International Journal of Advanced Research in Biological Sciences
ISSN: 2348-8069
www.ijarbs.com
DOI: 10.22192/ijarbs Coden: IJARQG(USA) Volume 5, Issue 12 - 2018

Research Article

DOI: http://dx.doi.org/10.22192/ijarbs.2018.05.12.009

The prevalence of pneumonia in Iranian children presenting with febrile convulsion: A systematic review and meta-analysis

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Abstract

Objective :
The aim of this study was to evaluate The prevalence of pneumonia in Iranian children presenting with febrile convulsion.
Methods:
The present systematic investigation applies developed methods that are consistent with the accurate instructions in the PRISMA check list.Observational studies, including posting to editors, publications, poor quality articles (based on the Hoy's tool) and studies on adult subjects were only excluded from the study. Only articles in English and Persian are included.
Results:
These 4 studies were conducted on 653 Iranian children presenting with febrile convulsion. Out of the 4 studies, 3 provided cross-sectional data and the next research was a prospective study . Out of the 4 studies, one was from zahedan province, two from Ardabil and Babol, and one from Birjand province. The prevalence pneumonia in Iranian children presenting with febrile convulsion was 18.1(95% CI: 15.4 , 20.8; $I^2 = 98$).
Discussion:
Although seizure is, in most cases, a benign disorder, the frequency of seizures requiring special treatment, diagnosis and planning is so high that a complete history, careful examination, and para-clinical assessment is performed for each child.

Keywords: pneumonia , respiratory infection , febrile convulsion , FC , prevalence

Introduction

Pneumonia is the inflammation of lung parenchyma tissue(1,2). Acute lower respiratory infections, and in particular pneumonia, account for about 20% of child mortality. Signs and symptoms of pneumonia vary according to the type of pathogen, age, and severity of the disease; thus, symptoms may be nonspecific and with few clinical findings in case of small infants(3,4). Febrile convulsion (FC) is the most common abdominal disorder in children and occurs in 3-4% of children, reaching 15% in some areas. FC is a type of seizure that occurs with sudden body temperature rise of more than 37.8 in children under six years of age, provided that there are no cases of central nervous system infection, acute metabolic disorders, and a history of febrile seizure or newborn seizures(5). Seizures are divided into simple and complex types, with the complex category consisting of cases where the seizure is localized (focal), lasts for more than 10-15 minutes, or is repeated within 24 hours. Fever is due to upper and lower respiratory tract infections, gastroenteritis, and urinary tract infections and other viral infections (rubella, measles, and rosoliainfantum), followed by vaccination, infectious abscesses, and other cases.30-50% of children with FC

experience relapses. Failure to know the exact nature of the disease causes anxiety and abnormal behavior on the part of parents, especially the mothers; some parents might actually fear the death of the child with a seizure attack; this will make them unequipped in case of the recurrence of such attacks(6-8). The aim of this study was to evaluate The prevalence of pneumonia in Iranian children presenting with febrile convulsion.

Materials and Methods

The present systematic investigation applies developed methods that are consistent with the accurate instructions in the PRISMA check list.

Inclusion and exclusion criteria

Observational studies, including posting to editors, publications, poor quality articles (based on the Hoy's tool) and studies on adult subjects were only excluded from the study. Only articles in English and Persian are included.

Sampling methods and sample size

All observational studies with any sampling and statistical surveys were included in the present systematic study.

Research strategy

Two separate researchers conducted studies until November 2018 at international (PubMed, Google Scholar, and WOS) and national (SID and Magiran) databases in English and Persian, without any time limit. We examined a list of available articles sources for further related article searches. Specific research strategies have been developed using the MESH vocabulary explorer and free vocabularies, according to the PRESS standard, by a Health scientist librarian specializing in research on systematic review. We used the MEDLINE research strategy to investigate other databases. The key words used in the research strategy included: pneumonia , respiratory infection , febrile convulsion , FC , prevalence , frequency and Iran, which were combined with Boolean agents such as AND, OR, NOT.

Selection of research and data extraction:

Two separate researchers examined the titles and abstracts by considering qualifying criteria. After removing the repetitive research, the full text of the research was examined depending on the qualifying criteria and the required data was extracted.

To answer questions regarding qualifications, additional research information was obtained from the authors in case it is required. The general information (first author, province, and year of publication), research characteristics (sampling method, research design, location, sample size and bias risk), and the measurement of results (prevalence of pneumnia) were also collected.

