Ministry of Higher Education and
Scientific Research

Diyala University College of Medicine

The Relationship Of Temperature Of Human Body And Humidity With Plt And WBC Count

Submitted to the Council of the College of Medicine, Diyala University, In Partial Fulfillment of Requirements for the Bachelor Degree in medicine and general surgery.

Supervisor:

Lec. Ibrahim Tariq Ibrahim

Done by: Zainab Thair Abbas

2023

Stage: 6

بِسْمِ اللَّهِ الرَّحْمَنِ الرَّحِيمِ

{هُوَ الَّذِي بَعَثَ فِي الْأُمِّيِّينَ رَسُولًا مِنْهُمْ يَتْلُو عَلَيْهِمْ آيَاتِهِ وَيُزَكِّيهِمْ وَيُعَلِّمُهُمُ الْكِتَابَ وَالْحِكْمَةَ وَإِنْ كَانُوا مِنْ قَبْلُ لَفِي ضَلَالٍ مُبِينٍ}.

سورة الجمعة، آية: 2

Acknowledgment

By the name of Allah, we start our project and we are thankful to Allah for helping us to complete this project and giving us the power and determination to do it faithfully and honestly.

We would like to thank the dean of our collage **Dr. (Ismail Ibrahim)** for his help in allowing us to complete this project. We are deeply indebted to **(Lec. Ibrahim Tariq Ibrahim)** , for great help and appreciable advice and for close and scientific supervision to our project In addition, thanks for every person participated to finish this project.

In addition, thanks to all our doctors in the Diyala University College of medicine for the knowledge they provided to us throughout the duration of our studies.

We want to thank all the people who accept to provide us with information about our subject.

Abstract

Background: Human body score temperature varies from day to day and from time to time, but theses fluctuations are small, usually no more than 1.00C. Humans are homoeothermic and body temperature is regulated at about 37 0 - 10C, the thermoregulatory center in the hypothalamus plays a very active role in keeping body temperature in the normal range. External (climatic) and internal (metabolic) heat sources influence body temperature.

Aim: The aim of study is to assess the relationship of temperature of human body and humidity with plt and wbc count .

Subject and methods: The current study is cross section study type was carried out in Baqubah teaching hospital from 7th of December 2022 to the 24th of March 2023. Sample taken was simple random sampling.

Results: The total sample of study was (50), the male was (31) and female was (15), and the aged from 18 to 75 years old. the mean level of platelet count at was observed to be (82.28±44.62 x 103) cells/cumm . Similarly the mean of leukocyte count was observed to be (3.7±1.62 x 103) cells/cumm, the temperature was not significantly correlated with platelet count whereas it was significantly correlated with total leukocyte count (ρ= -0.329, p = 0.026). the temperature was not significantly correlated with either platelet count or total leukocyte when compare of male with female. patients aged <45 years the temperature was not significantly correlated with either platelet count or total leukocyte whereas in patients aged 46 years or above it was significantly correlated with total leukocyte count (ρ= -0.576, p = 0.025). the mean of humidity in study was 59 and minimum was 35% and maximum 95%.

Conclusions: The temperature was not significantly correlated with platelet count whereas it was significantly correlated with total leukocyte count. The temperature was not significantly correlated with either platelet count or total leukocyte when compare of male with female. The temperature was not significantly correlated with either platelet count or total leukocyte in sample with age less than 45 years old whereas in patients aged 46 years or above it was significantly correlated with total leukocyte count. There is no significance correlations between humidity and temperature.

Keywords: temperature, platelet count, total leukocyte count, humidity.

Contents

Lists tables and figures

Introduction

Human body score temperature varies from day to day and from time to time, but theses fluctuations are small, usually no more than 1.00C. Humans are homoeothermic and body temperature is regulated at about 37 0 - 10C, the thermoregulatory center in the hypothalamus plays a very active role in keeping body temperature in the normal range. External (climatic) and internal (metabolic) heat sources influence body temperature [1].

Heat stress is the most important climatic stress that even threatens the survival of the animals, Environmental factors including the ambient temperature, relative humidity and metabolic heat produced from the maintenance and productive process contribute to the heat stress, Heat stress is a combination of environmental conditions when the ambient temperature is higher than the temperature range of animal´s [2].

Heat stress is responsible for alterations of the immune response which changes depending on the type of immune response and the length of time that human are exposed to the stressor, Workers in industries are exposed to high temperature around them, as a result of technical processes which heat the atmosphere [3].

Such as the workers in front of the bakery and in such cases may prevent the heat of the human body to lose the appropriate amount of heat, which leads to increased heat and resort in this case to try to increase the means of loss of heat by expanding the blood vessels surrounding the skin to increase the temperature of the skin and increase the amount of sweat In an attempt to increase heat loss by evaporation, the body's ability to adapt is limited and disturbances and diseases may occur, When the organism is exposed to different types of stress, it results in the formation of a thermal shock protein that includes stress exposure to high temperatures and various chemicals materials [4].

