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Research Article

Normalized Power are used in the Diagnosis of Insomnia Medical Sleep Syndrome through EMG1-EMG2 Channel

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Abstract

Insomnia is a very harmful disease to the zoological species. Insomnia is a neurological and sleep disease. The diagnosis of insomnia is use in the electroencephalogram signal. Delta Wave & Theta Wave are use in the detection of insomnia sleep disorder. The all simulation is completed by MATLAB programming. The detection time both normalized power of the insomnia patient and normal patient is associated. Nine insomnia and sixteen normal patient, four electroencephalogram wave and three sleep stages successfully achieve the all research of investigation of insomnia. The normalized power are achieved by MATLAB programming i.e. normalized power are used in the recognition of insomnia.

Keywords: Insomnia; Normalized power; Electroencephalogram

Abbreviations

EEG: Electroencephalogram; INS: Insomnia; N: Normal; N/A: Channel not available; PSD: Power Spectral density; EMG: Electromyogram

Introduction

Insomnia

Slumber disease in which about inability to stay insensible as long as preferred. A person misery from a sleeplessness wake up recurrently during the darkness and feels tired with powerlessness to distillate. It's mutual problem in overall population in current time. It is likewise collected with pain & exhaustion. The possessions of wakefulness can also include short-tempered mood & increased probability of accidents while hired with machine. Insomnia is not an indication of other diseases, but it is inferior to other health situations [1-5].

Types of insomnia

1. According to Sleep Pattern- Two types of sleep pattern insomnia:

a) Sleep-maintenance Insomnia- The sleep-maintenance wakefulness sufferer awakens frequently throughout the darkness & sleep is disjointed.

b) Sleep-onset Insomnia- Sleep-onset sleeplessness sufferer takes a long passe to get to sleep then can sleep through the obscurity once sleep starts.

2. According to Duration- Three types of duration insomnia:

a) Transient Insomnia- It is most wide and mutual spread form among the individuals.

b) Chronic Insomnia- Continues for four or more week & may be due to essentially causes in the organism.

c) Acute Insomnia- It has connected to stress inspirations but extended permanent than for passing insomnia [6-10].

3. According to etiology- Two types of etiology insomnia:

Table 1: Normalized Power of Insomnia Patient.

Patient	Stage	Delta Wave	Theta Wave
INS1	S0	0	0.23417
INS1	REM	0	0.26232
INS2	S0	0	0.32262
INS2	REM	0	0.47154
INS3	S0	0	0.23654
INS3	S1	0	0.25188
INS3	REM	0	0.22354
INS4	S0	0	0.3637
INS4	REM	0	0.46438
INS5	S0	0	0.43103
INS5	S1	0	0.42748
INS5	REM	0	0.45064
INS6	S0	0	0.24692
INS6	S1	0	0.32362
INS6	REM	0	0.32038
INS7	S0	0	0.3034
INS7	S1	0	0.30848
INS7	REM	0	0.48365
INS8	S0	0	0.31856
INS8	REM	0	0.48128
INS9	S0	0	0.33279
INS9	S1	0	0.34105
INS9	REM	0	0.36049

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Table 2: Normalized Power of Normal Patient.

Patient	Stage	Delta Wave	Theta Wave
N1	S0	0	0.27951
N2	S0	0	0.31279
N3	S0	0	0.29706
N4	S0	N.A	N.A
N5	S0	0	0.29706
N6	S0	0	0.32383
N7	S0	0	0.34696
N8	S0	N.A	N.A
N9	S0	0	0.23212
N10	S0	0	0.35355
N11	S0	0	0.2684
N12	S0	N.A	N.A
N13	S0	N.A	N.A
N14	S0	N.A	N.A
N15	S0	N.A	N.A
N16	S0	N.A	N.A
N1	S1	0	0.27469
N2	S1	0	0.38684
N3	S1	0	0.31338
N4	S1	N.A	N.A
N5	S1	0	0.31384
N6	S1	N.A	N.A
N7	S1	N.A	N.A
N8	S1	N.A	N.A
N9	S1	N.A	N.A
N10	S1	N.A	N.A
N11	S1	0	0.31897
N12	S1	N.A	N.A
N13	S1	N.A	N.A
N14	S1	N.A	N.A
N15	S1	N.A	N.A
N16	S1	0	0.18151
N1	REM	0	0.39655
N2	REM	0	0.36229
N3	REM	0	0.35896
N4	REM	N.A	N.A
N5	REM	0	0.37114
N6	REM	0	0.35398
N7	REM	0	0.37197
N8	REM	N.A	N.A
N9	REM	0	0.32951
N10	REM	0	0.35682
N11	REM	0	0.38049
N12	REM	N.A	N.A
N13	REM	N.A	N.A
N14	REM	N.A	N.A
N15	REM	N.A	N.A
N16	REM	N.A	N.A

Table 3: Normalized power of the theta wave of normal patient and insomnia patient for EMG1-EMG2 channel and stage S1.

Stage S0	Normal 1	Normal 11	Insomnia I2	Insomnia 4
Theta Wave	0.27951	0.2684	0.32262	0.3637
Observation	Normalized Power is Low		Normalized Power is High	

Table 4: Normalized power of the theta wave of normal patient and insomnia patient for EMG1-EMG2 channel and stage S1.

Stage S1	Normal 3	Normal 5	Insomnia 5	Insomnia 9
Theta Wave	0.31338	0.31384	0.42748	0.34105
Observation	Normalized Power is Low		Normalized Power is High	

Table 5: Normalized power of the theta wave of normal patient and insomnia patient for EMG1-EMG2 channel and stage REM.

Stage REM	Normal 6	Normal 10	Insomnia 2	Insomnia 4
Theta Wave	0.35398	0.35682	0.47154	0.46438
Observation	Normalized Power is Low		Normalized Power is High	

a) Primary Insomnia- Primary insomnia has no notorious pain, depression, noise at darkness causes is establish.

b) Secondary Insomnia- This is when the victim has sleep difficulties because of approximately else such as health condition like asthma, cancer, arthritis being used like alcohol [11-15].

Methods

Datasheet of insomnia & normal patient

The total numbers of 25 patients are use in the research work, sixteen normal (nine female and seven male) and nine insomnia patients (4 Male and 5 Female) sleep disorder [15-21].

Examination of electroencephalogram signal

Step 1: Apply electroencephalogram signal to the insomnia patient's data of one minute.

Step 2: Extracted the EMG1-EMG2 signal.

Step 3: Apply low pass filter i.e. filtering the electroencephalogram signal. The frequency of the signal is used in 25Hz.

Step 4: Apply Hamming window to the electroencephalogram signal.

Step 5: Apply Power Spectral Density, calculated by Welch Method.

Step 6: Finally gain the Normalized Power of electroencephalogram signals of sleep stage S0, S1 & REM.

Results

The Normalized power of Insomnia Patient is gained by the MATLAB coding, the stage S0, S1 and REM stage are used. The two wave of electroencephalogram delta and theta wave are used because the reduction of noise. The Delta value of all stages is zero and theta value is different, it has shown in (Table 1, 2).

On future research data time is less i.e. 30sec are used in the recognition of Insomnia.

Competing Interests- Md Belal Bin Heyat is a researcher and author asserts that they have no competing interests.

Conclusion

Table 3-5 shown that normalized power of different stages of normal patient is low and insomnia patient is high.

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