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The relationship between the effect of panic attacks and physiological parameters in some patients with sudden onset diabetes, non-hereditary epilepsy, and animal lab

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ABSTRACT

The effects of a panic attack were studied in some patients who do not have hereditary diseases "sudden onset" as well as using laboratory animal "rats" to examine the types of effects on some physiological parameters. compared with control. These attacks affect daily life and result from a complex interaction between environmental, neurological, and psychological factors. Venous blood samples were collected from people with non-genetic diseases such as diabetes mellitus and non-hereditary epilepsy suffering. Blood samples were also collected from experimental animals exposed to fear at intervals of 0, 3, 7, and 28 days to detect the relationship between environmental factors and some physiological factors. Statistical analysis was performed using the SPSS program. The results indicated an increase in the level of cholesterol 246.75 mg\dl, glucose261.62 mg\dl, and C-reactive protein 44.50 mg\l in people with non-genetic diseases compared to their decrease in the control group, the percentages were 173.50mg\dl,89.25mg\dl,6.01mg\l in addition to an increase in the level of cholesterol and glucose and no effect on C-reactive protein in rats exposed to the impact of fear and low body weight. The results of the study also showed that the impact of visual fear led to a significant increase in heart rate 183.25 beats\minute and respiratory rate 54.75 breaths per minute. The oxygen rate decreased by 71.75% after the effect of fear compared to the group before the impact.

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العلاقة بين تأثير الذعر والمقاييس الفسيولوجية في مرضى السكري المفاجئ والصرع غير الوراثي وبعض الحيوانات المختبرية

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الملخص

تمت دراسة تأثيرات نوبة الهلع لدى بعض المرضى الذين لا يعانون من أمراض وراثية" البداية المفاجئة "وكذلك استخدام حيوانات المختبر "الجرذان "لفحص أنواع التأثيرات على بعض المؤشرات الفسيولوجية .مقارنة مع معاملة السيطرة .تؤثر هذه النوبات على الحياة اليومية وتنتج عن تفاعل معقد بين العوامل البيئية والعصبية والنفسية .تم جمع عينات الدم الوريدية من الأشخاص الذين يعانون من أمراض غير وراثية .كما تم جمع عينات الدم من حيوانات التجارب المعرضة للخوف على فترات (28,7,3,0) يوم للكشف عن العلاقة بين العوامل البيئية وبعض العوامل الفسيولوجية ، وتم اجراء التحليل الاحصائي بأستخدام برنامج SPSS،أشارت النتائج إلى ارتفاع مستوى الكوليسترول 246.75 ملغم/ديسيلتر، والجلوكوز 261.62 ملغم/ديسيلتر، وبروتين سي التفاعلي 44.50 ملغم/لتر لدى الأشخاص المصابين بأمراض غير وراثية مقارنة بانخفاضهم في معاملة السيطرة، وكانت النسب 173.50 ملغم/ديسيلتر، 89.25 ملغم/ديسيلتر، 6.01ملغم/لتر بالإضافة إلى ارتفاع نسبة الكولسترول والجلوكوز وعدم وجود تأثير على بروتين سي التفاعلي في الجرذان المعرضة لتأثير الخوف وانخفاض وزن الجسم. كما أظهرت نتائج الدراسة أن تأثير الخوف البصري أدى إلى ارتفاع ملحوظ في معدل ضربات القلب بمقدار 183.25 نبضة/دقيقة ومعدل التنفس بمقدار 54.75 نفساً في الدقيقة، كما انخفض معدل الأكسجين بنسبة 71.75% بعد تأثير الخوف. مقارنة بمعاملة قبل التأثير.

