

Effect of Infection with Scabies on The Adrenaline Hormone of Patients with Chronic Diseases in Basra City/ Southern Iraq

Saeed F. Mnati^{1,*}, Mufeed A. Habeeb², Muslim A. Mohammed²

1. Department of Biology, Collage of Science, University of Basrh, Iraq

2. Department of Pathological Analysis, Collage of Science, University of Basrh, Iraq

*Corresponding author E-mail: saeedfadil88@gmail.com

Doi: 10.29072/basjs.2021111

Abstract

Scabies, a parasitic skin infestation by the burrowing “itch” mite *Sarcoptes scabiei*, causes significant health problems for children and adults worldwide. Crusted scabies is a particularly severe form of scabies in which mites multiply into the millions, causing extensive skin crusting. The symptoms and signs of scabies suggest host immunity to the scabies mite. The defense against stress is executed by the hypothalamic-pituitary-adrenal axis and the sympathetic-adrenal medullary system. Adrenal gland is a major effector organ of stress system. During stress, adrenal gland rapidly responds with increased secretion of glucocorticoids (GCs) and catecholamines into circulation, which hormones, in turn, affect metabolism, to provide acutely energy, vasculature to increase blood pressure, and the immune system to prevent it from extensive activation. . The current study examined (80) people, of whom (16) had negative control samples and (64) had scabies and had chronic diseases such as heart disease, diabetes, pressure, lung, liver, kidneys, ulcers, cancer, anemia and epilepsy, the current study recorded the highest levels of adrenaline using the associated immunosorbent assay technique With the enzyme (ELISA), which is (523 pg / ml) for patients suffering from chronic heart disease and infected with the scabies mite parasite and their number (14) out of (64) have other chronic diseases and their percentage was (21.88%) and the current study recorded the lowest levels of the hormone adrenaline. In patients with scabies and suffering from epilepsy at a rate (219 pg / ml) percentage (1.56%), which shows the hormone levels in patients with scabies and suffering from chronic diseases and comparing them with the control samples .

Article inf.

Received:
9/1/2021

Accepted
20/4/2021

Published
30/4/2021

Keywords

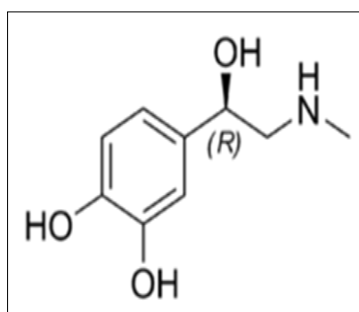
SPS, composites,
IPNs, TGA and
DSC

1. Introduction

Skin diseases caused by ectoparasites are the main diseases of small ruminants that cause serious economic losses in pets with implications for animal trade [1]. Man has known the sciotic dream for a long time, and the Greeks referred to Acari, which means sciotic dream, but they remained unknown until the beginning of the seventeenth century. Since that time, studies have shown the existence of various types of this organism on vertebrate and invertebrate animals coexisting with ectoparasites. They parasitize on domestic and wild animals, and most of these countries suffer from an outbreak of disease, especially countries whose economy depends on livestock due to unexpected losses Cattle, sheep, goats, horses, rabbits, pigs and dogs, and some other species have animal importance such as the ability to infect humans in When about (300) million people are affected worldwide, and infection in animals may lead to economic losses due to reduced growth and feed conversion rates, sheep meat is used for human consumption more than any other type of meat [2]. The mani mite causes serious damage to the animal's skin by digging and forming tunnels in the epidermis where it feeds on blood lymph, tissue fluid, sebum secretion ,and skin residues and lays eggs, causing subsequent irritation and scratching, which leads to inflammation and exudation that forms scales [3];[4] Ectoparasites are ubiquitous and are often very damaging and in most cases irreversible. Hence, they must be managed locally with insecticides, and some ectoparasites also act as hosts and vectors for bacteria, viruses, and nematodes. The behavior of ectoparasites may also cause harm indirectly, causing disruption, increasing levels of behavior (itching), reducing time spent grazing or grazing and in some cases self-wounding.[5] Primarily by physical contact, the generalized veterinary term for mite infestation in an animal is called bee disease and can lead to acute dermatitis, known as scabies, economic losses, and direct deaths.[6] Scratching and scratching leads to significant damage. In hides and skins [7], although mites are active in the keratin layer and cause direct damage to the skin, it also causes indirect economic losses by reducing reproductive and production performance [8] favors leather and wool products. Sheep over other species; Trade in sheepskin provides a major subsidy to more countries of the world through large economic imports [9] stated that enormous economic losses are caused by damage to the skin and wool, physical condition, anemia, and reduced production. Meat ,and dairy, and growth rates of about (16) families including (26) genera and (50) species of dreaming and may cause scabies where all major dream types are within orders (Astigmata and (Prostigmata, including Astigmata) medical or veterinary families The important (Sarcoptidae) and Psoroptidae which include the Sarcoptes mite that causes scabies, Sarcoptic scabies in human mammals and others as an animal disease, while (Prostigmata) include Cheyletiellidae, Demodecidae and Psorergatidae [10], the scabies mite is mainly composed of Four types: Sarcoptic (barn itch), Psoroptic (sheep scab, body scab, ear scab), Chorioptic (tail and leg scab) and Demodectic (follicular scabies). It has developed moderate to severe anemia



