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Children

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# **Prevalence, Incidence and Determinants of Epilepsy among School Children in Egypt**

**(A systematic review and meta-analysis study)**

A PhD. in Childhood Studies (Children Health and Nutrition)  
Medical Studies Department for Children

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# **Prevalence, Incidence and Determinants of Epilepsy among School Children in Egypt (A systematic review and meta-analysis study)**

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## **Abstract:**

**Background:** Epilepsy is the fourth most common neurological disorder and affects people of all ages.

**Objective:** To provide the first meta-analysis of Egyptian research regarding prevalence and some risk factors of epilepsy among school children.

**Methodology:** The researcher reviewed the **Egyptian** theses, papers, journals, in English language, searching for the eligible studies published from January 1990 to the end of December 2017. Meta-analysis was done using MedCalc software ver. 12.7.7.0. The pool of 58 studies.

**Results: Prevalence rate** with total number of 692100 was **4.91/1000**. The mean LD score was significantly lower in epileptic children than controls (69.3, 75.9,  $t = 2.2$ ,  $P = 0.028$ ). **Consanguinity** 42.2% positive cases (212/502) and 20% (698/3474) controls.  $OR=1.55$ ,  $Z=3.22$ ,  $P=0.001$ ). **Family history** was positive in 40.6% (204/502) cases and 6% (210/3474) controls. (Odd ratio=2.54,  $Z=3.04$ ,  $P=0.002$ ). **Prenatal risk factors** (231), **11.5 %**. **Perinatal risk factors**(1235), 14.7%. **Natal risk factors** (122), 23%. **Post natal infection**(1875), 16.6%. **Post natal trauma**(1958), 8.4 %.

**Conclusion:** Prevalence of epilepsy are high among school children, and this requires guidelines-based treatment program to help epileptic children and their caregivers how to manage epilepsy in the best evidence based way.

**Keywords:** Epilepsy, Children, Risk factors, prevalence, Meta-analysis.

## List of abbreviations

AEDs	Anti-epileptic drugs
ANTI-NMDA	Anti-N-methyl-D-aspartate
BMI	Body mass index
CBC	Complete blood picture
CGH	Comparative genomic hybridization
CNS	Central nervous system
CSF	Cerebrospinal fluid
DALYs	disability-adjusted life years
DTI	Diffusion tensor imaging
EEG	Electroencephalography
GAMA	Gamma aminobutyric acid
GLUT1	Glucose transporter type 1
GTCS	Generalized tonic clonic seizures
ICES	International classification of epileptic seizures
ILAE	International league against epilepsy
LD	Learning disability
MEG	Magnetoencephalogram
MRI	Magnetic resonance imaging
PET	Positron emission tomography.
RNS	Responsive neurostimulator
RSE	Refractory status epilepticus
SE	Status epilepticus
SES	Socioeconomic status
SPECT	Single photon emission computed tomography
TSC1,TSC2	Tuberous sclerosis 1,tuberous sclerosis 2
VNS	vagal nerve stimulation

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# **Introduction**

# Introduction

Epilepsy is one of the most common neurological disorders worldwide, contributing one percent to the global burden of disease (**WHO, 2005, PapDiop et al., 2014**).

About 69 million people worldwide are affected by this disorder with 90 percent of these individuals living in low- and middle-income countries (**Ngugi AK, et al. 2010**). The cumulative lifetime incidence of epilepsy is 3% and more than half of the cases begin in childhood (**Johnston, 2004**).

Epilepsy is a common neurological disorder in children and can have a major impact on a child's development. Epilepsy starts in childhood in 60% of cases and most of the clinically significant aspects of the disease occur during childhood(**Neville, 2006**).

Prevalence is defined as the proportion of a population with a given disease at a specified time, most studies have found the point prevalence of epilepsy to lie between 4 to 10/1000 (the lower figure in developed countries, while the higher in developing countries) (**Sander and Shorvon, 2006**).

The prevalence of epilepsy is higher in developing countries when compared with developed ones. The incidence of epilepsy is 3 per 1000 in Italy (**Pazzaglia and Frank-Pazzaglia, 2006**) 8 per 1000 in Turkey, 8 and 22.2 per 1000 in India (**Hackett et al., 2007**). However, the incidence is 9 per 1000 in Japan, a developed country. The degree of development of a country is therefore not the only determinant of epilepsy incidence. The incidence of epilepsy is directly related to the incidence of epilepsy risk factors (**Tsuboi, 2004**).