Introduction

Panic attacks are a period of recurrent intense fear or anxiety, which is accompanied by anticipatory anxiety. These seizures are experienced with a range of physical and physiological symptoms. [1] An attack of severe anxiety, known as a panic attack, appears as a short period of fear accompanied by physical sensations. Symptoms may include rapid heartbeat, difficulty breathing, dizziness, and tremors. Panic attacks often arise without warning or contact with any external danger. [2] While the attack itself may last a few minutes to thirty minutes, the effects of the physical and emotional repercussions can last for several hours. Panic disorder has been found to affect approximately 3-4% of the general population, especially women between the ages of 20 to 25 years. [3] The causes of this disorder are multifaceted and involve a complex interplay of environmental, neurological, and psychological factors. Anxiety disorders are characterized by a variety of physiological changes, mostly affecting the nervous system, the respiratory system, the digestive system, and alterations in body composition. In recent years, research has suggested that the neuroimmune system plays a role in the development of a range of psychological and physical symptoms from anxiety to psychosis. [4] People who are constantly afraid of panic attacks can have difficulties performing their daily activities and staying away from places or situations where attacks have occurred or may occur in the future, affecting their overall safety and well-being [5]. Adenosine, a purine nucleoside, performs important physiological functions,[6] especially within the cardiovascular and central nervous systems.[7]. The presence of chronic or recurring psychological stress has been linked to changes in levels of stress hormones and inflammatory markers. [8] These disturbances in hormonal and immune functioning are in turn associated with adverse health outcomes, including increased risk of cardiovascular disease and metabolic syndrome. [9] Specifically, excessive cortisol production due to chronic stress is related to metabolic and circulatory disturbances, such as high systolic blood pressure, fasting glucose levels, and insulin levels. [10] These attacks increase the possibility of increased risk of

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cardiovascular disease and increased mortality, especially among individuals who suffer from anxiety disorders. In addition to its association with accelerated biological aging, such as premature neurodegeneration and telomere attrition. [11] Research has revealed a link between anxiety and problems related to the regulation of various neurotransmitters. In addition, disturbances in metabolic performance play a role in the development of these conditions, it is believed that the relationship between dysregulation and both metabolic and psychological disorders is linked to inflammation.[12]It has been shown that an imbalance in fat and glucose metabolism leads to the Activation of innate immune cells, the release of proinflammatory cytokines, and the breakdown of biogenic amines. These processes can lead to microglia-induced hypothalamic inflammation, all of which have been associated with the development of depression, anxiety, and stress-related disorders. [13]. The main objective of this study is to evaluate the effect of panic attacks physiologically on patients and animals in the lab.

2. Materials and methods

The method is divided into two groups:

2.1 Sick people

In this study, (14) venous blood samples were collected from individuals, males and females، It included 8 samples from patients with sudden onset diabetes, 2 from patients with non-genetic epilepsy, and 4 samples from healthy people. Certain biochemical tests were performed.

2.2 Laboratory animals

Laboratory animals represented by rats were used as a model to study the effects of panic disorder. The number of animals used in this study was 28 (14 males and 14 females). The rats were placed in special plastic cages provided with water and fed in appropriate quantities, and were exposed to fear (panic attacks) under the influence of two factors:

2.2.1 The Sudden loud sound effect

A number of 14 adult rats were divided into two groups for the study. The control group consisted of 4 rats and was isolated from the rest of the experimental rats. In addition, 10 adult male and female rats were placed in a separate fear exposure chamber through the use of firecrackers. Blood samples were collected from rats immediately after the fear in different periods between 0, 3, 7, and 28 days. Blood was drawn from the venous plexus of the eye using capillary tubes. The collected blood was then transferred to gel tubes and cooled for 15 minutes. The tubes were centrifuged at 3000 rpm for 15 minutes to separate the serum. The serum was then stored in a refrigerator at -20 °C until further biochemical testing could be performed.[14]