characterized by a decrease in total red blood cell count, compact cell volume, and hemoglobin concentration [11]. Signaling to the skin's immune system, which usually consists of lymphocytes, keratinocytes, Langerhans cells, dendritic cells, granulocytes and lymph nodes that deplete the skin, and regulation of the skin's defense mechanism is essential because abnormal immune reactions lead to the pathogenesis of the skin. Including dermatitis and exposure to allergens can lead to allergic skin disorders. It has often been difficult to define human responses to parasitic infection of either Th1 or Th2, as characteristics of both types of response are reported [12] There is accumulating evidence that the host's immune response for scaly scabies is not similar to the allergic response to Th2 allergy, and normal scabies resembles Th1 protective response [13]., Th1-biased immune reactions are dominant. "In terms of diseases, they are usually two things - help, or at least, do no harm." (Hippocrates.) Diagnosis, treatment, or Preventing diseases and other damage to the body or mind is called medicine., the object of study for this thesis, *Sarcoptes scabiei*, is found. This ectoparasite is a malignant pathogen mite with the ability to infect a wide range of animals and humans.)([14]. Likewise, there are numerous reports from all over the world of scabies outbreak as an epidemic disease in wild populations such as bovine, canine (1). *S. scabiei* is also an important public health problem among humans. It is estimated that as many as 300 million people worldwide are infected with scabies at any given time)[15]. The dream is transmitted by close personal contact, including sexual contact. In the first place, scabies is a major problem in developing countries, as transmission is usually associated with overcrowding and poverty [16] Other groups at risk of developing scabies are infants, the elderly, and patients with weakened immune states [17]. Thus, *S. scabiei* is an important pathogen, as a cause of suffering in humans and animals, as well as causing economic harm to farmers. At present, there are effective treatments for scabies, but reports have recently been published of increased resistance to the more common killers;[18] [19] Problems associated with resistance are likely to worsen over time if not Precautionary measures are taken Recombinant DNA technology has provided tools that have greatly increased our understanding of many different organisms and biological processes.



(1) epinephrine Figure

(1)epinephrine Figure shows the chemical structure of the hormone epinephrine Parasites comprise



veterinary importance are the leading cause of mortality and socio-economic advancement alike in the developing world. Sexual differences in parasitic infections are a biological phenomenon of great importance for individual health and disease. The general rule is that females are more resistant to infectious diseases than males [20]. However, there are several notable exceptions to this rule that illustrate the bias of the female in exposure to infection [21]. This model means that the sexual form mediating the response to parasites is primarily through the host's immune system, which ignores the ability of some parasites to respond directly. On the features of distinct steroidal sex hormones in both female and male hosts [22]., parasites exploit the host systems for growth during establishment, growth, or reproduction [23]. As a result, parasites can either positively or negatively affect the infection pathway. [24] Based on the above data, Adrenaline (also called epinephrine) is a hormone and neurotransmitter secreted by the adrenal gland which is located above the kidney, where it is produced in the chromophore cells in the adrenal core. It works to increase the heartbeat and constrict blood vessels, and in general, it prepares the body for hit-and-run situations. Epinephrine and norepinephrine are the most important neurotransmitters in the sympathetic nervous system.

