

## Prevalence of overweight and obesity and trends of physical activity in people with epilepsy – An observational study

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### Abstract

**Background:** Alteration of metabolic and biochemical factors is one of the proposed mechanics for higher cardiovascular mortality and morbidity in people with epilepsy (PWE) than general population. We aimed to quantify obesity and physical inactivity in PWE and compare with general population.

**Methods:** In this observational study of PWE with seizure controlled on anti-epileptic drugs, 191 subjects aged 18–60 years recruited. Data on anthropometry, physical activity and six minute walk distance was obtained. A comparison for the above mentioned data in study participants was compared with Indian population average. Association between weight and physical activity was evaluated using correlation analysis.

**Results:** The mean age of the cohort was 26.45±9.85 years with 117(57.0%) men. The mean body mass index was 28.75±6.73 and waist-hip ratio of 0.97±0.08. The prevalence of over-weight (28.5% vs 12.5%; p<0.001), obesity (44.8% vs 21.0%; p<0.001) and pre-diabetes (15.5% vs 8.7%; p<0.05) was significantly higher in PWE than general population. The average distance walked in the six minute walk test was 383.61 ± 71.51 metres. There was no significant correlation between six minute walk test and weight, (r=0.031; p=0.897) and body mass index (r=0.05; p=0.912). PWE who were active, covered more distance in six minute walk than those who were physically inactive (409.68 ± 44.04 vs 382.30 ± 70.0 metres; p=0.030).

**Conclusion:** Prevalence of conventional cardiovascular risk factors like obesity and physical inactivity is significantly higher in people with epilepsy than general population. The role of lifestyle modification in management of these risk factors should be evaluated in people with epilepsy.

**Keywords:** epilepsy; physical activity; fitness; walk test

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## Introduction

Epilepsy is a disorder characterized by recurrent seizures of cerebral origin, presenting with episodes of sensory, motor or autonomic phenomenon with or without loss of consciousness. Epilepsy is the second most common chronic neurological condition seen by neurologists [1].

It is well established that seizure control is determined by lifestyle of the patients in few types of epilepsies. Numerous psychopharmacological and behavioral studies have shown that reduction in stress and anxiety resulted in decreased seizure frequency in epilepsy patients [2, 3]. Studies have previously also explored the benefits of stress reduction on seizure control through interventions like psychotherapy [4], meditation [5], yoga [6] and acupuncture [7]. Similarly, physical activity is also a known stress reducer [8].

Most of the people with epilepsy refrain from active lifestyle because they think activity increases the chances of epilepsy [9]. Importantly, nearly 40% of patients with epilepsy are obese which is also associated with increasing age [10, 11]. In addition antiepileptic drugs (AEDs – valparin, Oxcarbazepine) cause weight gain, and abnormalities of metabolic parameters. Many patients are advised to refrain from exercise by family, friends due to fear of seizure during exercise [12]. However, few studies have shown that fewer seizures occur during exercise than at rest [13].

Elliot et al., reported that patients with epilepsy ate fewer servings of salad and consume more non-diet soda when compared to non-epilepsy population [15]. The study also suggested that as persons with epilepsy have higher rates of co-morbid conditions, and suggested that suitable diet modifications and increasing physical activity many help reduce all-cause mortality risk in people with epilepsy.

Existing literature about the role of lifestyle modification in patients with epilepsy is predominantly done in western populations and is limited by small study population. A healthy lifestyle is defined based on guidelines of World Health Organization (WHO) on 150 minutes of physical exercise per week, healthy body mass index (BMI) and balanced diet consumption (five servings of

fruits and/or vegetables per day). However, there is limited information available on physical activity levels and cardio pulmonary fitness in patients with epilepsy especially those who are obese. Therefore, in this observational study, we aim to report that prevalence of overweight, obesity and self-reported physical activity levels in patients with epilepsy and compare it with prevalence reported in Indian population. We also aimed to evaluate the relationship between self-reported physical activity, obesity and current cardio-pulmonary fitness levels assessed using a six minute walk test.

## Methodology

Consecutive persons with epilepsy with seizures controlled on optimal AED dosages for the last two years, attending the Out-Patient Epilepsy Clinic of Krishna Institute of Medical Sciences, Secunderabad, 191 subjects aged 18–60 years were recruited after obtaining an informed consent. The study was approved by Institutional Ethics Committee.