So recent studies have focused on studying the metabolic and biochemical events of high-temperature exposed organisms because they are essential to understanding the environmental risks of pollution and reflect the damage to cells, tissues and their bodies, the continuous exposure to high heat increases the kinetic energy of all cellular molecules, this energy is then spread and distributed within the cell. It is possible that the occurrence of hydrolysis or accumulating proteins of

heat in the cell and within different cellular organs such as nucleus, mitochondria and microorganisms, Furthermore, the decline in cognitive performance in hot environments has been reported by many studies as a cause that can lead to human errors due to reduced attention and increased likelihood of unsafe behavior [5].

A mosquito induced viral infection; dengue fever annually affects almost 100 million people globally with 2.5 billion people at risk of developing dengue fever, It has four viral strains i.e. DEN-1, DEN-2, DEN-3, and DEN-4, Majority of the cases of dengue fever have been estimated to be caused by DEN-2 and DEN-3 viral strains, The symptoms of dengue fever begins with flu like illness and may lead to severe manifestations such as bleeding, sudden loss of consciousness and even loss of life [6].

Fever usually persists for one week while within first two days patients feel warmth and redness on face or neck with red spots under the skin, Its clinical manifestations include headache, fever, skin rashes, leucopenia and arthralgia. Dermatological manifestations occur in almost 50% of cases and begin just after patient appears to be afebrile, Bleeding occurs more frequently in patients with severe thrombocytopenia [7].

Dengue fever and dengue hemorrhagic fever are diagnosed on the basis of clinical and epidemiological parameters, the treatment plan depends upon detection of IgM and IgG antibodies in the patient's blood whereas ELISA is used to differentiate between primary and secondary dengue infections, for rapid diagnosis of the dengue virus, NS1 antigens are detected in the patient's blood, the treatment of the infection is decided on the basis of severity of clinical features and level of fluids in the body. Patients with hemorrhagic manifestations such as petechiae, gum-bleeding, epistaxis etc. require platelet transfusion. [8]

Dengue is prevented by mosquitoes control and by protecting the subjects from mosquito bite, Viral prevention strategies include properly disposing off waste, up gradation of water storage system and proper usage of repellents, there is no recommended vaccine yet for the eradication of the virus though a new live attenuated tetravalent vaccine is undergoing clinical trials [9].

Both white blood cell count and mean platelet volume are variables of interest in epidemiological and clinical studies in view of their relation to inflammation and role of risk markers for cardiovascular disease, the change in platelet volume with time after blood sampling provides a practical problem when analysis has to be postponed, For the evaluation of mean platelet volume, it has been proposed to wait for >48 h with analysis to allow for the swelling in EDTA blood to be completed, the volume of the swollen platelet has been shown to be proportional to the original volume [10].

Subjects and methods

Ethical and Approval Consideration

Permission was taken from mothers and grandmothers to fill the information required and they were assured regarding the confidentiality of their responses. The aim of the study was explained and only those who agreed to participate are included in the study .

Study Population

The study was performed among patients in Baqubah teaching hospital .

Study design

The current study is cross section study type was carried out in Baqubah teaching hospital from 1th of December 2022 to the 25th of March 2023. Sample taken was simple random sampling.

Sample size and sample procedure

The sample size was 50 cases. Trained very well to interview the questionnaire carefully and in scientific way to avoid any bias. Respondents were assured that the information obtained would be confidential and used only for statistical purposes.

Data Analysis and Presentation

The relevant data were analyzed on SPSS version 20. After checking normality, the correlation of temperature with platelet count and WBC count was assessed using Spearman's correlation coefficient. The significance level was set at 0.05.

Results

The total sample of study was (50), the male was (31) and female was (15), and the aged from 18 to 75 years old.

In a total of 50 patients the mean level of platelet count at was observed to be **(82.28±44.62 x 103)** cells/cumm.

Similarly the mean of leukocyte count was observed to be **(3.7±1.62 x 103)** cells/cumm.

The study results revealed that the temperature was not significantly correlated with platelet count whereas it was significantly correlated with total leukocyte count **(ρ= -0.329, p = 0.026)** (table 1).

Table 1: Correlation of Temperature with Platelet Count and Total Leukocyte Count.