2.2.2 Effect of visual and auditory fear

The visual fear group included 14 adult rats, consisting of two groups. The first group included 4 rats (2 males, 2 females), who served as a control group and were isolated from the second group. The second group included 10 adult rats (5 males, 5 females), who were placed in a separate room and subjected to visual and audio stimuli that gave rise to fear using a simulated dog attack. Using these fear factors at different times 0,3,7 within a period of 28 days. Blood samples from rats exposed to visual and hearing fear were collected during each specific period, followed by biochemical tests.[15]

3. Statical analysis

The statistical program system (IBM SPSS Statistics 26) was used in analyzing the results of the study with its eight experiments. The program used *The Completely Randomized Design, Anova one-way analysis*, to analyze the study criteria for this analysis. The independent test-type analysis was also used to analyze the study results, and the Duncan Multiple Range test was also used to determine the significance of the differences between the means at a significance level of $P \leq 0.05$. The means and the standard error were also extracted [16].

4. Results and discussion

4.1 Effect of exposing rats to sudden fear in their biochemical parameter:

The results (Table 1) representing the statistical analysis show that the fearful rats period (0, 3, 7, 28 days) had significant Differences in the cholesterol level in the blood serum ($P \leq 0.05$). The frequency of fear increased the cholesterol level, compared with a period (0). Furthermore, the fear time of period (0) showed a significant $P \leq 0.05$ reduction in cholesterol level when compared to times (3, 7, 28 days).

By observing Table (1), each of these two periods mentioned (7, 28) days showed a significant difference at $P \leq 0.05$ in the level of glucose in the blood serum when compared with the periods (0, 3 days) in the level of glucose in the blood serum.

The results in Table 1 showed an increase in cholesterol and glucose levels in blood serum, with an increase in the frequency of sudden fear

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during the period (7.28) days compared to the control group. This increase can be attributed to the body's physiological response to stress and anxiety, as it secretes anxiety hormones such as adrenaline and cortisol, causing various physiological changes and increasing the level of cholesterol and glucose[17]. This is consistent with the[18] findings that stress causes a significant increase in glucose levels in rats.

Statistical analysis showed that exposing rats to (sudden auditory fear) did not show statistically significant differences in the level of C-reactive protein in blood serum when comparing the four periods. The statistical analysis results showed no significant relationship between the levels of C-reactive protein when the rats were exposed to sudden fear. This may be due to a C-reactive protein response, which requires inflammation or damage to the central nervous system. This process requires a longer period, hours, and days than the immediate response to fear. The results of the study differed from the findings of [5]. which is that Parkinson's patients who suffer from anxiety disorders have an elevated inflammatory response. In addition, the result of a study[19] of high CRP levels in people infected with the coronavirus (COVID-19) is due to the body's inflammatory response to the virus.

Table 1 : Effect of (rats) exposed to sudden fear on biochemical parameters

Biochemical standards	Cholesterol	Glucose	C-reactive protein
Control group	61.8±3.00 a	85.75±2.54 a	5.98±0.036 a
0 day	80.4±0.85 b	152.10±6.55 b	5.98±0.048 a
3 day	103.00±1.53 c	141.90±5.70 b	5.97±0.039 a
7 day	118.60±1.39 d	239.50±7.53 c	5.96±0.076 a
28 day	129.20±2.22 e	226.70±9.80 c	5.93±0.071 a

Similar letters in the same column indicate that there are no significant differences between times at level of P ≤0.05.

Different letters in the same column indicate the presence of significant differences between times at level of p≤0.05.

4.2 Effect of exposing rats to visual and auditory fear (leashed dog attack)

The results (Table 2) showed a significant increase in the cholesterol level at (28,7 days) compared to the two periods of scaring the rats at (3,0 days) in the cholesterol level in blood serum. Both periods (7,28 days) showed a significant rise (p ≤0.05) in the glucose level in the serum compared to the control group.

The level of C-reactive protein was analyzed for the study periods and for the control group, where statistical analysis showed that there were no significant differences between them.

