Diagnostic Aids of Psychogenic Non-epileptic Seizures

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ABSTRACT

Psychogenic non-epileptic seizures (PNES) account for 10–40% of patients referred to epilepsy centers. Distinguishing between NES and epileptic seizures is a very difficult task that faces the clinician. This study included 20 epileptic patients and 20 patients suffering from psychogenic non-epileptic seizures. All patients were subjected to a detailed medical and neurological history and examination, psychometric tests including intelligence assessment, Minnesota Multiphasic Personality Inventory and the following investigations: Routine laboratory investigations, Pre and post-ictal Creatinephosphokinase, Routine EEG, Prolonged video EEG recordings with the use of induction technique, Auditory event related potentials (P300) using oddball paradigm done in three sessions, preictal, postictal (within 6 hours from the onset of fits), and interictal (6-48 hours from the onset of fit) and CT brain for epileptic group. The comparative studies included: demographic and neurological history variables, seizure semiology, psychological testing, serum CPK and event related potentials measurements. The combination of more than one of these variables particularly P300 and MMPI-II raised the diagnostic accuracy of PNES even without video EEG. (Egypt J. Neurol. Psychiat. Neurosurg., 2006, 43(1): 371-380).

INTRODUCTION

Psychogenic nonepileptic seizure (PNES) is a sudden change in a person's behavior, perception, thinking, or feeling that is usually time limited and resembles, or is mistaken for, epilepsy but does not have the characteristic electroencephalographic (EEG) changes that accompanies a true epileptic seizure.1 Distinguishing between NES and epileptic seizures can be the most challenging task facing the clinician while the clinical characteristics of ictal events and behavioral information correctly differentiate NES from epilepsy in less than 70% of patients with seizures.2

Long-term electroencephalogram monitoring with video recording (video EEG) is the most common method of differential diagnosis of epilepsy and PNES. However, video EEG is complex, costly, and unavailable in some areas, thus, alternative diagnostic techniques have been studied.2,3

Personality differences were found between patients with PNES and those with epileptic seizures, PNES patients found to have elevated hypochondriasis and hysteria scores in comparison to depression score and the opposite occurs in patients with true epilepsy as shown in Minnesota Multiphasic Personality Inventory (MMPI).4 Postictal creatine phosphokinase serum level (CPK) determination can serve as an adjunctive test for differentiation between psychogenic and epileptic generalized tonic clonic seizures although other authors pointed out a limited discriminative power of CPK in differentiating psychogenic nonepileptic seizures (PNES) and epileptic seizures (ES).5

There are current findings suggesting that postictal event related potentials (ERP), the P300 wave, recordings are useful in the diagnosis of psychogenic nonepileptic seizures (PNES) and differentiating temporal lobe epilepsy (TLE) from (PNES).6 The application of a multiple regression model showed a significant relationship between P300 latency prolongation and epilepsy duration, seizure frequency and polytherapy.7 There is a general decline of cognitive functions in epileptics especially memory, attention, concentration and
speed of mental processing corroborated by P300, so it can be used as an additional sensitive parameter to assess the cognitive status.8,9

The aim of this work is to establish other diagnostic methods that are as accurate as video EEG, but more cost effective, convenient, and readily available for diagnosis of psychogenic non-epileptic seizures and differentiating them from true epileptic seizures.

**PATIENTS AND METHODS**

The study group included 40 patients, 20 ES and 20 PNES patients. Patients were randomly chosen from those admitted to the neurology department, presented to the out patient clinic, or to the emergency department in Sohag faculty of medicine, South Valley University.

**Exclusion Criteria:**
1- Clinically suspected patients with psychogenic non-epileptic seizures in whom no induction of fits occurred during video EEG recordings.
2- Patients suffering from organic causes of epilepsy (tumors, accidents, traumas, and other medical causes).
3- Mentally retarded patients.
4- Patients with mixed epileptic and PNES who have epileptogenic EEG and positive induction techniques.
5- Patients with history of recent traumas, operations, myocardial infarction or recent intra-muscular drug injections to avoid fallacious serum CPK results.

All patients were subjected to the following:
A- Detailed medical and neurological history and examination.
B- Psychometric tests including intelligence assessment (IQ testing), and Minnesota Multiphasic Personality Inventory (MMPI). IQ testing was carried out by using colored progressive matrices test for all patients either epileptic or those suffering psychogenic non-epileptic seizures.