2. Materials and Methods

Adrenaline, which is important in the process of regulating stress and psychological pressures due to scabies, using a special kit from the American origin EPI (Epinephrine / Blood samples were taken from the injured from the vein area (5CC), as well as blood from non-infected persons as control samples by sterile single-use syringes and then placed in tubes containing anticoagulant and then placed in a centrifuge (5000 rpm) For ten minutes, the serum was separated from the blood cells, after which the serum was placed in a special Abendorf capacity (1.5 microliters) and kept in the refrigerator at a temperature of (-20) degrees Celsius until it was used in immunological diagnostics (64) people infected with scabies were selected, and some people with chronic diseases such as heart and kidney disease, high pressure, diabetes, anemia, stomach ulcers, liver disease, tuberculosis and epilepsy were selected. The blood serum of healthy people was also examined as samples controlled by (16) healthy, uninfected people. For comparison sake, The study period from November of 2018 to November of 2019 Samples were collected from infected patients and suffering from chronic diseases from Basra Governorate Hospitals. The injury was diagnosed by scraping the injury with a sterile surgical blade and preserved with ethyl alcohol until it was transferred to the laboratories of the College of Science, Department of Science. Life The preservation liquid is disposed of by a centrifuge (1500 rpm / minute) and then a KOH solution is added to remove the skin tissue attached to the parasite using a special kit (Cut) from US EPI (Epinephrine / Adrenaline) Elisa Kit.



3. Statistical Analysis

The results were analyzed statistically by using the Anova [25] one way method of analysis of variance using the SPSS version 11 statistical program under the probability level $P < 0.05$. The T test and Pearson correlation were used in the current study.

4. Results

The current study proved that patients suffering from chronic diseases and infected with the scabies mite parasite for a whole year after measuring levels of the hormone adrenaline using a unit (pg / ml) (picogram / ml) on (80) people, including (64) with scabies and suffering from chronic diseases and (16) A person used as control samples, The current study proved that the levels of the hormone adrenaline released in the blood increases, which affects the high heart rate when feeling anxiety and fear, and this leads to stress in the heart and then brain hemorrhage and death. The current study recorded the highest levels of the hormone adrenaline, which is (523 pg / ml) for patients suffering from heart disease and infected with the scabies mite parasite and their number was (14 patient) out of (64 patient) and the percentage of them was (21.88%), and the number of diabetic patients was (11) successively. The highest percentage for them was (398 pg / ml) and their percentage was (17.19%) followed by patients with high blood pressure (10 people with scabies had their highest percentage (295 pg / ml) and their percentage (15.62%) after Patients suffering from chronic kidney disease (8) had the highest percentage (277 pg / ml) and their percentage was (12.5%), then patients with chronic lung disease number (6) and their highest percentage was (260 pg / ml) The percentage of them was (9.38%), then the religious patients suffering from chronic ulcer diseases were (5) and the highest hormonal percentage for them was (241 pg / ml) and the percentage of them was (7.81%), then the patients suffering from liver disease with scabies were (4) The highest hormonal level for them was (234 pg / ml) and the percentage for them was (6.25%), after which patients suffering from cancer were (3) and k You are the highest hormonal percentage for them (228 pg / ml) and the percentage for them was (4.69%), then the patients suffering from sickle cell anemia number (2) the highest hormonal percentage for them (221 pg / ml) and their percentage was (3.12%) Finally, patients suffering from epilepsy number (1) and the highest hormonal level was (219 pg / ml) and the percentage (1.56%) (Table No. 2) illustrates the relationship between hormone levels in patients with chronic diseases and those with scabies, noting that the normal rate is The hormone adrenaline in the human body is free from diseases (0-140 pg / ml)

Table 1: Illustrates the relationship between hormone levels in patients with chronic diseases and those with scabies and their comparison with control samples(mean)

Sample	Patient/Control	Unit pg/ml	N0 of case	Percentage %	P Value	Mean pg/ml
1	Heart	523	14	21.88	0.01	440
2	Diabetes	398	11	17.19	0.01	345
3	Hypertension	295	10	15.62	0.01	287
4	Kidney	277	8	12.5	0.35	269
5	Lung	260	6	9.38	0.16	252
6	Peptic	241	5	7.81	0.64	238
7	Liver t	234	4	6.25	0.57	231
8	Cancer	228	3	4.69	0.76	227
9	Anemia	221	2	3.12	0.34	220
10	Epilepsy	219	1	1.56	0.93	219
11	Control	140	16	100	0.01	129

The results of the statistical analysis (T-test) with a degree of freedom (78) and the t value (7.613) showed the presence of significant differences in the level of the hormone between patients and control samples.

