

**ISSN**INTERNATIONAL
STANDARD
SERIAL
NUMBER
INDIA

ISSN No. : 2584-2757

Volume : 03

Issue : 01

DOI : 10.5281/zenodo.17358633



Publisher

**ROGANIDAN VIKRUTIVIGYAN PG ASSOCIATION
FOR PATHOLOGY AND RADIOGNOSIS**

Reg. No. : MAHA-703/16(NAG)

Year of Establishment – 2016

Impact Factor : 1.013

INTERNATIONAL JOURNAL OF DIAGNOSTICS AND RESEARCH

Evaluation of Effect of Chronic Unpredictable Mild Stress on Albino Rats WSR To Hematology Parameters

Dr. Subhash Waghe¹, Dr. Vijay Potdar²¹Professor Dept. of Rog Nidan, Sardar Patel Ayurvedic Medical College, Dongariya, Balaghat.²Associate Professor Dept. of Rognidana & Vikrutivigyna, Govt. Ayurvedic College, Nagpur.

Corresponding author: Dr.Subhash Waghe

Article Info: Published on : 15/10/2025

Cite this article as: - Dr.Subhash Waghe (2025) ; Evaluation of Effect of Chronic Unpredictable Mild Stress on Albino Rats WSR To Hematology Parameters ;Inter .J. Dignostics and Research 3 (1) 1-8 , DOI : 10.5281/zenodo.17358633

Abstract

During the past three decades the number of deaths due to CVDs has increased from 15.2% to 28.1% in India. There are many dietary and lifestyle factors are responsible for this rise. In the common aetiology of heart diseases stated by acharya Charaka, along with other causes, psychological causes like *Chinta* (worry), *Bhaya* (Fear/Anxiety), *manasik trass* (mental tension) are mentioned as factors responsible for heart disease. There is sharp increase in cases of anxiety and depression due to change lifestyle in present era. Hence, it is essential to evaluate the role of *Ayurvedokta* psychological factor such as *Bhaya* (Anxiety) in the development of heart disease. Chronic unpredictable mild stress (CUMS) is the most elegant model for evaluation of anxiety in the rats as this model possesses construct, predictive and face validity in rats. Hence, this model is used in the present study. In CUMS process, animals will be subjected chronically and unpredictably to a variety of **low-grade stressors** which resembles to those associated with anxiety like symptoms in humans and also cause cognition impairment. It is observed that CUMS had generated the anxiety in rats leading to alteration in normal cardiac physiology.

Keywords – *Manasik trass*, *Bhaya* (Anxiety), Hematology Parameters, CVDs

Introduction :

Nearly there are 3 million (30 lac) cases of Myocardial Infarction occurs every year (API Study) in India and 15 million (1.5 Cr.) cases across the globe every year. Out of this, 25% are under 40 age, 50% are under 50 age, 25% > 50 years of age. The death due to myocardial infarction is increasing in Indian population at an alarming rate and accounts for around 15-20% of all deaths. During the past three decades the number of deaths due to CVDs has increased from 15.2% to 28.1% in India.^[1]

Stress is an important factor having high impact on the psychological development which alters emotion, cognition and related behavioral outputs. Chronic unpredictable mild stress (CUMS) is the most elegant model for evaluation of anxiety as this model possesses construct, predictive and face validity in rats^{[2][3]}. In CUMS process, animals will be subjected chronically and unpredictably to a variety of **low-grade stressors** which resembles to those associated with anxiety like symptoms in humans and also cause cognition impairment.

CUMS protocol will be performed in separate room but the normal animal left unchallenged. During the 7 weeks, animals were submitted to 6 different stressors: **tilted cage** (45°), **food and water deprivation**, **restricted access to food**, **exposure to empty bottle**, **24 h wet cage** (200ml of water in 100g of sawdust bedding), **continuous illumination**. These stressors will be randomly scheduled over a week period and will be repeated to maintain the aspect of unpredictability. Hematological parameters like Hb%, RBC count, WBC count, platelet count are PCV, measured to know the effect of stressors on hemopoietic

condition.

Review Of Literature :

The number of factors play role in the development of ischemic heart diseases but over consumption of oily fatty food and unhealthy lifestyle (*mithya ahar vihar*) with **mental stress** are the important basic factors enumerated by both the science. In Ayurveda it can be called as '*Hrit Aposhanaj Hrit Roga*' and the pathophysiology of MI is mentioned by Sushruta in *Sutrasthana* 15/32^[4] and Syndrome of MI is mentioned by Sushrut *Uttartantra* 43/131-132^[5] in the form of '*Hrit Shoola*'. In the common etiology of heart diseases stated by acharya Charaka, along with other causes, psychological causes like *Chinta* (worry), *Bhaya* (Fear/Anxiety), *manasik trass* (mental tension) are mentioned as factors responsible for heart disease^[6]. There is sharp increase in cases of anxiety and depression due to change lifestyle in present era. Hence, it is essential to evaluate the role of *Ayurvedokta* psychological factor such as *Bhaya* (Anxiety) in the development of heart disease and alteration of normal hematological indices.