MMPI-II was carried out by using the MMPI (Minisota Multiphasic Personality Inventory-Revised Edition) which comprises 399 questions forming 10 clinical scales which are social introversion, hypochondriasis, depression, hysteria, psychopathic deviation, masculinity-femininity, paranoia, psychathenia, schizophrenia, and hypomania. This test was carried out for all patients either in one or more sessions according to the patient ability to continue testing, answer papers were collected and t scores were calculated then psychological profiles were drawn for every patient.

C- The following investigations were done:
1- Routine laboratory investigations (liver function tests, kidney function tests, blood sugar, and blood gas assessment).
2- Creatinephosphokinase (CPK) serum level was determined in both groups of patients, both preictal and 24-48 hours postictally because at that time CPK elevation is usually maximal.5
3- Routine EEG was carried out for all patients using Vega 10 EEG machine for at least 6 minutes under standard conditions, with provocation technique by hyperventilation for three minutes. Routine EEG was done late postictally (> 48 hours) to escape postictal EEG slowing
4- Video EEG recordings with the use of induction technique were carried out for both epileptic and PNES patients for three hours including three minutes of hyperventilation. Voyageur and BSMI 5000 EEG machines associated with a Panasonic camera were used. Placebo induction with verbal suggestion was done for all patients using five ml of saline solution given intravenously. For routine and video EEGs surface disc electrodes were placed to the heads of the patients according to the international 10-20 system for electrode placement. Visual analysis was used for interpretation of the EEGs due to absence of analysis programs in the EEG machines.
5- Auditory event related potentials (P300) using oddball paradigm were done in three sessions, preictal, postictal (within 6 hours from the onset of fits), and interictal (6-48 hours from the onset of fit). For both groups of patients using Neuropack IV-mini 4 channels EMG machine. The machine was adjusted to the standard P300 recording conditions.\textsuperscript{10}

The absolute latency of the P300 wave was calculated for every patient after two trials for checking of consistency.

6- CT brain for the epileptic group to exclude organic brain lesion that could be a cause of epilepsy.

**Statistical analysis:**
Results were tabulated and tested by the following statistical methods, presented in table 1.

Table 1. The Statistical Methods.

<table>
<thead>
<tr>
<th>Test</th>
<th>Tested variables</th>
<th>Value of significance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chi square contingency</td>
<td>All seizure semiology data and sex</td>
<td>3.84, 6.64</td>
</tr>
<tr>
<td>Chi square independency</td>
<td>Psychoneurotic triad</td>
<td>5.99, 9.61</td>
</tr>
<tr>
<td>T test in pairs</td>
<td>CPK and P300</td>
<td>2.09, 2.86</td>
</tr>
<tr>
<td>ANOVA – F test</td>
<td>Age, years of education, duration of seizures, intelligence, MMPI results.</td>
<td>4.10, 7.35</td>
</tr>
</tbody>
</table>

\textsuperscript{*} Significant, \textsuperscript{**} Highly Significant, \textsuperscript{NS} Insignificant.

### RESULTS

**A) Demographic Data:**
The study group included 40 patients, 20 epileptic patients [9 males (45 \%) and 11 females (55 \%) with mean age of 24.05 ± 9.17 years] and 20 PNES patients [5 males (25 \%) and 15 females (75 \%) with mean age of 22.1 ± 7.62 years]. The differences between both groups regarding the age of presentation to study and sex were statistical insignificant.

**B) Neurological History Data:**
Mentioned in table (2) showed significant differences between epileptics and PNES in all variables except the family history of epilepsy.

**C) Seizure Semiology Data:**
Seizure semiology was studied in the form of movement style, vocalization, injuries, tongue biting, incontinence, occurrence during sleep, pelvic thrusting, and eye appearance according to the history taken from the patients and video EEG recordings.

According to table (3) the difference between ES and PNES patients was statistically highly significant in all previous values except that of the vocalization during seizures which was just significant.

**D) Psychometric tests:**
1. Intelligence testing
   From table (4) there is significant difference (\(P<0.05\)) between ES and PNES patients.
2. Minnesota Multiphasic Personality Inventory (MMPI-2)
   It is worth saying that depression, hypochondriasis and hysteria scores form what is called the psychoneurotic triad of the patient; this psychoneurotic triad may take many profiles.\textsuperscript{11}

In patients with epileptic seizures, 70\% showed inverted V shaped profile of the psychoneurotic triad while only 10\% showed V shaped profile. In PNES only 5\% showed inverted V shaped profile and 80\% of patients showed V
shaped psychoneurotic profile of the psychoneurotic triad.