5. Discussion

The current study recorded the highest levels of the hormone adrenaline for patients who suffer from chronic heart disease. There is a process of hardening or accumulation of the layer of calcium and fat mixture inside the blood vessels, and it is possible that a narrowing of its interior may occur, which hinders the delivery of blood to the heart muscles, meaning that any damage to the heart muscle or a defect in its ability to contract may cause a temporary or permanent decline in the capacity of the heart. On the contraction, a decrease in blood flow to vital organs in the body, and this process causes angina pectoris, and if permanent damage to the heart muscle occurs, then myocardial infarction is generated, so states of anxiety, fear and terror may lead to an increase in

levels of the hormone adrenaline and thus It poses a threat to the life of a person with heart disease, but for patients with diabetes, the hormone adrenaline is a hormone and a transporter It is a nerve secreted by the adrenal gland, which is located above the kidney, where it produces chromium fibers in the core of the adrenal gland, which increases the heartbeat and constriction of blood vessels and has an opposite effect to insulin released when the blood sugar level is low by the transformation of liver glycogen into glucose in the blood, and the hormone rise In the blood, glycogen is released from its stores in the liver, and dextrose is released, which raises blood sugar. It is known that most diabetes incidents begin after a severe excitement of sadness or anger. The rise of the hormone works to raise blood pressure by narrowing the arteries and small veins, and a sudden increase in pressure may cause a brain hemorrhage. Shocking and may suffer a heart attack or sudden death and may affect the eye vessels, causing her sudden blindness, but for patients who suffer from chronic kidney diseases such as kidney cancer, this leads to the emergence of abnormal kidney growth, which loses its function, which in turn may affect the kidney cortex. Or the pulp that secretes the hormone adrenaline, and thus the rates of hormone secretion increase, which affects the patient negatively. As for those with pulmonary diseases, adrenaline helps to relax the smooth muscles in the lungs, where adrenaline is linked to the (Beta 2) adrenergic receptors from the bronchial muscle cells, allowing the bronchioles to relax and helps in intense and rapid breathing, which in turn affects the amount of blood pumping and the speed of the pulse, which causes a danger to the heart, and adrenaline increases the acidity of the stomach for the injured With symptoms of chronic ulcers and an increase in the amount of pepsin in the stomach, the current study has demonstrated the existence of a close relationship between psychological agitation and cancer for patients with scabies because psychological emotions generate a serious hormonal disorder in the endocrine glands that leads to a permanent swing in the hormonal balance. This swing helps the emergence of the cancer focus In one of the body systems, as the current study showed the effect of the hormone on patients with scabies and suffering from liver diseases where adrenaline combined with another hormone called (glucagon) which is responsible for the breakdown of (glycogen) in the liver cells to convert it into glucose, as the current study proved. The presence of a slight effect of the hormone adrenaline on patients with scabies and suffering from anemia, being responsible only for Psychological states, anger, anxiety and intense fear, and there are other hormones responsible for forming blood, such as (Erythroboitin). Therefore, adrenaline can have a slight and temporary effect due to fear, anxiety and temporary collapses. As for patients with scabies and suffering from epilepsy, the hormone adrenaline rises temporarily in line with cases of epilepsy Which does not last long because of seizures in the nerve cells and its effect is almost non-existent or simple cases that differ from patients with heart disease, so patients with epilepsy are less affected by the high level of the hormone and patients with scabies and heart disease are more affected by the high level of the hormone in the blood, if the signal of stress



Followed by inflammatory intermediate signals (released due to a wound or infection) at the site of leukocytes, leukocytes travel through the endothelium and infiltrate the site of inflammation. Thus it may lead to a more robust immune response thanks to the presence of more leukocytes at the site of the challenge compared to a non-stressed animal. In this way, stress hormones may direct the body "soldiers" (leukocytes), out of their "barracks" (spleen and bone marrow), Traveling in "media" (blood vessels), and taking a stand at potential "battle stations" (skin, lining of the digestive system and genitourinary system, and lymph node drainage) [26,27,28]. In addition to sending leukocytes to potential combat stations, stress hormones (epinephrine) may better equip them for battle by enhancing processes such as antigen presentation, phagocytosis, cytokine, And the production of antibodies [26] Consequently, hormonal alarms may prepare the signal emitted by the brain when immune system stresses are detected for potential challenges (wound by war dream or infection) that may arise from stressful actions (for example). , X predator or attacker), in contrast, chronic stress is likely to dampen immune function for i The leukocyte reduction team [26] and by inhibiting cytokine, prostaglandins and leukocyte function [29].