Quality assessment and abstraction:

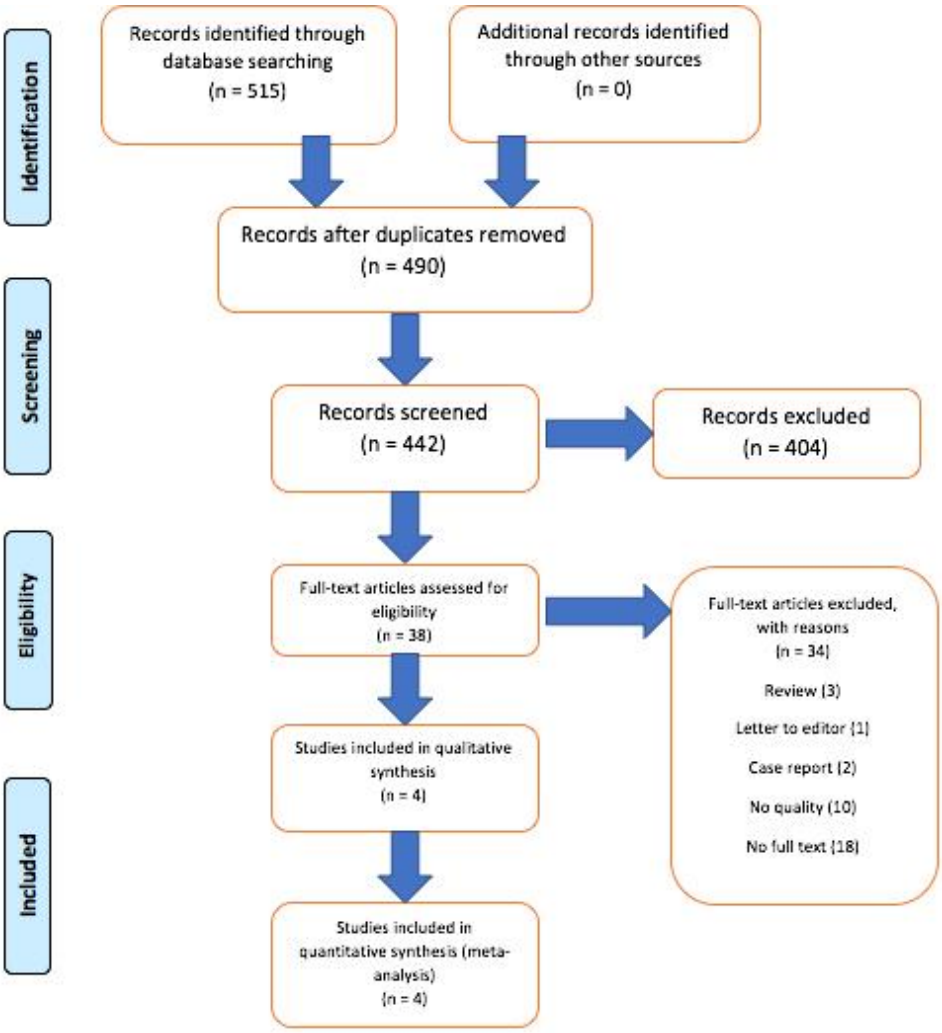
Hoy's et al. tool was used to assess the methodological quality and the risk of getting away from the truth (bias) for each one of the observational studies. This tool evaluates 10 items for assessing the quality of studies in two dimensions such as foreign (items 1-4, target population, sampling frame, sampling method and the minimum deviation from response) and domestic credits (the issues 5-9 of the data collection method, case definition, research tool, data collection mode were assessed while the issue 10 of the bias evaluation was related to data analysis). The higher index indicated that the bias is likely to reduce and the lower index indicated the risk of more bias. The separate bias risk was investigated by two researchers. Consensus was used to solve the disagreements.

Data combination:

The final data extracted using the STAT 14.0 statistical software, including studies combined with stock diagram and the prevalence of pneumonia, were assessed with random effect of the model.

Results

Selection of research: A total of 515 primary studies were reviewed from PubMed, Google scholar, SID, Magiran, and Web of Science from the beginning to November 1, 2018. Out of the 442 non-repetitive studies in the title and abstract of the screening process, 404 were excluded since their titles were unrelated. Out of the 38 studies, 4 had qualifying criteria. Out of 34 removed cases, six were reviewed, five were letter to the editor, , five studies did not have a complete text, and 13 did not meet the minimum quality requirements for inclusion in the article [Figure 1].



Research characteristics

These 4 studies were conducted on 653 Iranian children presenting with febrile convulsion. Out of the 4 studies, 3 provided cross-sectional data and the next research was a prospective study . Out of the 4 studies, one was from zahedan province, two from Ardabil and Babol, and one from Birjandprovince . The most commonly used sampling method was convenience (easiness), (n = 4).The most common place to conduct the studies was in the hospital (n = 4).The prevalence of pneumonia in Iranian children presenting with febrile convulsion was 18/1 % (CI 95%:15.4-20.8)(Table 1).

Table 1. Studies included in the systematic review (N=4)

First Author	year	Provence	Sample size	Female/male	Risk of bias
Khazaei[13]	2007	Zahedan	178	0.74	low
Shirvani[14]	2000	Babol	230	----	Moderate
Mohammadi[15]	2011	Ardabil	100	0.58	Moderate
Namakin[16]	2010	Birjand	145	0.70	low

The prevalence of pneumonia in Iranian children presenting with febrile convulsion :

4 studies conducted on 653 children , were included in this meta-analysis. The prevalence pneumonia in Iranian children presenting with febrile convulsion was 18.1(95% CI: 15.4 ,20.8; $I^2 = 98$) [Table 2].