The difference between both groups as regard the psychoneurotic profile was highly significant (P<0.001), table (4) and figure (1).

E) Serum Creatinephosphokinase:
The difference between preictal and postictal readings in the epileptic group was statistically highly significant (P < 0.01), but in the PNES group, the difference was statistically insignificant.

F) Event Related Potential (P300)
The difference between preictal and postictal readings as well as the pre- and interictal readings in the epileptic group was statistically highly significant but in the PNES group, the difference between preictal and postictal readings was statistically not significant table (6).

We considered the test positive when the difference between the pre and postictal readings are 5, 10, 15, and 30 msec respectively and the results of interpretation of performance are presented in table (7).

From these results, we can consider the ERP is most sensitive, specific, positively and negatively predictive, and most efficient when considering the difference between the pre and postictal readings is more than 30 msec.

Table 2. Neurological History Data.

<table>
<thead>
<tr>
<th>Variable</th>
<th>Measurement</th>
<th>Epileptic</th>
<th>PNES</th>
<th>P Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age at onset of fits (yrs)</td>
<td>Mean±SD</td>
<td>13.53±4.84</td>
<td>19.35±7.96</td>
<td>P &lt; 0.01**</td>
</tr>
<tr>
<td>Duration of seizure disorder (yrs)</td>
<td>Mean±SD</td>
<td>10.68±8.22</td>
<td>2.84±3.56</td>
<td>P &lt; 0.01**</td>
</tr>
<tr>
<td>Psychiatric treatment</td>
<td>Percent (Positive)</td>
<td>10%</td>
<td>45%</td>
<td>P &lt; 0.05*</td>
</tr>
<tr>
<td>Family History of Epilepsy</td>
<td>Percent (Positive)</td>
<td>25%</td>
<td>20%</td>
<td>NS</td>
</tr>
<tr>
<td>Family History of Psychiatric disorders</td>
<td>Percent (Positive)</td>
<td>5%</td>
<td>25%</td>
<td>P &lt; 0.05*</td>
</tr>
</tbody>
</table>

Table 3. Seizure Semiology Data.

<table>
<thead>
<tr>
<th>Variable</th>
<th>Measurement</th>
<th>Epileptic</th>
<th>PNES</th>
<th>P Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Movements Style</td>
<td>Stereotyped</td>
<td>85 %</td>
<td>30 %</td>
<td>P &lt; 0.001**</td>
</tr>
<tr>
<td></td>
<td>Variable</td>
<td>15 %</td>
<td>70 %</td>
<td></td>
</tr>
<tr>
<td>Vocalization</td>
<td>Yes</td>
<td>20 %</td>
<td>55 %</td>
<td>P &lt; 0.05*</td>
</tr>
<tr>
<td>Injuries</td>
<td>Yes</td>
<td>75 %</td>
<td>10 %</td>
<td>P &lt; 0.0001**</td>
</tr>
<tr>
<td>Tongue Biting</td>
<td>Yes</td>
<td>75 %</td>
<td>10 %</td>
<td>P &lt; 0.001**</td>
</tr>
<tr>
<td>Incontinence</td>
<td>Yes</td>
<td>60 %</td>
<td>5 %</td>
<td>P &lt; 0.001**</td>
</tr>
<tr>
<td>Occurrence During Sleep</td>
<td>Yes</td>
<td>70 %</td>
<td>20 %</td>
<td>P &lt; 0.01**</td>
</tr>
<tr>
<td>Pelvic Thrusting</td>
<td>Yes</td>
<td>5 %</td>
<td>55 %</td>
<td>P &lt; 0.001**</td>
</tr>
<tr>
<td>Eye Appearance</td>
<td>Opened</td>
<td>80 %</td>
<td>25 %</td>
<td>P &lt; 0.001**</td>
</tr>
</tbody>
</table>
Table 4. Psychometric tests.