References

- [1] D.B. Pence & E. Ueckermann, Sarcoptic mange in wildlife Scientific and Technical Review of the World Organisation for Animal Health 21 (2002) 385–398.
- [2] C., Kuhn, R. Lucius., H.F Matthes, G. Meusel , B. Reich, & B.H. Kalinna, Characterisation of recombinant immunoreactive antigens of the scab mite *Sarcoptes scabiei*. Vet parasitol , (2008):31-37.
- [3] P. Arck, Hansen, P.J., Jericevic, B.M., Piccinni, M & P. Szekeres-Bartho, J. Progesterone during pregnancy: endocrine-immune cross talk in mammalian species and the role of stress. Am. J .Reprod .Immunol (2007)58–79.
- [4] D.O. Morris & R.W.A. Dunstan, Histomorphological study of Sarcoptic acariasis in the dog: 19 cases, Journal of American Animal Hospital Association, 32 (1996): 119-124.
- [5] W. Richard, Ectoparasites Future challenges in a changing world. Elsevier B.V., Vet. Parasitol, 148 (2007) : 62-74
- [6] S. Tefera & W. Abebe, Effect of ectoparasites on quality of pickled skins and their impact on the tanning industry in Amhara Regional State, Ethiopia. Small Rum. Res., 69(2007):55-61.
- [7] M. Gabaj, W. Beesley, & M. wan, A survey of mites on farm animals in Libya. Annals of Trop. Med. Parasitol, 120: 251-274.
- [8] E. Soulsb, Helminthes, Arthropods and Protozoa of Domesticated Animals. Bailliere, Tindall and easel Ltd, London, (1992) :465-469.
- [9] J. Asp & M. Tauni, Skin disease on Ethiopian sheep and their effect on the pickled skin, Working paper 89 Swedish Univ. Agric. Sci. Inter. Rural develop. Center, Uppsala . (1988): 30
- [10] B. Vallat, E. S. wards, J.L. Schlater, & J.W. Mertins , Manual of Diagnostic Tests And Vaccines For Terrestrial Animals (mammals, birds and bees). (6th ed) . 2 (Oie), 12, rue de Prony, 75017 Paris, France ,(2008): 1255-1263 .
- [11] U.A. Hafeez, Z. Sindhu, Z., Iqbal, A. Jabbar, & Tasawar, Z. Prevalence of Sheep Mange in District Dera Ghazi Khan (Pakistan) and Associated Hematological /Biochemical Disturbances . International J. of Agricu and Biology ,6 (2007) :917-920.
- [12] D.J. Kemp, Walton, S.F., Harumal, P. & Currie, B.J. The scourge of scabies. *Biologist*, 49(2002):19-24.
- [13] P.N. Lalli, Morgan, M.S . & Arlian ,L.G. (2004) .Skewed Th1 / Th2 immune response to *Sarcoptes scabiei*. J Parasitol, (2004): 71- 90
- [14] D. Taplin & Meinking, T.L. Pyrethrins and pyrethroids in dermatology, *Archives of Dermatology*, 12 (1990): 213-221.