The results of the study of the auditory-visual fear factor agreed with the effect of the sudden factor on the rise in cholesterol and glucose, and the absence of any effect on C-reactive protein as a result of the body's physiological response.

The statistical analysis also showed that the exposure of the rats to fear during the period (7,28 days) each time showed a significant decrease with increasing periods of fear (p≤0.05) when comparing each period with (0,3 days) in the percentage of hemoglobin in the blood. This is due to the body's reaction to the fear disorder, it secretes adrenaline and redirects blood flow to the muscles and organs to facilitate a rapid response, reducing the total blood volume in the body[20].

Table 2: Effect of exposing rats to visual and auditory fear on biochemical parameters

Biochemical standards	Cholesterol	Glucose	C-reactive protein	Hemoglobin
Control group	62.43±2.61 a	82.93±4.26 a	6.02±0.14 a	13.63±0.23 c
0 day	70.60±1.25 b	118.90±2.29 b	6.02±0.03 a	9.68±0.23 a
3 day	70.30±1.57 b	128.20±1.77 b	5.99±0.03 a	9.54±0.20 a
7 day	78.70±1.10 c	147.40±5.10 c	6.03±0.04 a	11.08±0.36 b
28 day	78.80±1.61 c	163.70±2.84 d	5.99±0.04 a	11.32±0.21 b

Similar letters in the same column indicate that there are no significant differences between times at a significance level of P ≤0.05

Different letters in the same column indicate the presence of significant differences between times at a significance level of p≤0.05

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4.3 Level of some biochemical parameters in the blood serum of people with (epilepsy and sudden- diabetes)

Statistical analysis documented that the level of cholesterol in the blood serum of healthy people included in the study, which statistical analysis showed a significant decrease at, p≤0.05 when compared to the level of cholesterol in people with sudden onset diabetes and epilepsy**.**

Statistical analysis also documented that the group of people with epilepsy and diabetes had a significantly higher blood sugar level (p≤0.05) when compared to healthy people**.** Through the study, statistical analysis recorded that the level of C-reactive protein in the control group was significantly low (P≤0.05) when compared with the group of people with epilepsy and diabetes. High levels of C-reactive protein were observed in people with sudden-onset diabetes and non-hereditary epilepsy shown in Table 3. due to the distinct physiological characteristics of each case and its effect on the body. Data suggest that individuals with epilepsy and diabetes often experience high levels of anxiety, psychological distress, and physical distress. [21] In turn, these factors can raise cortisol levels, which in turn can raise blood sugar levels and C-reactive protein levels. Epileptic seizures can trigger chronic inflammatory responses, which further exacerbate these conditions [22].

Table 3: Levels of cholesterol and C-reactive protein and Glucose in the blood serum of people with epilepsy and diabetes

Biochemical standards	Cholesterol	Glucose	C-reactive protein
Control group	173.50±8.47 a	89.25±1.34 a	6.01±0.12 a
Diabetics	212.00±14.63 b	185.62±13.48 b	13.51±4.04 b
Epilepsy patients	246.75±4.70 c	261.62± 15.38 c	44.50±1.21 c

Similar letters in the same column indicate that there are no significant differences between times at a significance level of P ≤0.05.

Different letters in the same column indicate the presence of significant differences between times at a significance level of p≤0.05.

4.4 Effect of exposure of adult rats to visual and auditory fear on some physiological parameters:

4.4.1 Effect of exposure of adult rats to visual and auditory fear on temperature:

Data analysis revealed a noticeable effect on rats' body temperature when exposed to auditory and visual fear. There was little difference in temperature before and after the fear effect. However, when comparing the average temperature during the period leading up to fear and at different periods 0, 3, 7, and 28 days, no significant differences were observed This indicates the stability of the physiological state of individuals. This reflects that the nervous system and circulatory system of the body are in a state of balance and are not exposed to strong external influences that affect temperature. The analysis also indicated that there were no significant differences in temperatures between the rats during the periods of 28, 7, and 3 days. However, Temperature increased significantly (p ≤0.05) for periods 0, 7, and 28 immediately after the fear effect compared with period 3. As shown in Fig 1.