Incidence studies provide important information regarding the natural history of epilepsy and its risk factors. During the last three decades, several incidence studies of epilepsy have been performed .These studies indicate that the incidence of epilepsy varies considerably with age and that epilepsy is slightly more common in males. Moreover, recent studies suggest a secular trend in the age-specific incidence, with a decline in children and an increase in elderly people. However, the available data are difficult to interpret and compare because of methodologic differences (**Irene et al., 2002**).

**The Arab world** is unique in terms of mixed ethnicity, varied religious practices (related to food and substances, marriage) and disease epidemiology. A previous review on epilepsy from this region estimated the prevalence of epilepsy to be 2.3/1000 (**Benamer and Grosset, 2009**).

**Egyptian studies** in Al-Quseir, Egypt revealed that the prevalence of epilepsy is 5.5/1000. (**El-Tallawy et al., 2016**).

Other Egyptian studies in Zagazig and Al Kharga were done. (**El- Motayam;El-Tallawy et al., Kharga , 2013**)

# **Aim of the Study**

## **Aim of the study**

The aim of the present study is to provide the first meta-analysis of Egyptian research regarding prevalence and determinants of epilepsy among school children in Egypt. (a) survey the medical and psychological literature in order to identify studies using empirical methods to investigate the prevalence and determinants of epilepsy among school children in Egypt and (b) summarize the data using meta-analytic procedures .

### **Importance of the Study:**

As the prevalence of epilepsy all over the world is increasing, it is important to identify the prevalence of epilepsy among school children in Egypt helping in the diagnosis and management.

**REVIEW**  
**OF**  
**LITERATURE**

# Epilepsy

## Definition of epilepsy:

Seizure is paroxysmal alteration of neurological function caused by the excessive and hyper-synchronous discharges of neurons in the brain.

“Epileptic seizure” is used for distinguishing a seizure caused due to abnormal neuron firing from a non-epileptic event, as a psychogenic seizure. The condition of recurrent, unprovoked seizures is the definition of "Epilepsy". Epilepsy has multiple causes, every cause reflect underlying brain dysfunction (**Shorvon et al., 2011**).

A seizure provoked when a reversible insult occur as (fever, hypoglycemia) does not falling under the definition of epilepsy cause it is a secondary condition and short-lived, not a chronic state.

the International League Against Epilepsy (ILAE) in 2014, task force for defining epilepsy proposing that epilepsy could be considered a disease of brain defined by any of the following conditions:1- At least two unprovoked (reflex) seizures occur more than 24 hours apart. 2- One unprovoked (reflex) seizure and probability of further seizures similar to the known general recurrence risk after two unprovoked seizures (at least 60% over the next 10 years), or diagnosis of an epileptic syndrome.

“Epilepsy syndrome” is a group of clinical characteristics that consistently occur with each other, having similar type(s) of seizure, natural history, age of onset, triggering factors, EEG findings, genetics, prognosis and the response to antiepileptic drugs (AEDs). Epilepsy conceptualized as an “enduring” tendency for having seizures, although that “enduring” is not easily defined. A report had refined that concept considerably, however, practically, epilepsy usually defined as  $\geq 2$  unprovoked seizures separated by at least 24 hours (**Fisher et al., 2005**).

A seizure is a clinical manifestation, occurring due to a brief episode of abnormal synchronous or excessive neuronal activity in the brain. Epilepsy is brain disorder that is characterized of having chronic predisposition for generating epileptic seizures with secondary cognitive, neurobiologic, social and psychological consequences (**Fisher et al., 2005**).

### **Epidemiology of epilepsy:**

Epilepsy is a non-communicable, chronic disease of the brain affecting persons of all ages. Worldwide, 50 million people or even more having epilepsy, so globally, it one of the most common neurological diseases. Almost about 80% of people having epilepsy are living in low and middle income countries. It accounts that 70% of people live with epilepsy can live seizure- free if diagnosed and treated properly. Around three quarters of people with epilepsy live in countries with low and middle income, do not receive treatment they need. The general population with active epilepsy have their estimated proportion (with the need for treatment or continuing seizures) at a given time lies between 4 and 10 / 1000 people. Although, many studies in low and middle income countries show that the proportion is higher, between 7 and 15 / 1000 people. Worldwide, the estimated 2.4 million people have been diagnosed with epilepsy every year. In countries with high income, annually new cases recorded between 30 to 50 / 100 000 people in general population. In countries with low and middle income, that record could be up to two times more, due to the increase of risk of endemic conditions like neurocysticercosis or malaria; the higher incidence of birth-related injuries; road traffic injuries and variations in medical infrastructure, availability of accessible care and preventative programs of health. Up to 80% of people having epilepsy live in countries with low and middle-income (**Megiddo et al., 2016**).

Epilepsy represents 0.6% of the global burden of disease, a timed-based measure that combine years of life lost because of premature mortality and the duration of time lived