<table>
<thead>
<tr>
<th>Psychometric tests</th>
<th>Epileptic (mean ± SD)</th>
<th>PNES (mean ± SD)</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td>IQ testing</td>
<td>42 ± 6.08</td>
<td>45.05 ± 2.74</td>
<td>P&lt;0.05*</td>
</tr>
<tr>
<td>MMPI-2</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hypochondriasis</td>
<td>60.7 ± 9.71</td>
<td>72.5 ± 10.98</td>
<td>P &lt; 0.01**</td>
</tr>
<tr>
<td>Depression</td>
<td>79.75 ± 16.37</td>
<td>61.7 ± 9.95</td>
<td>P &lt; 0.01**</td>
</tr>
<tr>
<td>Hysteria</td>
<td>67.4 ± 8.39</td>
<td>76.95 ± 16.78</td>
<td></td>
</tr>
<tr>
<td>Social Introversion</td>
<td>57.25 ± 10.22</td>
<td>53.6 ± 5.56</td>
<td>NS</td>
</tr>
<tr>
<td>Psychotic deviation</td>
<td>65.95 ± 11.62</td>
<td>65.45 ± 10.2</td>
<td>NS</td>
</tr>
<tr>
<td>Masculinity-Feminity</td>
<td>55.9 ± 10.1</td>
<td>53.3 ± 14.24</td>
<td>NS</td>
</tr>
<tr>
<td>Paranoia</td>
<td>62.35 ± 9.49</td>
<td>64.15 ± 9.71</td>
<td>NS</td>
</tr>
<tr>
<td>Psychasthenia</td>
<td>62.35 ± 9.49</td>
<td>65.25 ± 2.29</td>
<td>NS</td>
</tr>
<tr>
<td>Schizophrenia</td>
<td>72.85 ± 14.62</td>
<td>75.9 ± 8.4</td>
<td>NS</td>
</tr>
<tr>
<td>Hypomania</td>
<td>56.4 ± 9.35</td>
<td>59.79 ± 7.8</td>
<td>NS</td>
</tr>
</tbody>
</table>

**Figure (1): MMPI-2 graphics**

The psychoneurotic profile is inverted V shaped in 70% of ES (continuous line) and V shaped in 80% of PNES (dashed line).
Table 5. CPK Measurements.

<table>
<thead>
<tr>
<th>CPK level (IU/ml)</th>
<th>Epileptic (mean±SD)</th>
<th>PNES (mean±SD)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Preictal</td>
<td>Postictal</td>
</tr>
<tr>
<td></td>
<td>(mean±SD)</td>
<td>(mean±SD)</td>
</tr>
<tr>
<td>Preictal</td>
<td>100.5±49.55</td>
<td>85.35±54.68</td>
</tr>
<tr>
<td>Postictal</td>
<td>294.45±21.57</td>
<td>102.75±65.2</td>
</tr>
</tbody>
</table>

Table 6. P300 Measurements.

<table>
<thead>
<tr>
<th>P300 latency (ms)</th>
<th>Epileptic (mean±SD)</th>
<th>PNES (mean±SD)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Preictal</td>
<td>Interictal</td>
</tr>
<tr>
<td></td>
<td>(mean±SD)</td>
<td>(mean±SD)</td>
</tr>
<tr>
<td></td>
<td>330.5±44.87</td>
<td>361.95±60.83</td>
</tr>
<tr>
<td></td>
<td>416.65±77.83</td>
<td>304.8±17.85</td>
</tr>
<tr>
<td></td>
<td>&lt; 0.01</td>
<td>&lt; 0.01</td>
</tr>
<tr>
<td></td>
<td>NS</td>
<td>NS</td>
</tr>
<tr>
<td>p-value</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 7. Performance interpretation of ERP in ES and PNES diagnosis and differential diagnosis.

<table>
<thead>
<tr>
<th>Test</th>
<th>Difference between Pre and Post ictal measures</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>≥ 5msec</td>
</tr>
<tr>
<td>Sensitivity</td>
<td>85%</td>
</tr>
<tr>
<td>Specificity</td>
<td>55%</td>
</tr>
<tr>
<td>Positive predictive value</td>
<td>59%</td>
</tr>
<tr>
<td>Negative predictive value</td>
<td>88%</td>
</tr>
<tr>
<td>Efficiency</td>
<td>65%</td>
</tr>
</tbody>
</table>

DISCUSSION

Differentiation between epilepsy and psychogenic nonepileptic seizures (PNES) is a common challenge in epilepsy care centers.

The difference between epileptic patients and PNES patients in this study as regard age at presentation to study is statistically insignificant and it show marked variability between different studies.\textsuperscript{12,13,14}

It is generally accepted in the literature that PNES groups include a higher proportion of female than male patients\textsuperscript{15,16}, although it is numerically right in the present study but it does not reach a statistically significant value.