N=50	Platelet Count		Leukocyte Count	
	ρ	p	ρ	p
Temperature	-0.177	0.239	-0.329	0.026

Table 2: Correlation of Temperature with Platelet Count and Total Leukocyte Count according to gender.
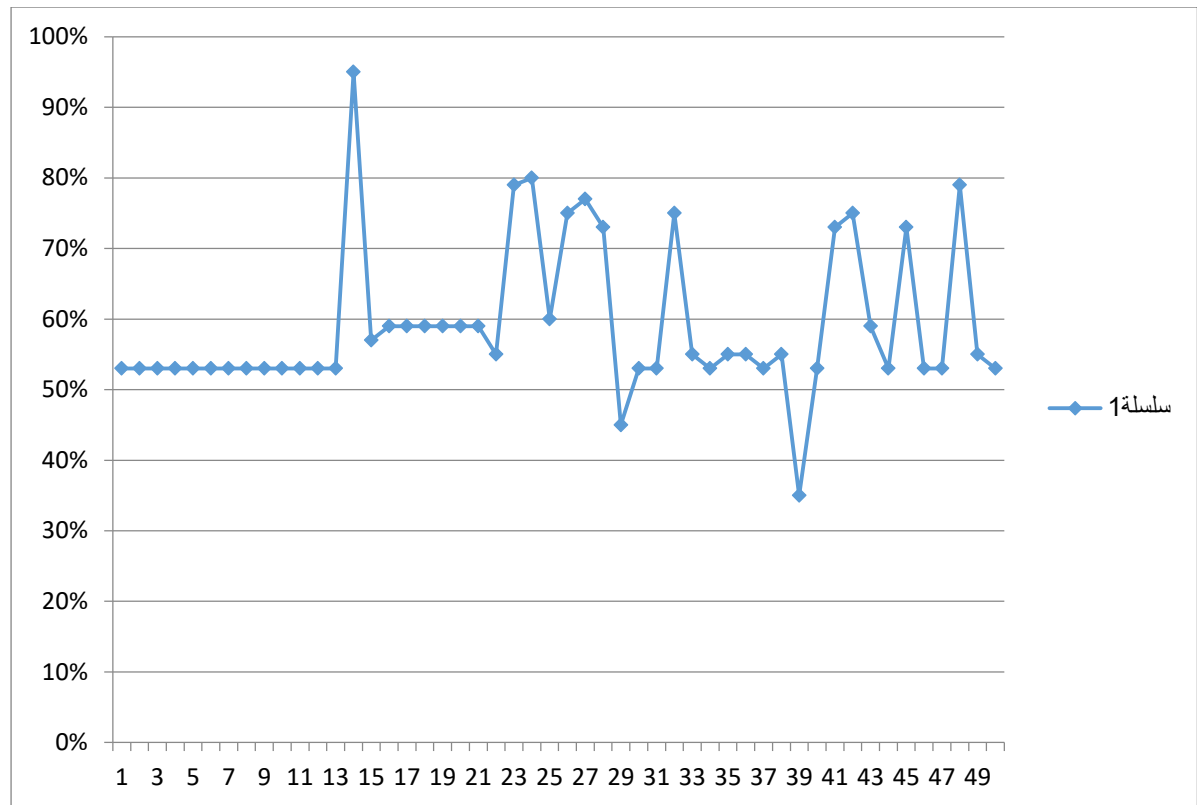
The study results revealed that in patients with fever, the temperature was not significantly correlated with either platelet count or total leukocyte when compare of male with female.

Temperature	Platelet Count		Leukocyte Count	
	ρ	p	ρ	p
Male	-0.189	0.335	0.097	0.701
Female	-0.211	0.28	0.296	0.233

Table 3: Correlation of Temperature with Platelet Count and Total Leukocyte Count according to age.

The study results also showed that in patients aged <45 years the temperature was not significantly correlated with either platelet count or total leukocyte whereas in patients aged 46 years or above it was significantly correlated with total leukocyte count (**ρ= -0.576, p = 0.025**).

Temperature	Platelet Count		Leukocyte Count	
	ρ	p	ρ	p
<45 years	-0.233	0.207	-0.172	0.354
>45 years	0.043	0.878	-0.576	0.025*

Figure 1: the distributions of humidity.

This figure shows that the mean of humidity in study was 59 and minimum was 35% and maximum 95%.

Figure 2: the correlation between humidity and temperature.

This figure shows that there is no significance correlations between humidity and temperature.

Discussions

This study was conducted on (50) sample in Baqubah teaching hospital, The study results revealed that the temperature was not significantly correlated with platelet count whereas it was significantly correlated with total leukocyte count (ρ= -0.329, p = 0.026).

This results agree with study was conducted in Al-Anbar, Iraq [11], that's the temperature was not significantly correlated with platelet count whereas it was significantly correlated with total leukocyte count (p-value less than 0.05) for correlation between temperature and leukocyte.

Also with study of Amsterdam [12] that conducted on 304 of patients, that shows significantly correlated with total leukocyte count (p- value less than 0.05) for correlation between temperature and leukocyte without any correlation between platelet and temperature.

