimah, 1999) It is the major cause of morbidity and mortality world wide. Tuberclosis is spread mainly through coughing, sneezing, or talking in poorly ventilated areas. It is characterized by heamoptasis and unexplained cough persisting for more than three weeks (De, 1991). The co-infection with HIV, inadequate treatment, malnutrition, overcrowding and emergence of multi drug resistance tuberclosis have become contributory factors to the resurgence of tuberclosis in the developing countries (cheesbrough, 2000, Nwanjo and Oze, 2007). The free radicals have been associated with the pathogensis of membrane damage in tuberclosis. This membrane damage has been linked to play an important role in generating the cascade process resulting in the cellular death of the tissues (Halliwell and Gutleridge, 2006).In *Mycobacterium tuberclosis* patients, the production of free radicals increase which affects the antioxidants (Vitamin C and E) reactions catalyzed by reactive oxygen species scavenging enzyme (Uchimara *et al* 1999). The free radicals attack proteins enzyme and DNA and hence causing some pathological derangement (Tirkey *et al* 2005). Some nutrients have shown a protective role as antioxidants in restoring the tissues of the cells. Vitamin C which is a water soluble vitamin and non-enzyme antioxidant serves directly by scavenging aqueous peroxyl radicals. Also indirectly regenerate reduced vitamin E (Ojiako and Nwanjo, 2007). Nikki (1991) reports that vitamin C and E are chain breaking antioxidants and could stop the chain of oxidative reactions that lead to

*Corresponding author Email: johnkennedy23@yahoo.com

Table 1. The levels of plasma vitamin C and E in *Mycobacterium tuberclosis* and control

Parameter	Control	*Mycobacterium Tuberclosis*
Vitamin C (mmo/l)	76.29± 9.10	54.91± 7.31*
Vitamin E (mg/dl)	12.13± 1.54	9.14±2.83*

*Significantly different from control

disease condition. Kutlu *et al* (2005) ;Nwanjo and Ojiako (2006) reported that the use of vitamin C and E coupled with moderate exercise have a counteract oxidative stress effect; with the attendant decrease in Malondialdehyde which is a marker of oxidative stress. In recent time, there is a high rate of incidence of tuberclosis in this part of the world, it is therefore the purpose of this present study to evaluate the level of plasma vitamin C and E. Hence, providing information on the clinical significance of eating foods rich in this vitamin C and E.

MATERIALS AND METHODS

Subjects

Seventy confirmed *Mycobacterium tuberclosis* positive patients (30 male and 40 females) aged 20 – 50 years diagnosed by Ziehl Neelson staining were selected for the study. Patients with complication: renal disease and HIV – positive were excluded from the study. Seventy normal subjects free from tuberclosis were used as control. Informed consent was obtained from all the subjects verbally.

Blood sample

In all subjects, 5ml of veinous blood was collected into EDTA bottles. The plasma samples were obtained by centrifuging the whole blood in wistefuge (model 684) at 2500g for 10minutes and were used for the estimation of plasma vitamin C and E Plasma vitamin C was assayed by the 2,4-nitrophny hydrazine method described by Tietz (1976a). The vitamin E was done by the method of Tietz (1976b) in which vitamin E caused the reduction of ferric to ferrous ion which then forms a red complex with α-α dipyridyl.

Statistical analysis: The values were expressed as mean ± standard deviation. The student t-test was used to calculate the significant differences at $P<0.05$.

RESULTS

The level of plasma vitamin C and E (Table I) in *Mycobacteria tuberclosis* were decreased when compared with the control. This implies that vitamin C and E are depleted in disease condition such as *Mycobacterium tuberclosis*

DISSCUSION

The increased production of reactive oxygen species and reactive nitrogen intermediate is a consequence of phagocyte respiratory burst during *Mycobacterium tuberclosis* infection (Evans and Burdon 1993:.Hallwell, (1997). These products of activation are cytotoxic and need to be removed by efficient and effective antioxidant system (Akiibinu *et al*, 2009). The vitamin C and E are important non-enzymic antioxidants involved in cushioning the effect of free radicals produced in tuberclosis (Kutlu, *et al*, 2005)

In this present study, it was observed that the plasma vitamin C decreases significantly in tuberclosis when compared with the control ($P<0.05$). The reduced level of vitamin C is associated with excessive reactive oxygen species production and oxidative stress in tuberclosis. The increase in oxidative burst is a characteristic feature of macrophage activation after *Mycobacterium tuberclosis* invasion of the macrophage (Klein 1989). This is consistent with the work of Ojiako and Nwanjo, (2007) in which plasma Vitamin C was depleted in Ischaemic heart disease. In the same vein, the level of vitamin E was significantly lowered.

Tuberclosis is linked to oxidative stress (Bayness, 1991). Some evidence suggests that oxidative cellular injury caused by free radicals contribute to the development of this disorder (Genet *et al*, 2002). The reports of research indicating increased oxidative stress and oxidative damage have been demonstrated in the veinous sample (Singh *et al*, 2000). This damage may be as a result of reactive oxygen species that promotes lipid peroxidation and play essential role in tuberclosis. The supplementation of vitamin C and E has been described

to have antioxidant effect on some pathological conditions (Ojiako and Nwanjo, 2007).

Having established that the level of Vitamin C and E are decreased in tuberclosis, it is recommended that foods rich in vitamin C and E should be consumed in order to protect the tissue from a high risk of oxidative damage which may be associated with tuberfclosis

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