



## EVALUATION OF GLUTATHIONE PEROXIDASE AS BIOCHEMICAL MARKER IN MELASMA PATIENTS AT TERTIARY CARE HOSPITAL, BIKANER.

### Biochemistry

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### ABSTRACT

Melasma is persistent genetic skin condition caused by an excess of melanin in areas exposed to UV light. It appears as irregular patches and macules with varying shades of light-dark brown appearing symmetrically<sup>1</sup>. The aim of the study was evaluation of glutathione peroxidase as biochemical marker in melasma patients and healthy controls. It was an observational cross-sectional study carried out in Department of Biochemistry, S. P. Medical College and Department of Dermatology & associated groups of PBM Hospital, Bikaner, Rajasthan. 50 cases with melasma and 50 healthy controls were enrolled. In this study, an analysis of serum glutathione peroxidase (GPx) and melasma area severity index (MASI) score was done in both groups. The mean serum glutathione peroxidase was higher in melasma patients as compared to healthy controls  $121.63 \pm 17.06$  and  $80.39 \pm 14.74$  respectively and the parameter was statistically significant ( $p < 0.001$ ). Correlation ( $r$ ) of GPx with MASI in melasma cases was 0.17.

### KEYWORDS

Melasma, Glutathione peroxidase, MASI, Melanin.

### INTRODUCTION

Melasma is a persistent genetic skin condition caused by an excess of melanin in areas exposed to UV light<sup>2</sup>. It commonly occurs on the face with the neck and forearms being less affected. The condition presents as irregular patches and macules with varying shades from light to dark brown usually appearing symmetrically<sup>3</sup>. The presence of oxidative stress in melasma recently has become an intriguing topic of interest. It is a key element that can cause skin hypopigmentation or hyperpigmentation<sup>4</sup>.

First, the presence of oxidative stress in the etiopathogenesis of melasma was thought to be based on the effectiveness of antioxidants in treatment<sup>5</sup>. Glutathione peroxidase is an intracellular enzymatic antioxidant, and its levels are used as a major parameter representing oxidative damage<sup>6</sup>.

### METHODS

**Study Design:-** It was an observational cross-sectional study.

**Study Place:-** This study was carried out in Department of Biochemistry, S. P. Medical College and Department of Dermatology & associated groups of PBM Hospital, Bikaner, Rajasthan.

### Study Population :

The present study was conducted on 100 subjects. They were further divided in two groups:

1. Group I: Healthy Control Subjects (n=50). It was ensured by routine examinations that all the subjects were healthy and there was no signs and symptoms or positive history of any diseases.
2. Group II: It was included the clinically established patients of melasma (n=50).

**Sampling Technique:** Purposive Sampling Technique

### Inclusive Criteria:-

- All patients attending the dermatology department clinically diagnosed with melasma.
- Age between 20-60 years

### Exclusive Criteria:-

- Patients with previous history of skin disease, malignancy, pregnancy.
- Patients with other co-morbid conditions.
- Pregnant women.

**Sample Size:** 50 cases with melasma and 50 healthy controls were included in this study.

**Data Collection:-** Ethical approval certificate has been taken from institutional ethical committee. An informed consent was obtained from all subjects those were diagnosed with melasma and healthy

controls. A detailed history including family and drug history was taken from all the subjects. Routine clinical examination including the weight, anthropometric measurements and general physical examination was performed. The severity of the disease was determined using the melasma and severity index (MASI) score. The score was calculated from assessments of the darkness of the pigmentation and the percentage of affected area on the face<sup>7</sup>.

### Sample Collection And Processing:

Blood samples were collected by venopuncture using aseptic technique and subjected to the assay of GPx estimated by ELISA<sup>8</sup>.