A higher temperature is correlated to the cells working harder and therefore means they need a higher supply of oxygen to keep them going. Therefore at higher blood plasma temperatures, the hemoglobin becomes less likely to bind to oxygen and much more likely to unload to into the cells of the tissue.

In the present study, results revealed that in patients with fever, the temperature was not significantly correlated with either platelet count or total leukocyte between male and female.

Also that's founded in study was conducted in Pakistan [13], and study of Al-Anbar, Iraq [11], that temperature was not significantly correlated with either platelet count or total leukocyte between male and female.

In the present study the results showed that in patients aged <45 years the temperature was not significantly correlated with either platelet count or total leukocyte whereas in patients aged 46 years or above it was significantly correlated with total leukocyte count (ρ= -0.576, p = 0.025).

While in study of Amsterdam [12], showed there is no significance correlation of temperature and platelets counts in relation to age, the difference of this results may be due to small size of sample that's may appears same bias.

In the presents study, there is no significance correlations between humidity and temperature.

While in study of Amsterdam [12] and study of Pakistan [13], showed that there is significance correlations between humidity and temperature that's results of this study was simply says they are inversely proportional. If temperature increases it will lead to a decrease in relative humidity, thus the air will become drier whereas when temperature decreases, the air will become wet means the relative humidity will increase, and this disagree when compare with our study may be due to small sample size and low quality of devise of humidity.

Conclusion

1. The temperature was not significantly correlated with platelet count whereas it was significantly correlated with total leukocyte count.
2. The temperature was not significantly correlated with either platelet count or total leukocyte when compare of male with female.
3. The temperature was not significantly correlated with either platelet count or total leukocyte in sample with age less than 45 years old whereas in patients aged 46 years or above it was significantly correlated with total leukocyte count.
4. There is no significance correlations between humidity and temperature.

Recommendations

Recommended for evaluation of the study findings with a larger sample size.

Provide regular data and good devices for medical staff in hospitals to detect any abnormal humidity.

References

1. Malavige GN, Fernando S, Fernando DJ, Seneviratne SL. Dengue viral infections. Postgraduate medical journal. 2014; 80(948):588-601.

2. Thein S, Aung MM, Shwe TN, Aye M, Zaw A, Aye K et al. Risk factors in dengue shock syndrome. The American journal of tropical medicine and hygiene. 2013; 56 (5):566-72.

3. Tang JW, Khanani MR, Zubairi AM, Lam WY, Lai F, Hashmi K et al. A wide spectrum of dengue IgM and PCR positivity post-onset of illness found in a large dengue 3 outbreak in Pakistan. Journal of medical virology. 2008 Dec; 80(12):2113-21.

4. Ashley EA. Dengue fever. Trends in Anaesthesia and Critical Care. 2011; 1(1):39-41. doi:10.1016/j.tacc.2010.10.002

5. Oishi K, Saito M, Mapua CA, Natividad FF. Dengue illness: clinical eatures and pathogenesis. Journal of infection and chemotherapy. 2007; 13(3):125-33.

6. Pal T, Dutta SK, Mandal S, Saha B, Tripathi A. Differential clinical symptoms among acute phase Indian patients revealed significant association with dengue viral load and serum IFN-gamma level. Journal of Clinical Virology. 2014; 61(3):365-70.

7. Makroo RN, Raina V, Kumar P, Kanth RK. Role of platelet transfusion in the management of dengue patients in a tertiary care hospital. Asian journal of transfusion science. 2007; 1(1):4.

8. Attia, N. E. S. (2016). Physiological, hematological and biochemical alterations in heat stressed goats. Benha Vet. Med. J, 31, 56-62.

9. Tsekeri E., Kolokotsa D., Santamouris M. On the association of ambient temperature and elderly mortality in a Mediterranean island—Crete. Sci. Total. Environ. 2020;738:139843.

10. Lv L.-S., Jin D.-H., Ma W.-J., Liu T., Xu Y.-Q., Zhang X.-E., Zhou C.-L. The Impact of Non-optimum Ambient Temperature on Years of Life Lost: A Multi-county Observational Study in Hunan, China. Int. J. Environ. Res. Public Health. 2020;17:2699.

11. Marwan Mahmood Saleh, The Effect of High Temperature on the Hematological Parameters, A multifaceted review journal in the field of pharmacy, 2020; 11(2): 100 103.

12. Vogelaar, S. ., Posthuma, D., Boomsma, D., & Kluft, C. (2020). Blood sample stability at room temperature for counting red and

white blood cells and platelets. Vascular Pharmacology, 39(3), 123–125.

13. Momin A, wajid Z, Adil M, Haleem F, et al. (2019) Correlation of Temperature with Platelet Count and Total Leukocyte Count Dengue: Findings from a Secondary Data Analysis. SOJ Microbiol Infect Dis 7(1):1-4.