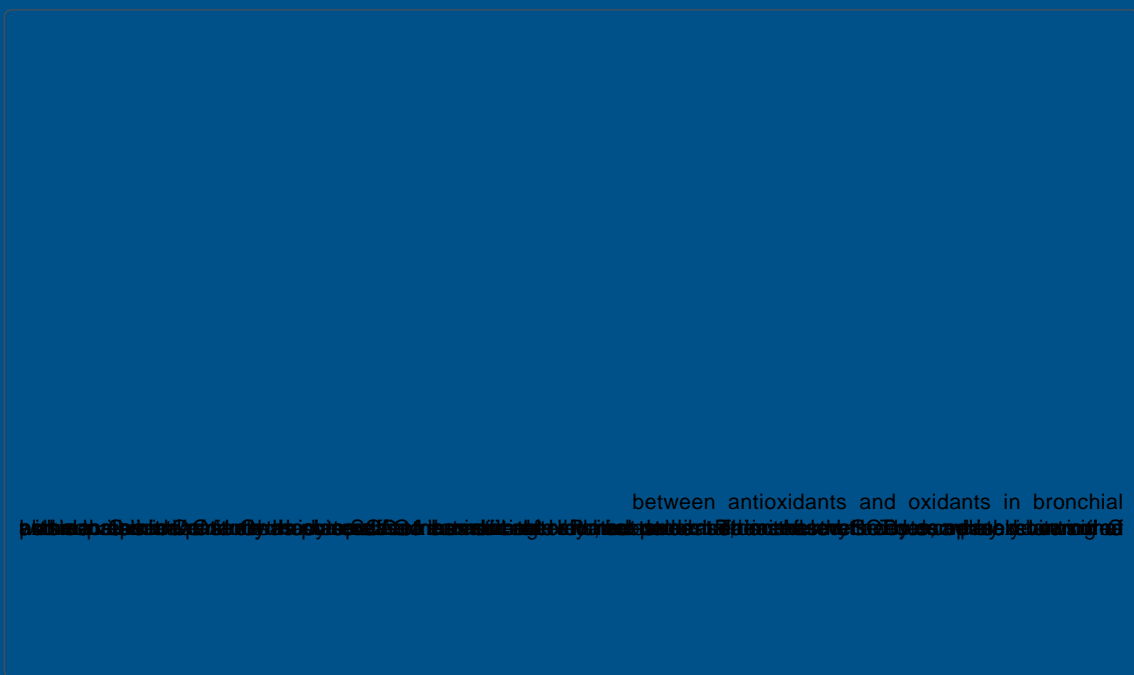


when compared to their pretreatment values. Plasma vitamin C attained a normal level

**Conclusion:** The present study showed an imbalance



**Keywords:** Erythrocyte; Hemoglobin; Bronchial asthma

## Introduction

Homeopathy is a safe and effective therapeutic approach for the treatment of asthma [1,2]. In the management of bronchial asthma [3] before and after homeopathic treatment [4,5]. The WHO defines asthma as a chronic inflammatory disease of the airways characterized by reversible airflow obstruction, airway hyperresponsiveness and lung hyperinflation [6]. In addition, the presence of eosinophilic infiltration of the airway wall is a characteristic feature of asthma [1,2]. Homeopathy is a safe and effective therapeutic approach for the treatment of asthma [1,2]. Homeopathy is a safe and effective therapeutic approach for the treatment of asthma [1,2]. Homeopathy is a safe and effective therapeutic approach for the treatment of asthma [1,2]. Homeopathy is a safe and effective therapeutic approach for the treatment of asthma [1,2].

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Oxidative stress is a key factor in the pathogenesis of asthma. It is characterized by an imbalance between reactive oxygen species (ROS) and antioxidant defenses. ROS can damage cellular lipids, proteins, and DNA, leading to airway hyperresponsiveness and inflammation. Antioxidants like superoxide dismutase (SOD), catalase, and glutathione peroxidase (GPx) help neutralize ROS. In asthma, levels of these antioxidants are often found to be lower, and ROS levels are higher, contributing to the disease's progression.

In a study conducted by Pinto et al. (2011), the levels of ROS and antioxidants were measured in the plasma and erythrocytes of asthma patients before and after homeopathic treatment. The study found that after treatment, there was a significant decrease in ROS levels and a corresponding increase in antioxidant levels, suggesting that homeopathic treatment may help reduce oxidative stress in asthma.

## Material and Methods

### Study design

The study was a randomized controlled trial conducted at the Department of Homeopathy, Faculty of Homeopathy, Central Board of Homeopathic Education and Registration, Bangalore, India.

### Exclusion/inclusion criteria

Patients with a confirmed diagnosis of bronchial asthma, as per the Global Initiative for Asthma (GINA) guidelines, were included in the study. Patients who were on any form of asthma medication, including inhalers and oral steroids, were excluded. The study was approved by the Institutional Review Board (IRB) at the study site.

Patients were recruited from various hospitals and clinics in Bangalore. The study included 60 patients, aged 17-70 years, with a mean age of 36.71 ± 0.624 years. All patients were diagnosed according to the Global Initiative for Asthma (GINA) guidelines (World Health Organization, 2004) [1]. The study was conducted between January 2004 and June 2006. Patients were randomly assigned to either the homeopathic treatment group or the control group. The homeopathic treatment group received a personalized homeopathic remedy based on their symptoms and constitutional characteristics. The control group received a placebo. The study was conducted in a double-blind manner. The primary outcome was the change in ROS levels and antioxidant levels (SOD, catalase, and GPx) in the plasma and erythrocytes. Secondary outcomes included changes in lung function parameters like FEV1, FVC, and PEF. The study was registered with the ClinicalTrials.gov registry (NCT00316542). The results of the study were published in the Journal of Homeopathic and Ayurvedic Medicine [1].