### Statistical Analysis:

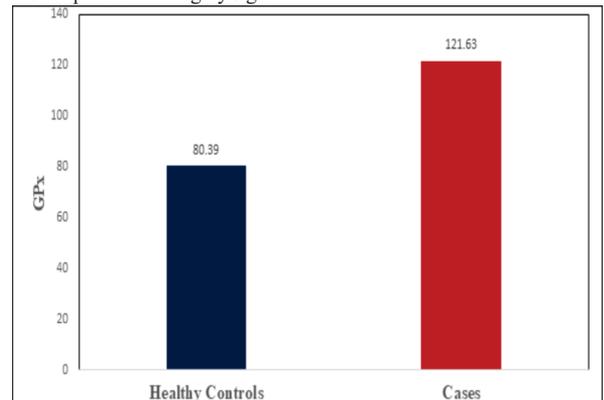
Data is entered in MS Office Excel worksheet in the form of master chart and analysis is performed with IBM SPSS. All the results were expressed as mean  $\pm$  SD values. Independent t-test of two means was used for the comparison between both groups. P values  $< 0.05$  was considered significant and pearson correlation was performed.

### OBSERVATION TABLE AND GRAPH

**Table : 1 Comparison Of Serum Glutathione Peroxidase In Both Groups**

S. No	Group studied	GPx (U/ml) (Mean $\pm$ S.D.)	T- test	P value
1	Healthy Controls	80.39 $\pm$ 14.74	12.93	P<0.001
2	Melasma Cases	121.63 $\pm$ 17.06		

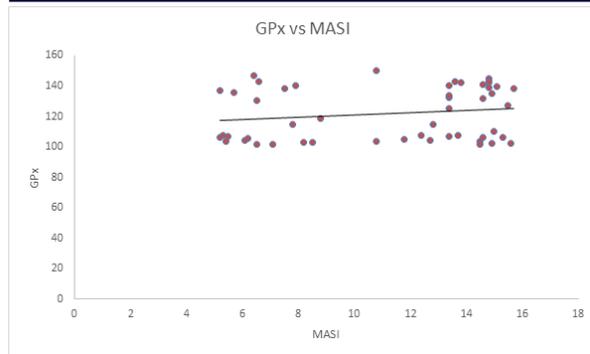
Note:  $p < 0.001$  = Highly significant.



**Graph: 1** Graphical representation of mean GPx in both groups

**Table : 2 Correlation Of GPx With MASI In Melasma Cases**

S. No.	Parameters (Vs)	Correlation ( r )
1.	GPx	0.17
2.	MASI	



**Graph: 2** Correlation of Gpx with MASI in melasma group

## RESULTS:

Mean GPx level between case and control group was observed in table 1 and figure 1.  $80.39 \pm 14.74$  and  $121.63 \pm 17.06$  was mean GPx in healthy controls and cases respectively the parameter was statistically significant ( $p < 0.001$ ). Correlation ( $r$ ) of GPx with MASI in melasma cases was 0.17. these findings are in close agreement with previous study of Havva H Y et al. (2014)<sup>9</sup> that reported that SOD and GPx enzyme activities were significantly higher in the melasma patient group in comparison with the control group ( $p < 0.001$ ). The results show that the balance between oxidant and anti-oxidants was disrupted and the oxidative stress increased in melasma. These results improve the understanding of etiology-pathogenesis of the disease and its treatment.

## DISCUSSION:

Melasma is a common skin problem caused by brown to gray-brown patches on the face. Oxidative stress is a key contributor to the development and progression of melasma. It plays a significant role in melasma by causing free radicals (reactive oxygen species) to damage skin cells and promote inflammation, leading to increased pigmentation. UV exposure, hormonal changes and other factors increase ROS production beyond the body's ability to neutralize them with antioxidants, leading to this imbalance<sup>10</sup>. Consequently, antioxidants are being explored for melasma management because they can neutralize ROS, reduce inflammation and help inhibit melanogenesis (pigment production). GPx1 is one of the most critical members of the GPxs family that catalytically reduces hydrogen peroxide to produce water. This reaction protects cells and tissues from the damaging effects of oxidative stress. As per my study, GPx can be used to understand the prognosis and severity and better treatment plan in melasma cases.

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