Research Question :

Whether *Ayurvedokta Bhaya* (fear) acts as a aetiological factor for development of heart disease

Hypothesis:

- **Null Hypothesis (H1)** -*Ayurvedokta Bhaya* (fear) acts as a *aetiological* factor for alteration of normal hematological indices.
- **Alternate Hypothesis (H0)**-
Ayurvedokta Bhaya (fear) does not acts as an *aetiological* factor for alteration of normal hematological indices.

Material & Methodology :

Study Design :

- **Center of Study** – Dept of Roga Nidana & Vikrutvigyana, Government Ayurvedic College, Nanded And National Testing Centre, Pune
- **Study Population And Sampling :**
Animal required for the Study
- **Species/Common name** -
- **Weight** - 200-250 g
- **Gender** – Male and Female
- **Number to be used** - 12
- **Groups** : Animals will be divided into 2 groups.

Groups (n = 6)	Treatment
Normal Control	No treatment
Disease Control	Chronic unpredictable mild stress induction

Data Collection & Instruments :

The animals will be subjected chronically and unpredictably to a variety of **low-grade stressors** which resembles to those associated with anxiety like symptoms in humans and also cause cognition impairment. CUMS protocol will be performed in separate room. During the 7 weeks, animals will be submitted to 6 different stressors:

- 1] tilted cage (45°),
- 2] Tail Clamping for 3 minutes,
- 3] Cold swimming for 5 minutes at 4°C
- 4] exposure to empty bottle,
- 5] 24 h wet cage,
- 6] continuous illumination. These stressors will be randomly scheduled over a one week period and

will be repeated to maintain the aspect of unpredictability. After confirmation of stress in animals, Hematological investigations were done.

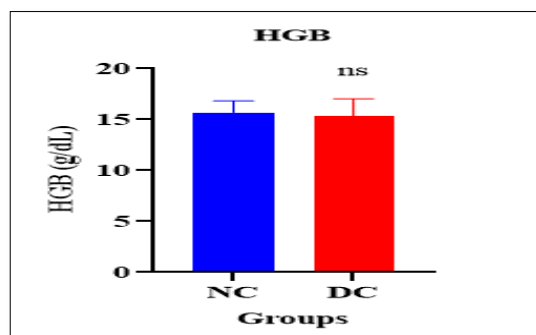
Assessment Criteria :

1. The normal reference range of **HB%** in rats is - **10.4 to 16.5 g/dl**. The level lower than the normal range is considered to be significant decrease.
2. The normal reference range of **PCV Value** in rats is **18 to 48%**.
3. The normal reference range of **RBC Value** in rats is 3.5 to 7.5 $10^{12}/L$ or 3.5 to 7.5 $\times 10^6/\mu L$.
4. The normal reference range of **Platelet Value** in rats is 107 to 615 $10^9/L$. or 1.7 to 5.57 $\times 10^6/\mu L$.
5. The normal reference range of **WBC Value** in rats is 4.44 to 14.8 $10^9/L$ or 4400 to 14800/cumm.
6. The normal reference range of **Neutrophil count** in rats is 13 to 63% or 1.3 to 6.3 $10^9/L$.
7. The normal reference range of **Lymphocyte count** in rats is 61 to 86 % or 6.1 to 8.6 $10^9/L$.

Observation & Result :

Table No. 1 – Hb% Values (G/Dl)

				HGB
Group	Animal No	Sex	Marking	g/dL
NC	1	M	1	15.3
	2	M	2	17.3
	3	M	3	15.8
	4	F	1	15.8
	5	F	2	16.1
	6	F	3	13.8
MEAN				15.7
SD				1.1
DC	7	M	1	16.2
	8	M	2	16.6
	9	M	3	16.3
	10	F	1	16.2
	11	F	2	14.5
	12	F	3	12.2
MEAN				15.3
SD				1.7



Graph No.1 : Hb% Values (G/Dl)

Table No. 2 – RBC Value ($10^{12}/L$) :