Table 4: Effect of exposure of adult rats to visual fear on average temperature

Impact periods	Before effect	After effect
(0) day	25.22±0.31 a	27.97±1.36 b
(3) day	25.07±0.38 a	24.97±0.28 a
(7) day	24.50±0.42 a	26.02±0.51 a b
(28) day	25.20±0.64 a	27.05±0.27 a b

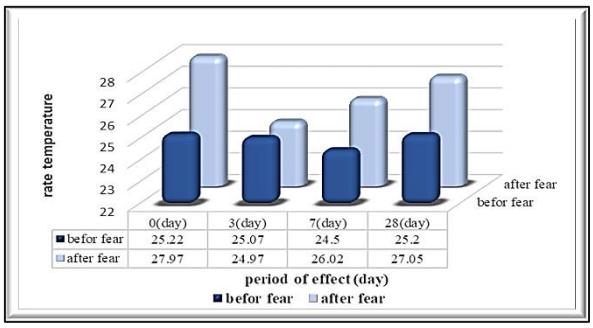

Fig. 1: shows the average temperature before and after the fear

4.4.2 Effect of exposing adult rats to visual and auditory fear on measuring heart rate :

Table 5 shows the heart rate before the effect of auditory fear during the 0, 3, 7, and 28-day periods shows that there are no statistically significant differences between the four time periods This is a result of the body's physiological state stabilizing before exposure to fear.

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As shown in Figure 2, the results of the horizontal statistical analysis showed that the heart rate increased significantly after exposure to fear during periods 0, 3, 7, and 28 days compared to the periods before fear. The increase in heart rate after fear is due to reactions in the body called "reactions." When you feel fear or stress, the body secretes hormones such as adrenaline and noradrenaline, which increase the heart rate and accelerate its pulse to increase blood flow to the muscles and increase the chance of escape or defense.

Table 5: The comparison of fear periods with heart rat

Impact periods	Before effect	After effect
0 (day)	*73.50±3.96 a	183.25±9.77 b
3(day)	*60.0±11.57 a	134.75±3.81 a
7(day)	*93.75±2.52 a	166.25±23.77 a b
28(day)	*81.25±16.65 a	125.50±7.59 a

Similar letters in the same column indicate that there are no significant differences between times at a significance level of P ≤0.05. Different letters in the same column indicate the presence of significant differences between times at a significance level of p≤0.05. The presence of * indicates the presence of significant differences between the groups horizontally. The absence of* indicates that there are no significant differences.

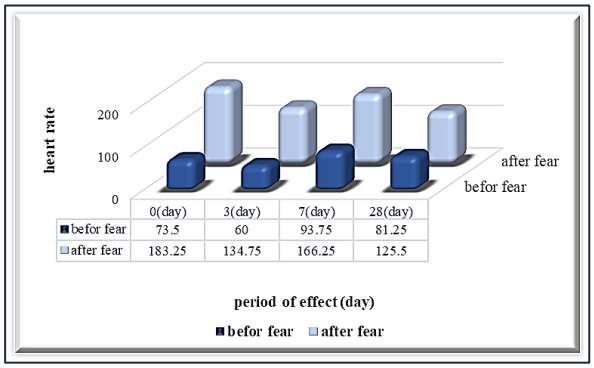

Fig. 2: The figure shows the heart rate before and after the fear

4.4.3 Effect of exposure of adult rats to visual fear on measuring respiratory rate :

Statistical analysis revealed no statistically significant differences in respiratory rate during the period before fear, after comparing the respiratory rate over different periods of 0,3,7 and 28 days. Table 6 shows the specific results**.**

Figure 3 shows the rat's breathing rate After the effect of fear at different intervals. There were significant differences (P≤0.05) in the respiratory rate at periods 0, 3, 7, and 28 days after fear, compared horizontally with the respiratory rate before fear. The reason is that the sympathetic nervous system secretes adrenaline to stimulate the body in the presence of danger. Fear affects breathing rate, stimulates the brain, and increases breathing [23]. The study agreed with the findings of [24]. that individuals experiencing panic had stronger heart rate and respiratory rate responses compared to the control group.