Table 2 : prevalence of pneumonia in Iranian children presenting with febrile convulsion

ID	First Author	Year	Province	ES	95% CI for ES		% Wight
					Low	Up	
1	Khazaei	2007	Zahedan	0.12	0.073	0.167	32.97
2	Shirvani	2000	Babol	0.087	0.048	0.126	47.48
3	Mohammadi	2011	Ardabil	0.60	0.506	0.694	8.24
4	Namakin	2010	Birjand	0.45	0.37	0.530	11.30
Sub-total Random pooled ES	-------	-----		0.181	0.154	0.208	100

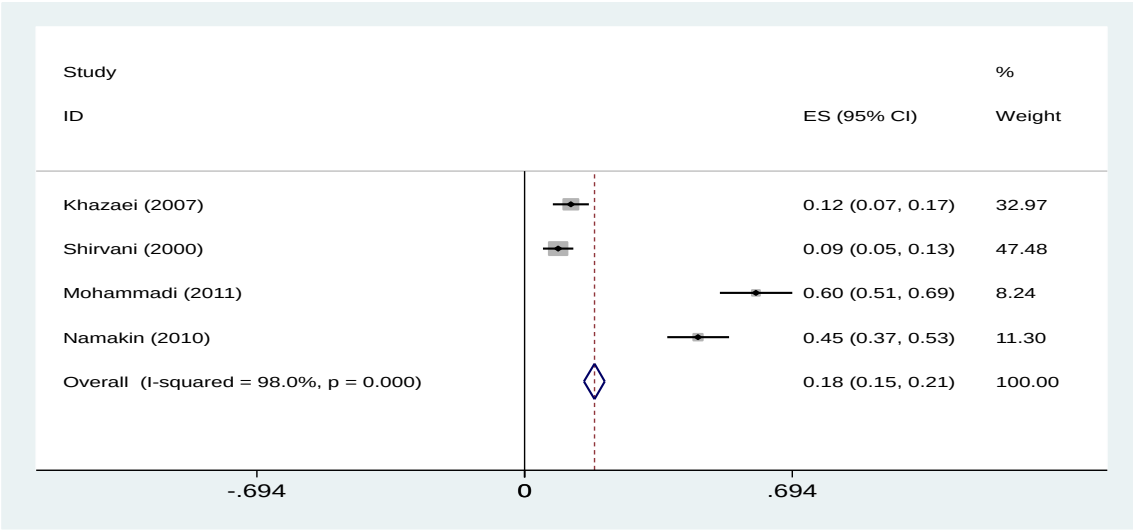


Fig. 2 :The prevalence of pneumonia in Iranian children presenting with febrile convulsionand its 95% interval for the studied cases according to the year and the city where the study was conducted based on the model of the random effects model. The midpoint of each section of the line estimates the% value and the length of the lines showing the 95% confidence interval in each study. The oval sign shows Prevalence of pneumonia in Iranian children presenting with febrile convulsionfor all studies.

Discussion

The prevalence of pneumonia in Iranian children presenting with febrile convulsion was18.1(95% CI: 15.4 , 20.8; I^2 = 98) .Although seizure is, in most cases, a benign disorder, the frequency of seizures requiring special treatment, diagnosis and planning is so high that a complete history, careful examination, and para-clinical assessment is performed for each child, because diagnostic evaluation affects treatment decisions, family counseling, and the need for admission and follow-up of these patients(9). The provision of accurate evidence of attacks over time helps identify the causes of the escalation of attacks, enabling the nurses to help with the frequency of attacks, reduce them, prevent them, or, at least, control complications(10).

Family support and education is important when a seizure attack occurs, because seizure is a dangerous and horrific event for them; family members fear the risk of shock, death or brain injury, learning disability, or chronic seizure disorder(11).

Given the anxiety, fear, and worry dominating family members in case of seizure and related complications, as well as taking into account the side effects of the drug sometimes used to prevent it, and that febrile convulsion may be triggered by persistent seizure in 25% of cases, which can, in turn, have several acute

and prolonged complications in the nervous system such as speech disorders, mental retardation, cerebral palsy, and epilepsy impose extra costs , causing social and economic consequences on the family and society(12).

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Quick Response Code	Subject: Medical Sciences
DOI:10.22192/ijarbs.2018.05.12.009	

How to cite this article:
Mehran Hesaraki , Mohammad Hasan Mohammadi. (2018). The prevalence of pneumonia in Iranian children presenting with febrile convulsion: A systematic review and meta-analysis. Int. J. Adv. Res. Biol. Sci. 5(12): 70-74.
DOI: http://dx.doi.org/10.22192/ijarbs.2018.05.12.009