- [15] MS. Green, Epidemiology of scabies. *Epidemiologic Review*, 11: 126-150.
- [16] O. Chosidow, Clinical practices. Scabies, *N Engl J Med*, 16 (2006): 1718–1727.
- [17] B. J. Currie & Kemp D. G. *Am. J. Trop. Med. Hyg.* 68 (2003). 1):54-60.
- [18] S.F Walton, A. Slender, S. Pizutto, K.E. Mounsey, F. Opresecu, & W.R.Thomas, Analysis of IgE binding patterns to house dust mite allergens in scabies-endemic communities: insights for both diseases. *Clin Exp Allergy*, 2 (2015):1868–72.
- [19] F. S. Dhabhar & McEwen, B. S. *J. Immunol.*, **156** (1996):2608–2615.
- [20] S. Howard, *Illustrated Pharmacology Memory Cards: PharMnemonics. Minireview(2008)*, ISBN 1-59541-101-1.
- [21] I. Raz, A. Katz, M.K. Spencer, "Epinephrine inhibits insulin-mediated glycogenesis but enhances glycolysis in human skeletal muscle", *The American Journal of Physiology*, (1991). 260 (3 Pt 1): E430-5.
- [22] D.A. Arnall, J.C. Marker, R.K. Conlee, & W.W. Winder, "Effect of infusing epinephrine on liver and muscle glycogenolysis during exercise in rats". *The American Journal of Physiology*, (1986).
- [23] Sabyasachi Sircar *Medical Physiology. Thieme Publishing Group (2007)..536*. ISBN 3-13-144061-9.
- [24] *Guideline 11.5: Medications in Adult Cardiac Arrest* (PDF). *Australian Resuscitation Council*..
- [25] K. Mahmoud & K. Allah, A. Muhammad, Design and Analysis of Agricultural Experiments, Dar Al Kutub for Printing and Publishing, University of Mosul. (1980).
- [26] F. S. Dhabhar & B. S. McEwen, (1997) *Brain Behav. Immun.* 11, 286–306.
- [27] F. S. Dhabhar, Miller, A. H., Stein, M., McEwen, B. S. & Spencer, R. L. *Brain Behav. Immun.*, **8** (1994) : 66–79.
- [28] F. S. Dhabhar & McEwen, B. S. *J. Immunol.* 156 (1996): 2608–2615.
- [29] R. P. Schleimer, H. N. Claman, & A. Oronsky, *Anti-Inflammatory Steroid Action Academic*, San Diego, (1989).

تأثير الإصابة بالجرب على هرمون الأدرينالين في المرضى المصابين بالأمراض المزمنة في جنوب العراق / محافظة البصرة

سعيد فاضل مناتي^{1*} ، مفيد عبد الحبيب² ، مسلم عبد الرحمن محمد³

1. قسم علوم الحياة ، كلية العلوم ، جامعة البصرة ، العراق
2. قسم التحليلات المرضية ، كلية العلوم ، جامعة البصرة ، العراق

المستخلص

الجرب ، وهو غزو جلدي طفيلي من سوس "حكة" الجرب *Sarcoptes scabiei* ، يسبب مشاكل صحية كبيرة للأطفال والبالغين في جميع أنحاء العالم. الجرب المتقشر هو شكل حاد بشكل خاص من الجرب حيث يتكاثر العث إلى الملايين ، مما يتسبب في تقشر الجلد على نطاق واسع. تشير أعراض وعلامات الجرب إلى مناعة المضيف لعث الجرب. يتم تنفيذ الدفاع ضد الإجهاد عن طريق محور الغدة النخامية - الغدة الكظرية ونظام النخاع الودي - الكظري. الغدة الكظرية هي عضو رئيسي في نظام الإجهاد. أثناء الإجهاد ، تستجيب الغدة الكظرية بسرعة مع زيادة إفراز الجلوكوكورتيكويدات (GCs) والكاتيكولامينات في الدورة الدموية ، والتي بدورها تؤثر على عملية التمثيل الغذائي ، لتوفير الطاقة بشكل حاد ، والأوعية الدموية لزيادة ضغط الدم ، والجهاز المناعي لمنعه من التنشيط المكثف. الدراسة الحالية فحصت (80) شخص منهم (16) عينة سيطرة سالبة و (64) مصابين بالجرب ويعانون امراض مزمنة مثل امراض القلب والسكر والضغط والرئة والكبد والكلية والقرحة والسرطان وفقر الدم والصرع . سجلت الدراسة الحالية أعلى مستويات هرمون الأدرينالين باستخدام تقنية مقايسة الممتز المناعي المرتبط بالأنزيم (ELISA) وهي (523 pg / ml) للمرضى الذين يعانون من أمراض القلب المزمن والمصابين بطفيلي حلم الجرب وعددهم (14) من أصل (64) مصابين بامراض مزمنة اخرى والنسبة المئوية لهم كانت (21.88%) وسجلت الدراسة الحالية اقل مستويات هرمون الادرينالين في المرضى المصابين بالجرب ويعانون مرض الصرع هي (219 pg / ml) بنسبة (1.56%) الذي يوضح مستويات الهرمون في المرضى المصابين بالجرب ويعانون امراض مزمنة ومقارنتها مع عينات السيطرة