Table 6: shows the comparison between periods of fear and measuring respiratory rate vertically

Impact periods	Before effect	After effect
0) day)	38.25±7.85 a*	54.75±12.79 a
3) day)	43.50±7.02 a*	92.50±10.96 b
7) day)	23.00±2.73 a*	73.75± 6.75 a b
28) day)	34.75±10.86 a*	67.00±11.86 a b

The presence of * indicates the presence of significant differences between the groups horizontally

The absence of* indicates that there are no significant differences

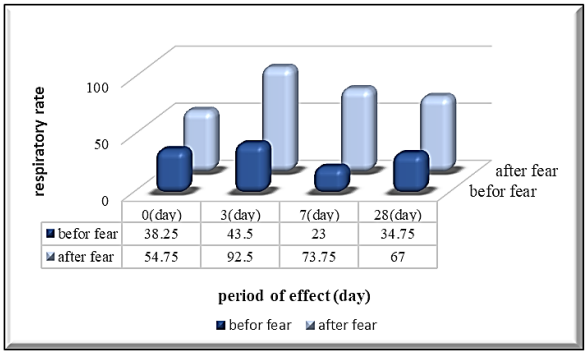

Fig.3: shows the breathing rate before and after the fear

4.4.4 Effect of visual fear in rats and measuring the oxygen rate before and after the fear:

From observing Table .7 the statistical analysis documented that the period after fear did not show significant differences when comparing the periods of (0, 3, 28) days in the oxygen rate. Moreover, the oxygen rate in the two periods (28, 7) days did not show any differences. Significant among themselves, while the oxygen rate at the 7 days showed a significant increase (P≤0.05) when compared with both periods (0,3 days) statistically. This is due to rapid breathing that occurs when you feel stressed or afraid, which increases the concentration of oxygen in the body.

The statistical analysis shows that the oxygen rate after fear is significantly lower, p≤0.05, for the periods (28,7,3,0) when compared horizontally with the periods before fear, as shown in Figure 4. A decrease in oxygen concentration may occur due to a response to stress or tension, which reduces blood flow to some tissues, including the lungs. This can contribute to reducing gas

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exchange and thus lowering the oxygen concentration in the blood.

Table 7: The table shows the comparison between periods of fear and measuring oxygen level

Impact periods	Before effect	After effect
(0)day	96.75±1.10 a*	71.75±4.32 a
(3) day	98.00±1.08 a*	73.75±3.75 a
(7) day	95.75±2.17 a*	85.00±2.38 b
(28) day	96.00±0.91 a*	75.50±1.55 a b

The presence of * indicates the presence of significant differences between the groups horizontally

The absence of* indicates that there are no significant difference

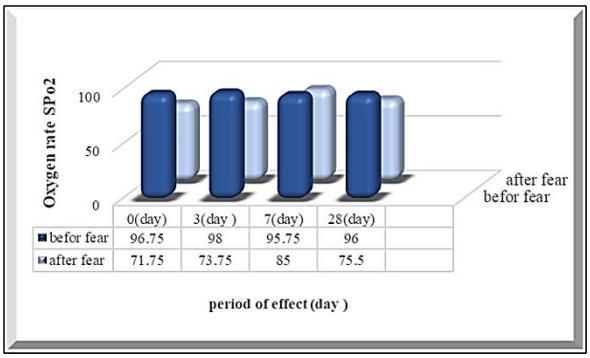

Fig. 4: shows measuring the oxygen rate before and after the fear

4.5 Effect of exposure of adult rats to sudden fear on body weight before and after exposure to fear (after 24 hours, 3, 7, 28days):