### Methodology

Randomized double-blind controlled trial. All patients gave written informed consent before starting the study. The study was approved by the Institutional Review Board (IRB) at the study site. The study was registered with the ClinicalTrials.gov registry (NCT00316542). The results of the study were published in the Journal of Homeopathic and Ayurvedic Medicine [1].

da e ac [36]. Pa a a C a de e ed ce ca d d e d a ea ac c d [37]. Pa a GST a de e ed b c ba CDNB (1 c 2, 4 d b e e) ed ced GSH e e e ce f e c a e-S- a fe a e 2, 4-d e e (add c) f ed a e ad a 340 [38]. AOA ac a e a e b K a ce ce a. [39].

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### Homeopathic Treatment of Bronchial asthma patients

A a f 122 e e e e e c bed f 41, a e e. 2.9 ed ca e e a e. O e e e e e c e d e ed ca e c bed e a e a e c. Med ca e e e a e e e e a

d e d e c d f e a e. H e a c e a e a e c bed f a e a e.

Table 1 e 17 e a c ed ca e c bed e d e (e, 41, a e) d e a e a e: A e c a b, P a a, A a a c, Na ph c, Ka ca b c, Fe Ph ph c a d A ca b c.

A e c a b, P a a, A a a c, Na ph c, Ka ca b c a d A ca b c e e e e c bed a a d f 30%, e e a Fe Ph ph c a 6.54% f e 41, a e e ce ed A e c a b a d 29% e ce ed P a a. A a a c, Na ph c, Ka ca b c, Fe Ph ph c a d A ca b c e e e c bed f, 24%, 17%, 19%, 14% a d 13% f e a e e e e.

Group	TBARS as nmol MDA/ g Hb (Mean ± SEM)		
	0 Hour	2 Hours	Susceptibility to LP
Normal Controls(NC) n=53	77.8 ± 4.46 (20.8 – 181.6)	384.5 ± 18.54 (102.8 – 898.7)	306.0 ± 16.65 (72.0-735.6)
Bronchial asthma n=41	101.9 ± 8.01 *** (20.3 – 299.1)	514.4 ± 31.32 *** (118.9 – 936.3)	412.5 ± 30.00 ** (98.9-833.5)
% change	30.97% > NC	33.78% > NC	34.80% > NC

Ranges of TBARS levels observed are given in parentheses  
n= number of cases  
(Mann-Whitney Test)

Table 3: Lipid peroxidation in bronchial asthma.

Clinical status	TBARS as nmol MDA/ g Hb Mean ± SEM		
	0 Hours	2 Hours	Susceptibility to LP
Before treatment n=23	118.2 ± 12.10 (20.3-299.1)	552.7 ± 47.20 (118.9-936.3)	434.5 ± 45.87 (98.6-833.5)
After treatment n=23	77.0 ± 7.52 ** (20.9 – 169.9)	354.7 ± 23.90 *** (140.8 – 605.2)	277.8 ± 22.10 *** (86.1-465.7)
% change	34.80% < before Treatment	35.82% < before treatment	36.07 % < before treatment

Ranges of TBARS levels observed are given in parentheses  
n= number of cases  
(Paired T-Test)

Table 4: Lipid peroxidation in bronchial asthma before and after treatment.

Diagnosis	GSH (µmol/g Hb)	SOD (units/g Hb)	Catalase (units/g Hb)	GR (units/g Hb)
Normal Controls(NC) n=53	4.71 ± 0.209 (2.36 – 10.25)	9214 ± 492.5 (4046 – 21990)	245996 ± 10410.2 (27920 – 413385)	1.77 ± 0.153 (0.10 – 4.09)
Bronchial asthma n=41 NS	5.39 ± 0.382 (1.46 – 10.38)	11787 ± 986.4 * (2396 – 36053)	283870 ± 23404.0 (77978 – 881356)	1.88 ± 0.199 (0.22 – 5.79)
% change	12.52% > NC	27.92% > NC	15.39% > NC	6.21% > NC

n= number of cases.  
(Mann-Whitney Test).

Table 5: Erythrocyte antioxidant levels in bronchial asthma (Mean ± SEM).

Table 2. The effect of homeopathic treatment on the levels of erythrocyte antioxidant enzymes (SOD, GPx, GSH, CAT, GR) and plasma antioxidant levels (ascorbic acid, beta-carotene, alpha-tocopherol, lipoic acid, ubiquinol, coenzyme Q10) in asthmatic patients before and after treatment. The data are expressed as mean ± SD. \*p < 0.05, \*\*p < 0.01, \*\*\*p < 0.001. Values are expressed as mean ± SD. (FC = forced expiratory volume in 1 second). (Table 2) (Table 3) (Table 4) (Table 5) (Table 6)

**Results**

The effect of homeopathic treatment on the levels of erythrocyte antioxidant enzymes (SOD, GPx, GSH, CAT, GR) and plasma antioxidant levels (ascorbic acid, beta-carotene, alpha-tocopherol, lipoic acid, ubiquinol, coenzyme Q10) in asthmatic patients before and after treatment. The data are expressed as mean ± SD. \*p < 0.05, \*\*p < 0.01, \*\*\*p < 0.001. Values are expressed as mean ± SD. (FC = forced expiratory volume in 1 second). (Table 2) (Table 3) (Table 4) (Table 5) (Table 6). (Table 2) (Table 3) (Table 4) (Table 5) (Table 6). (Table 2) (Table 3) (Table 4) (Table 5) (Table 6).



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