Group	Animal No	Sex	Marking	RBC $\times 10^{12}/L$
NC	1	M	1	7.7
	2	M	2	8.4
	3	M	3	8.2
	4	F	1	7.7
	5	F	2	8.4
	6	F	3	7.1
MEAN				7.9
SD				0.5
DC	7	M	1	8.7
	8	M	2	8.6
	9	M	3	8.5
	10	F	1	8.0
	11	F	2	8.1
	12	F	3	6.2
MEAN				8.0
SD				0.9

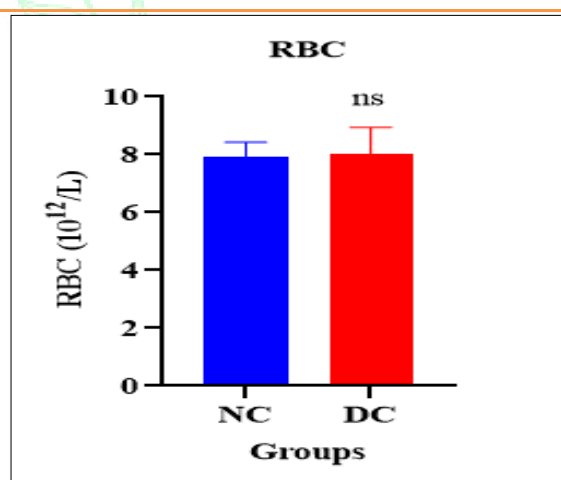
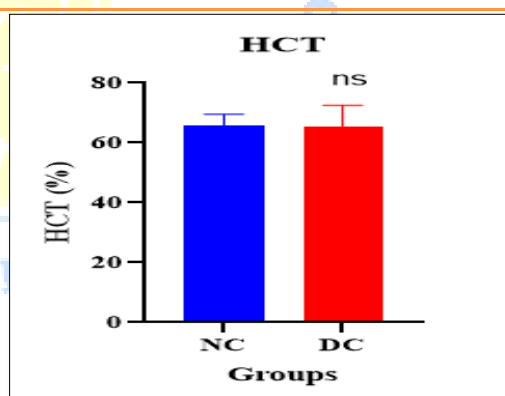
Graph No.2 : RBC Value ($10^{12}/L$)

Table No. 3 – Haematocrit Values (%) :

Group	Animal No	Sex	Marking	HCT %
NC	1	M	1	64.6
	2	M	2	70.5
	3	M	3	67.0
	4	F	1	64.7
	5	F	2	68.1
	6	F	3	59.0
MEAN				65.7
SD				3.9
DC	7	M	1	69.8
	8	M	2	68.8
	9	M	3	68.7
	10	F	1	69.6
	11	F	2	63.8
	12	F	3	51.5
MEAN				65.4
SD				7.1

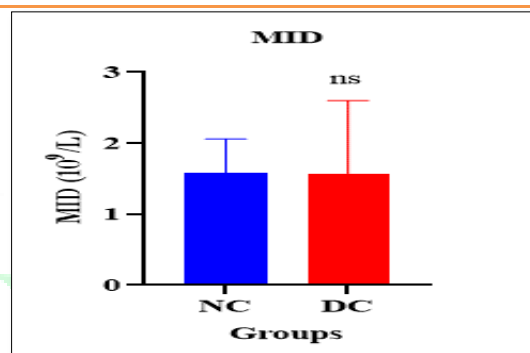
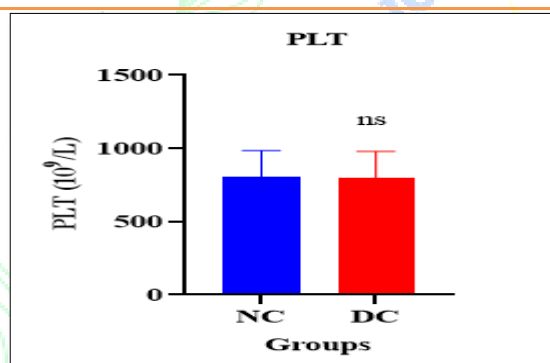


Graph No.3 : Haematocrit Values (%)

Table No. 4 – Platelet Values ($10^9/L$) :

Group	Animal No	Sex	Marking	PLT $\times 10^9/L$
NC	1	M	1	1116.0
	2	M	2	726.0
	3	M	3	804.0
	4	F	1	565.0
	5	F	2	838.0
	6	F	3	782.0
MEAN				805.2
SD				180.1

				PLT
Group	Animal No	Sex	Marking	*10 ⁹ /L
DC	7	M	1	935.0
	8	M	2	846.0
	9	M	3	927.0
	10	F	1	671.0
	11	F	2	919.0
	12	F	3	484.0
MEAN				797.0
SD				182.8