As for the age of onset of seizure and the duration of seizure, in this study, PNES patients have an older age of onset than do epilepsy patients. Epilepsy patients typically have been experiencing spells longer than PNES patients.\textsuperscript{21,22}

As regards the history of psychiatric treatment in this study the difference between epileptic patients and PNES patients was statistically significant in agreement with authors reported that PNES patients have high rates of lifetime and current psychiatric diagnoses other than conversion disorder.\textsuperscript{17,18} However others are not reaching this point in their studies.\textsuperscript{19,20}

Family history of epilepsy and family psychiatric history in this study do not consistently differ between epilepsy and PNES patients and are probably not useful discriminators between epilepsy and PNES.\textsuperscript{23,24}

There are several behavioral characteristics (seizure semiology) that are more common in PNES. PNES spells are not likely to occur during sleep and may be accompanied with pelvic...
thrusting and eyes closed during a spell. However injuries, tongue biting, incontinence and vocalization in this study showed high significant difference some author did not considered them as solid rules for differential diagnosis between epileptic and PNES patients and taken them with great caution.

The MMPI-2 has been extensively studied in relation to diagnosing PNES patients. The research suggests that Scales 1 and 3 elevations or a conversion V profile raise the likelihood of PNES diagnosis. However, it is difficult to give estimates of sensitivity and specificity of the conversion V profile as most studies do not provide exact percentages of either PNES or epilepsy samples that show this profile. In those studies that do provide percentage data, sensitivity of the conversion V profile of PNES ranges from 38% (in a sample consisting of PNES and epilepsy plus PNES patients) to 60% (in a sample of only PNES patients). It reached up to 80% of our PNES.

The high incidence of conversion V profile in PNES subjects can be explained by the higher rates of psychiatric disorders occurring in those subjects. A somatoform disorder is the unconscious production of physical symptoms due to psychological factors ie, the patient is not faking and not intentionally trying to deceive. Somatoform disorders are subdivided into several disorders depending on the characteristics of the physical symptoms and their time course. The two somatoform disorders relevant to PNES are conversion disorder and somatization disorder.

In this study epileptic patients being less intelligent than PNES patients, this can be explained by the fact that cognitive dysfunction is more frequent and more profound in epileptic patients. Cognitive dysfunction and epilepsy may both be consequences of the same underlying disorder, rather than one being a consequence of the other.

It is however known that individual seizures may result in a cognitive penalty, and that interictal epileptiform EEG discharges can sometimes disrupt cognitive functioning. Some antiepileptic drugs can also play a part.

In the present study post ictal CPK level was high in epileptic patient particularly those experience generalized tonic clonic seizures but not in PNES. This can be explained by the skeletal muscle origin of this elevation suggesting that it is related to exercise, ischemia, or hypoxia of muscle tissue during convulsions.

Recently, there are current findings suggesting that postictal event related potentials (ERP) recordings are useful in the diagnosis of psychogenic nonepileptic seizures (PNES). The difference between both preictal and interictal readings, and also the preictal and postictal readings in the epileptic group was statistically highly significant (P<0.01), but in the PNES group, the difference between both preictal and postictal readings was statistically not insignificant. Those results are in agreement with Wambacq and Abubakr.

There are several theories on the neural processes underlying the origin of the P3. The most cited and most criticized theory is the theory of Donchin and Coles. Donchin’s theory is referred as "updating of working memory". P3 is seen as an electro-physiological correlate of a steady revision of the representation of an environment in a working memory. P3 pops out at the moment when an update of this representation of an environment is needed. More precisely, the P3 shows up when the inner model of an outer environment is about to be revised. The P3 reflects neural activities involved in the representation change. The latency of the P3 then corresponds to the speed of cognitive processing and the amplitude shows the allocation of brain energy resources.

Another explanation of P3 origin is that it reflects the surprise associated with the occurrence of the less frequent stimulus. In 1998, Polich and his colleagues suggested that P3a may be generated by target versus standard discrimination rather than by stimulus novelty. The P3b reflects the memorization processes. Current opinion takes for the P3 generation site the temporo-parietal junction and neighboring parietal and temporal neo-cortical regions.
contribution of sub-cortical structures of the limbic system is indirect.\(^3\)

The explanation of (P300) prolongation in epileptic patients could be related to the abnormal excessive cortical neuronal discharge that occurs in epilepsy (but absent in psychogenic seizures) which exhausts the P300 mechanics.\(^2\)

**Conclusion:**

The combination of more than one of previously discussing variables particularly P300 and MMPI-II raised the diagnostic accuracy of PNES even without video EEG.