The natural growth of rats led to significant differences in body weight between the periods included in the study before exposure to fear 0 after 24 hours, 3, 7, and 28 days. The statistical analysis showed that the average body weight for the period before fear on day 28 of treatment showed an increase. Significant differences were observed at p≤0.05 when compared with both body weights at periods 0 after 24 hours, 3, and 7 days**.**

The average body weight of the fear group (before fear) and statistical analysis showed significant differences, p≤0.05, when compared with the body weight for each of the four periods after 24 hours, 3, 7,28 days when statistically comparing the period before fear with all study times. mentioned in the table.8

The average body weight of the sudden fear group during the period after 24 hours,3,7 days did not show any significant differences in body weight for each period. Also, the average body weight at the time of 28 days showed a significant decrease in p≤ 0.05 when compared with the Period before fear.

Table 8:. Comparison of the control group with the weights of the rats exposed to sudden fear

Totals / Times	**Rat weights**		**Low body weight %**
Before fear	212.37±5.13 a*	230.80±9.32 c	----------
	Control group	**After fear**	
(0)after 24 hours	236.37±6.65 a b*	209.30±3.59 b	**11.5%**
(3) day	263.00±11.18 b*	202.30±3.54 a b	**23%**
(7) day	264.12±9.72 b*	195.70± 4.09 a b	**25.9%**
(28) day	297.00±11.62 c*	190.20±4.84 a	**%35.9**

Similar letters in the same column indicate that there are no significant differences between times at a significance level of P ≤0.05. Different letters in one column indicate the presence of significant differences between times at a significance level of p≤0.05. The presence of * indicates the presence of significant differences between the groups horizontally

4.6. Effect of exposure of adult rats to visual and auditory fear on body weight before and after exposure to fear (after 24 hours, 3, 7, 28 days):

The results of the statistical analysis of body weight before exposure to fear and the control group were clarified at the two periods (0 after 24 hours, 3 days), and it was found that there were no noticeable differences in body weight between the three specified periods in Table 9.

The body weight of the rats after fear at the time of (28) days showed a significant decrease P≤0.05 when compared with the body weight after fear at the periods (before fear, 0 after 24 hours, 7 days)

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Table 9: Comparison of the control group with the weights of rats exposed to visual and auditory fear

Totals / Times	Rats wight		Low body wight %
Before fear	269.75±10.05 a	257.00±4.82 d	----------
	Control group	**After fear**	
(0) After 24 hours	273.71±3.29 a b*	247.40±5.02 c d	**11.2%**
(3) day	279.50±2.99 a b*	233.50±4.45 c	**16.45%**
(7) day	287.25±1.93 b c*	221.30±3.72 b	**22.9%**
(28) day	297.75±0.81 c*	205.30±2.31 a	**31.04%**

Similar letters in the same column indicate that there are no significant differences between times at a significance level of P ≤0.05. Different letters in one column indicate the presence of significant differences between times at a significance level of p≤0.05. The presence of * indicates the presence of significant differences between the groups horizontally. The absence of* indicates that there are no significant differences.

The results also showed that rats exposed to sudden visual and auditory fear had lost significant weight after 28 days. As shown in the data in Tables 8 and 9. This indicates that stress caused by fear can affect weight, it increases or decreases due to metabolic functions. Previous research has revealed that stressed and anxious rats may show a decreased appetite, leading to reduced food intake, while in other cases, they may consume more and thus suffer from weight gain. These results were consistent with this study [25] High levels of corticosterone in the blood due to chronic stress change body weight.

Conclusion

The data showed that no physiological activity was observed when fear levels were low, regardless of the specific situation that elicited fear. However, when anxiety levels were high, the effects of the increase in physiological parameters began to as anxiety levels increased**.**

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