Graph No.5 : MID Value (10⁹/L)Graph No.4 : Platelet Values (10⁹/L)Table No. 5 – MID Value (10⁹/L) :

				MID
Group	Animal No	Sex	Marking	*10 ⁹ /L
NC	1	M	1	1.6
	2	M	2	2.4
	3	M	3	1.1
	4	F	1	1.4
	5	F	2	1.2
	6	F	3	1.8
MEAN				1.6
SD				0.5
DC	7	M	1	3.0
	8	M	2	1.3
	9	M	3	2.7
	10	F	1	0.5
	11	F	2	0.8
	12	F	3	1.1
MEAN				1.6
SD				1.0

Table No. 6 – Total WBC Value (10⁹/L) :

				WBC
Group	Animal No	Sex	Marking	*10 ⁹ /L
NC	1	M	1	17.5
	2	M	2	17.5
	3	M	3	15.4
	4	F	1	16.1
	5	F	2	16.3
	6	F	3	13.9
MEAN				16.1
SD				1.4
DC	7	M	1	31.9
	8	M	2	18.2
	9	M	3	21.3
	10	F	1	6.4
	11	F	2	10.5
	12	F	3	11.2
MEAN				16.6
SD				9.3

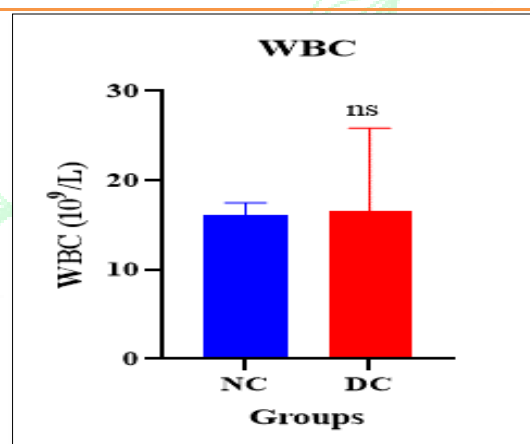
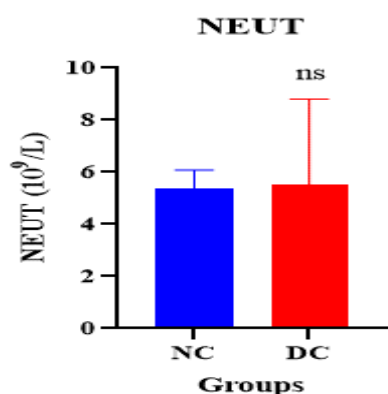
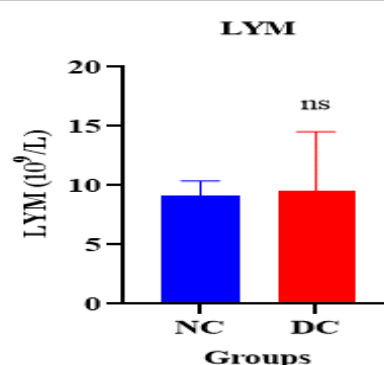
Graph No.6 : Total WBC Value (10⁹/L)

Table No. 7 – DLC-Neutrophil Value ($10^9/L$) :

Group	Animal No	Sex	Marking	NEUT * $10^9/L$
NC	1	M	1	4.8
	2	M	2	6.3
	3	M	3	4.8
	4	F	1	5.3
	5	F	2	6.2
	6	F	3	4.8
MEAN				5.4
SD				0.7
DC	7	M	1	11.0
	8	M	2	6.5
	9	M	3	6.8
	10	F	1	2.0
	11	F	2	3.2
	12	F	3	3.6
MEAN				5.5
SD				3.3

Graph No.7 : DLC-Neutrophil Value ($10^9/L$)

Group	Animal No	Sex	Marking	PLT * $10^9/L$
DC	7	M	1	17.9
	8	M	2	10.4
	9	M	3	11.8
	10	F	1	3.9
	11	F	2	6.5
	12	F	3	6.5
MEAN				9.5
SD				5.0

Graph No.8 : DLC- Lymphocyte Value ($10^9/L$)

Discussion :

The mean **Hb%** observed in normal control is **15.7 g/dl** whereas in Disease control, it is **15.3 g/dl**. Statistically not much significant decrease in Hb% is observed. This Hb% count is in the normal range.

The mean **RBC count** observed in normal control is **7.9 $10^{12}/L$** whereas in Disease control, it is **8 $10^{12}/L$** . No much variation in the values of RBC count was observed in NC and DC group. This RBC count is in the normal range.