Data was collected using a standard form for the following information: demographics, antiepileptic drug (AED) profile, seizure control and remission. Relevant data will be collected through an interview with the patients and/or family. All the patients underwent comprehensive assessment for: BMI based on WHO guidelines, girth measurement, supervised six minute walk test and self-reported Health Enhancing Physical Activity (HEPA) score.

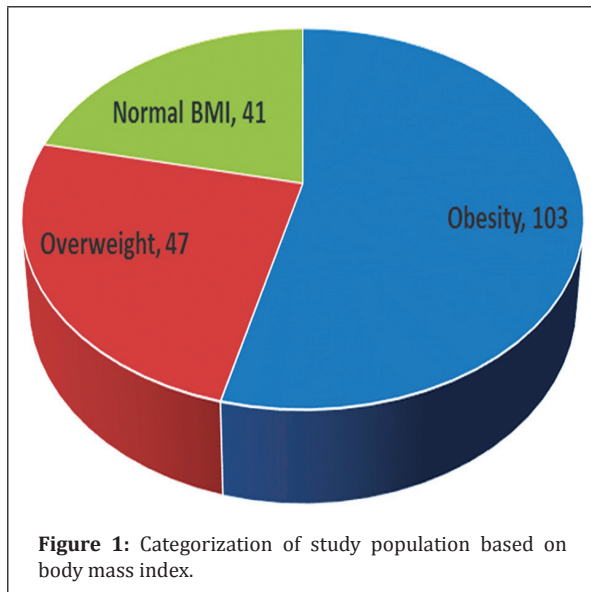
## Statistical analysis

After ensuring the homogeneity of data, all continuous variables were expressed as mean  $\pm$  standard deviation; whereas all categorical variables were expressed at percentages. Association between variables was evaluated using Pearsons and Spearman correlation. A  $p \leq 0.05$  was considered significant. All statistical analysis was done using Statistical Package for Social Sciences (SPSS), version 20.0 for windows, IBM Computers, New York, USA.

## Results

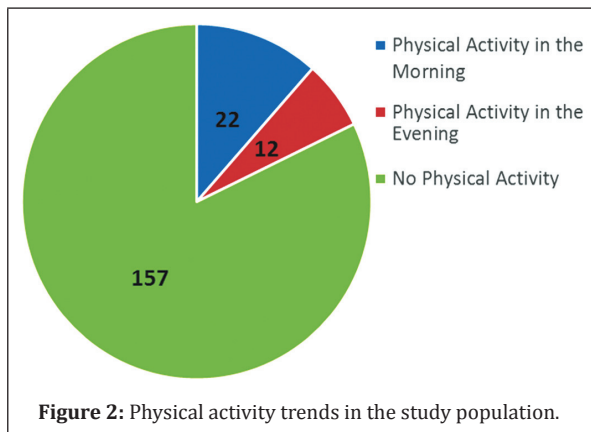
The mean age of the cohort was  $26.45 \pm 9.85$  years with 117(57.0%) men. The mean body mass index was  $28.75 \pm 6.73$  and waist-hip ratio of  $0.97 \pm 0.08$ . The prevalence of over-weight (28.5% vs 12.5%;  $p < 0.001$ ), obesity (44.8% vs 21.0%;  $p < 0.001$ ) was significantly higher in study population than general

population. Figure 1 summarizes the categorization of study population into various groups based on BMI.



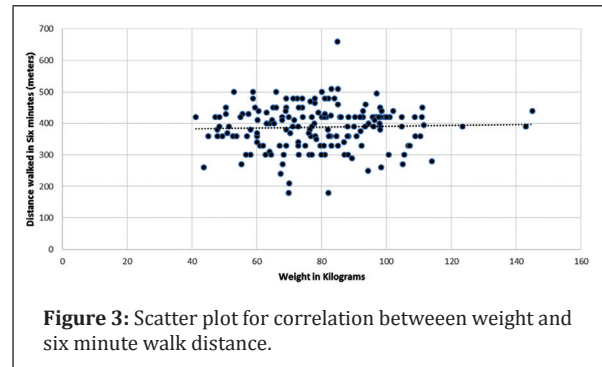
**Figure 1:** Categorization of study population based on body mass index.

A significantly lower fraction of study population reported regular physical activity on HEPA of more than 150 minutes a week (10.5% vs 46.4%;  $p < 0.001$ ). Figure 2 summarizes the trends of exercise in the study population. The physical activity scores have been reported as if the participant did minimum of 30 minutes of moderate intensity physical exercise for at least 5 days a week.