Researches in the area of event related potentials in relation to PNES and its differential diagnosis are considered a new area of research studies are lacking and are needed.

**REFERENCES**


الملخص العربي

مساعدات التشخيص في النوبات النفسية غير الصرعية

النوبات النفسية غير الصرعية تعرف على أنها تفريغات مفاجئة في سلوك، أدركات، أو تفكير الشخص وذلك لفترة زمنية محدودة تشتبه في ظاهرها النوبات الصرعية، ولكنها تكون غير مصحوبة بالغيرات المشتركة لمرض الصرع الحقيقي والتي تظهر عند إجراء رسم المخ، لذا من هذة الارتباط هو تم أداء طرق اختبارات حديثة غير مكثفة، وتكون، وتستلزم التطبيقات التشخيصية للنوبات النفسية غير الصرعية وتفعيلها من مرضي النوبات الحقيقي.

وقد نتجت هذه الدراسة في قسم الأمراض العصبية في كلية طب سوهاج، ونبعها تم تقدير 29 مريضاً من مرضى النوبات النفسية غير الصرعية وتم اختبار المرضى بناءً على التاريخ المرضي والمفاهيم الإكلينيكية ورسم المخ الطول.

وقد تم تتضمن جميع المرضى الآتي:
1- تاريخ مرضي مفصل.
2- فحص طبي وعسيبي مفصل.
3- اختبارات قياس نفسي وتشمل قياس معدل الذكاء واختبار مونوسرت متوسط الأوجه للشخصية.
4- التحاليل المعملية وظائف الكبد، وظائف الكلى، سكر الدم، ونسبة الغازات بالدم.

تتمثل عملية تشخيص ( çünkü كرياتين سينوفاقيز) قبل و بعد النوبة.

رسم المخ المطأط.

رسم المخ المطول بالنفيدي مع استخدام طرق أثارة لاحق لتشخيص (فعن مثبط النحل بالوريد مع الإجهاض بعد نوبة التشنجات).

الجدير بالذكر أن (لمحة ب 23) على ثلاث جلسات قبل النوبة، بعد النوبة (خلال 6 ساعات)، ما بين حدوث النوبة (6-48 ساعة من حدوث النوبة).

الاعتقادات المتماثلة:

كانت النوبات النفسية غير الصرعية تسبب النوبة الذين يعانون من نوبات صرعية حقيقية. كما أن هذا النوبة في الغالب تكون قصيرة لمرض الصرع الحقيقي. وقد أظهرت هذه الدراسة أيضاً أن النوبات النفسية الحقيقية تحدث أثناء النوم بنسبة أكبر، كما أنها تتميز بكفاءة موقعة ذات فنون النكث في كل مرات الحدوث، وغالباً ما تحدث الإصابات ومضار النسبة والبول والنار وتحقيق التشتت أكثر من النوبات النفسية غير الصرعية، مما يضعف أيضاً من هذه الدراسة أن الكلاه أثناء النوبة وحدوث حركات في تجانس تعداد تكونة الأكبر في النوبات النفسية غير الصرعية.

وقد نتجت هذه الدراسة أن مرضى النوبات النفسية غير الصرعية يكونون ذو ذكاء أحسن نسباً بالمقارنة بمرضي النوبات الحقيقيين، ويعتبرون أيضاً بالشجاعة وتوهم النوبة أكثر من مرضى النوبات الحقيقيين وفقاً للدراسة السابقة. أما بالنسبة للاختبارات المعملية فقابل أن مرضى النوبات النفسية الحقيقية الباردة الإيجابية العامة يمكن أن تكون أثراً أكبر في ارتفاع نسبة الكرياتين سينوفاقيز في الدم بعد النوبة بالمقارنة بالأوامر الأخرى من النوبات النفسية الحقيقية والنوبات النفسية غير الصرعية.

وقد تم خلال هذه الدراسة استخدام الموجة ب 300 في الفترة بين هذين النورين من النوبات النفسية ومشكلة. وقد أظهرت النتائج أن الزيادة في سرعة تكون هذه الموجة بعد النوبة بالمقارنة بها قبل حدوث النوبة يعد من الخصائص المميزة جداً للنوبات النفسية الحقيقية ولا يحدث ذلك في النوبات النفسية غير الصرعية.