The mean **Haematocrit / PCV** observed in normal control is **65.7%** whereas in Disease control, it is **65.4 %**. No much variation in the values of PCV count was observed in NC and DC group.

The mean **Platelet value** observed in normal control is **805.2 $10^9/L$** whereas in Disease control, it is **797 $10^9/L$** . No much variation in the values of

Table No. 8– DLC- Lymphocyte Value ($10^9/L$) :

Group	Animal No	Sex	Marking	LYM * $10^9/L$
NC	1	M	1	11.1
	2	M	2	8.8
	3	M	3	9.5
	4	F	1	9.4
	5	F	2	8.9
	6	F	3	7.3
MEAN				9.2
SD				1.2

Platelet count was observed in NC and DC group.

The mean **MID value** observed in normal control is $1.6 \times 10^9/L$ whereas in Disease control, it is $1.6 \times 10^9/L$. No variation in the values of Platelet count was observed in NC and DC group.

The mean **WBC value** observed in normal control is $16.1 \times 10^9/L$ whereas in Disease control, it is $16.6 \times 10^9/L$. No variation in the values of WBC count was observed in NC and DC group.

The mean **Neutrophil count** observed in normal control is $5.4 \times 10^9/L$ whereas in Disease control, it is $5.5 \times 10^9/L$. No variation in the values of Neutrophil count was observed in NC and DC group.

The mean **Lymphocyte count** observed in normal control is $9.5 \times 10^9/L$ whereas in Disease control, it is $9.5 \times 10^9/L$. No variation in the values of Lymphocyte count was observed in NC and DC group.

Summary & Conclusion:

There is no much variation in the values of blood indices were noticed in NC and DC group. Hence, it can be concluded that *Bhaya* (fear) may not act as an etiological factor for the alteration of hematological parameters in rats.

References :

- Ekta Mani, Bondu Venkateswaralu, Balajeet Maini Dheeraj Marwah, Machine learning based heart disease based prediction system for Indian population: An exploratory study done in south India,, Med J Armed Forces India, 2021 Jan 6;77(3):302-311
- Svitlana Antoniuk¹, Monika Bijata², Evgeni Ponimaskin³, Jakub Wlodarczyk⁴ , Chronic unpredictable mild stress for modeling depression in rodents: Meta-analysis of model reliability, Neurosci Biobehav Rev. 2019 Apr;99:101116.doi:10.1016/j.neubiorev.2018.12.002. Epub 2018 Dec 6
- Dmitrii D Markov¹, Ekaterina V Novosadova², Chronic Unpredictable Mild Stress Model of Depression: Possible Sources of Poor Reproducibility and Latent Variables, Biology (Basel) 2022 Nov 6;11(11):1621.doi: 10.3390/biology11111621
- Delwatta SL, Gunatilake M, Baumans V et al. Reference Values for selected hematological, biochemical and physiological parameters of Sprague Dawley rats at the Animal house, Faculty of Medicine, University of Colombo, Shrilanka, Animal Model Exp Med. 2018;1:250-254
- Atridev, 'Sushrut Samhita' of acharya Sushruta, hindi translation, Sutrashtana 15/32, published by Motilal Banarasidas, 41, UA Bunglow Road, Jawahar nagar , Delhi-110007,2007, pg. 60
- Atridev, 'Sushrut Samhita' of acharya Sushruta , hindi translation, Uttartantra 42/131-132, published by Motilal Banarasidas, 41, UA Bunglow Road, Jawahar nagar , Delhi-110007, 2007, Pg. 725
- Acharya Vidyadhar Shukla, Ravidutta Tripathi, 'Charaksamhita of acharya Charak and Agnivesha, Chikitsasthana 26/77, hindi translation, 1st edition, reprint, published by

Chaukhamba Sanskrit Pratishthan, ansari road,
Daryaganj, New Delhi – 110 002, 2019, pg.6

Declaration :

Conflict of Interest : None

ISSN: 2584-2757

DOI : 10.5281/zenodo.17358633

Dr. Subhash Waghe Inter. J.Digno. and Research

This work is licensed under Creative
Commons Attribution 4.0 License



Submission Link : <http://www.ijdrindia.com>

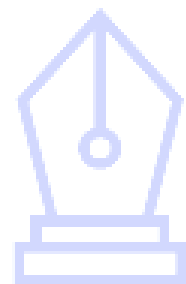


Benefits of Publishing with us

- Fast peer review process
- Global archiving of the articles
- Unrestricted open online access
- Author retains copyright
- Unique DOI for all articles

<https://ijdrindia.com>

प्रज्वालितो ज्ञानमयः प्रदीपः ॥



RVPGA