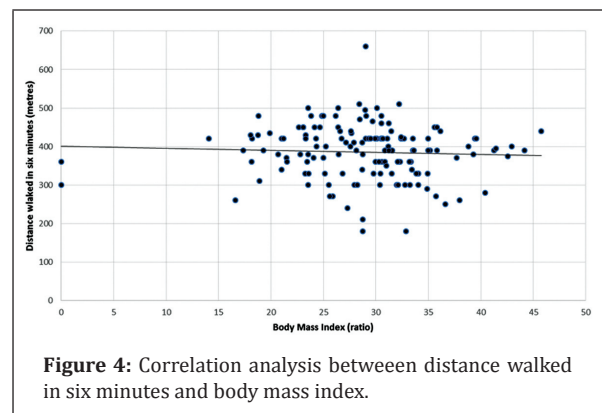
**Figure 2:** Physical activity trends in the study population.

The average distance walked in the six minute walk test was  $383.61 \pm 71.51$  metres. On correlation analysis for the association between six minute walk test and weight (Figure 3), there was no significant correlation between the variables, ( $r=0.031$ ;  $p=0.897$ ).



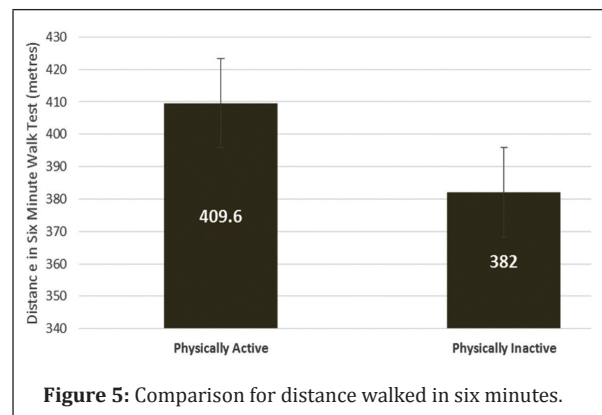
**Figure 3:** Scatter plot for correlation between weight and six minute walk distance.

Similarly, there was no correlation between distance walked in six minutes and body mass index ( $r=0.05$ ;  $p=0.912$ ), Figure 4.



**Figure 4:** Correlation analysis between distance walked in six minutes and body mass index.

Importantly, people with epilepsy, who did physical activity recommended by World Health Organization, did cover more distance in six minute walk than those who were physically inactive ( $409.68 \pm 44.04$  vs  $382.30 \pm 70.0$  metres;  $p=0.030$ ), Figure 5.



**Figure 5:** Comparison for distance walked in six minutes.

## Discussion

Most of the 191 patients who formed the study population were educated and lived in urban to

semi-urban population with access to both areas for physical activity and leisure time activities. Unfortunately, most of the patients did not adhere to WHO recommended physical activity levels. The most probable reason for our findings were more self-reported passive activities such as watching TV, listening to music, and spending time on mobile phones. Irrespective of age, surprisingly, very few people with epilepsy participated in social activities. The results of the current study, confirmed our clinical experience that PWE are not even half as active physically as the normal population.

The many reasons for physical inactivity in PWE could be, epilepsy itself, epilepsy treatment, patient personality. The reason most often quoted by patients was “fear of seizures” and social embarrassment, similar to those reported by Mittan et al. [14]. Although most of the PWE were advised by Neurologist to live an active life style, family and friends often discourage such a lifestyle. PWE often have anxiety and depression combined with physical unfitnes [15] but improvement of physical fitness can reduce psychosocial symptoms [16]. Another barrier for PWE who wish is the notion that exercise or physical activity may provoke seizures. To the best of our knowledge, there have been no reports of exercise inducing seizures, other than those associated with hyperventilation syndrome. As a limitation, this study was not designed to evaluate the effect of physical activity on seizure frequency. The findings of the current study, could lead to future research in improving proven, validated and safe exercise and activity regimen for PWE. Multi-disciplinary approach of patient, care-givers, neuro-physicians, psychologists and physiotherapists is essential.

## Conclusion

Prevalence of conventional cardiovascular risk factors like obesity and physical inactivity is significantly higher in people with epilepsy than general population. People with epilepsy who are physically active perform significantly better than those who are nor active. The role of lifestyle modification in management of these risk factors should be evaluated in people with epilepsy.

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## Conflict of interests

Authors declare no conflict of interests.

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