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## Ascorbic Acid Levels in Hepatitis and Non-Hepatitis Subjects in University of Calabar Teaching Hospital (UCTH), Calabar

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**Abstract:** The ascorbic acid levels of thirty (30) hepatitis (sero-positive) subjects who presented themselves as donors at the serology unit of the Department of Hematology and blood transfusion, University of Calabar Teaching Hospital (UCTH), Calabar, Nigeria were assessed alongside thirty (30) non-hepatitis (Sero-negative) subjects as controls. Using the 2, 4 dinitrophenyl hydrazine (spectrophotometric method), the mean ascorbic acid level for the control subjects was  $1.05 \pm 0.45$  mg/dl while that of the hepatitis subjects was  $1.06 \pm 0.42$  mg/dl. There was no significant difference between the mean ascorbic acid levels of hepatitis subjects, when compared with that of the controls ( $P > 0.05$ ). On separation of the subjects, based on their sex, there was also found to be no significant differences ( $P > 0.05$ ).

**Key words:** Ascorbic acid, hepatitis, non-hepatitis

### Introduction

Interest in Vitamin C has persisted since its discovery, due to its important roles in the body, such as collagen synthesis, hormone synthesis and its anticoagulant activity (Tietz, 1986) controversy centers on the dietary requirement for ascorbic acid, both in health and disease. Research has shown that the proportion of people with low ascorbic acid levels (Plasma and leucocytes concentrations) increases in both young and elderly patients who have been hospitalized for long periods (Kataria *et al.*, 1965). Low dietary intake and disease which deplete vitamin C reserves, possibly by increasing its rate of metabolism, are some of the factors that contribute to the low reserves in this group of people.

In the absence clinical scurvy, low vitamin C reserves have been found to be associated with various conditions such as behavioural change, poor recovery from surgical procedures and poor immune function, while supplementation with vitamin C has led to improvement in some of these parameters (Rebora *et al.*, 1980). These findings suggest that low vitamin C reserves have a deleterious effect in health in addition to the well known scurvy. This may be especially significant in diseases where it is necessary or important to maintain immune function, protein reserves and avoid physiological deterioration. One of such diseases is hepatitis which is an inflammation of the liver cells (Morishige and Murata, 1976). Hepatitis is accompanied by the destruction of both the structure and composition of hepatocytes (Fauci *et al.*, 1998). Vitamin C, due to its antioxidant activity, helps to prevent the harmful effects that free radicals would have in diseases like hepatitis, on cell structures and general cellular function (Rumley and Patterson 1998). The present study was therefore carried out to determine the ascorbic acid status of

Hepatitis (sero-positive) individuals, who visited UCTH Calabar, during the period of our investigation.

### Materials and Methods

The subjects consisted of thirty Hepatitis (sero-positive) patients. The control subjects consisted of (30) subjects who tested negative, serologically for hepatitis and were not clinically ill. Five milliliters each of fasting venous blood samples was collected aseptically by venepuncture from the subjects. The blood samples were allowed to stand for 20 mins to clot and the samples spun at 3,000g. The serum was separated and collected into plain serum containers stored frozen at 20°C. Analysis was done within one week, of sample collection. The Dinitrophenyl hydrazine spectrophotometric method (Roe and Kuther, 1943) was used for the ascorbic acid estimation.

### Results

Table 1 Shows the mean ascorbic levels of both the Hepatitis (sero-positive) patients and that of the control subjects. The mean ascorbic acid value of Hepatitis patients  $1.06 \pm 0.42$  mg/dl was found not be statistically different from that of the control subjects  $1.05 \pm 0.45$  mg/dl ( $P > 0.05$ ).

In Table 2, When the subjects were separated on the basis of their sex, there was also no significant difference in the ascorbic acid values, when the Hepatitis (sero-positive) were compared with the Hepatitis (sero negative) controls. The figures were  $1.11 \pm 0.47$  mg/dl and  $1.02 \pm 0.37$  mg/dl respectively for male and female hepatitis (sero-positive patients) and  $1.02 \pm 0.45$  mg/dl and  $1.07 \pm 0.46$  mg/dl for male and female controls respectively.

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Table 1: Mean ascorbic acid values of Hepatitis subjects and controls

	Hepatitis Subjects Mean±SD	Control Subjects Mean±SD	'P'
Ascorbic acid (mg/dl)	1.06±0.42	1.05±0.45	P>0.05
n =	30	30	

n = No of subjects studied.

Table 2: Mean ascorbic acid values of male and female Hepatitis (sero-positive) subjects and male and female controls

	Hepatitis Subjects Mean±SD (mg/dl)	Control Subjects Mean±SD (mg/dl)	P'
Male Subjects	1.11±0.47	1.02±0.45	P>0.05
n =	16	15	
Female Subjects	1.02±0.37	1.07±0.46	P>0.05
N =	14	15	

n = No of subjects studied.

### Discussion

The use of ascorbic acid as a therapeutic agent in treatment of hepatitis has been documented (Morishige and Murata, 1976). The findings showed a modulatory and alleviatory effect of ascorbic acid in hepatitis.

In the present study it is observed that there was no significant difference in the mean values of the ascorbic acid of Hepatitis (Sero-positive) and controls. The ascorbic acid value in these sets of patients was found to be within the reference range (Tietz, 1986). Ascorbic acid is an important free radical scavenger with a strong antioxidant function useful in the control of physiological stress seen in hepatitis (Brody, 1994) and other related inflammatory conditions. One would have expected significantly lower ascorbic levels in hepatitis subjects when compared with the controls, however this was not the case in the present study. Ascorbic acid is found in increased levels in leucocytes (Tietz, 1986). In inflammatory reactions, there is usually an increased mobilization of leucocytes to the site of inflammation due to the action of macrophage Chemotatic factors (Grob *et al.*, 1990). With the increased localization and population of leucocytes at sites of inflammation, it is likely that the

profound antioxidant scavenging action, of vitamin C (Brody, 1994) was contributed by leucocyte vitamin C thereby sparing the serum vitamin C in the process. This may explain in part why the level of vitamin C in the hepatitis patients remained unaltered.

As noted by (Brody, 1994) ascorbic acid may be an effective therapeutic agent in the treatment and management of hepatitis but from our study, serum ascorbic acid is not a reliable and sensitive diagnostic tool in hepatitis.

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