

ASSESSMENT OF PHYSICIANS' KNOWLEDGE AND ATTITUDES IN THE MANAGEMENT OF CASES OF FEVER WITH SEIZURES IN EL BEHAIRA GOVERNORATE

By

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ABSTRACT

Background: Cases of fever associated with seizures are among the most common cases seen in pediatric age group. Various differential diagnoses must be put in mind while dealing with these cases. All physicians who commonly meet cases of fever with seizures should be aware of suitable management including proper history taking, close assessment and rapid systematic resuscitation till final diagnosis could be reached.

Objectives: To assess the knowledge and attitudes of physicians in different specialties who are involved in care of children regarding cases of fever and seizures.

Methods: We assessed knowledge and attitudes of physicians - working in different specialties in El Behaira governorate - in the management of patients of fever with seizures using a questionnaire-based cross sectional study conducted from February-August 2021.

Results: In this study, of the 380 physicians who responded to the questionnaire, (27.1%) were males and (72.9%) were females, (16%) were consultants, (58.4%) were specialists, (20.3%) were resident and (5.3%) were general practitioners. Regarding specialty, the majority were general pediatricians. Our study showed that the consultants were more aware of general knowledge about cases of fever associated with seizures in comparison to other groups of physicians. There was no statistical difference between pediatric neurologists and general pediatricians, however general pediatricians and pediatric neurologists were much more aware of these cases and showed better attitude of management than adult neurologists.

Conclusion: The study highlighted the wide variation in knowledge and attitudes of physicians in different specialties with different levels of experience toward the

management of cases of fever with seizures. The use of clinical practice guidelines will help to minimize this diversity.

Keywords: *Fever with seizures, febrile seizures, lumbar puncture, electroencephalogram, neuroimaging, antiepileptic drugs.*

INTRODUCTION

Cases of fever associated with seizures are commonly seen in pediatric age group with numerous differential diagnoses could be such as febrile seizures, CNS infection, epilepsy and brain trauma, however febrile seizures come as the most common cause of seizures accompanying fever. Febrile seizure is a seizure occurring in a febrile child between the ages of 6-60 months, with no evidence of intracranial infection, metabolic disturbance, or history of afebrile seizures. Febrile seizures affect approximately 2-5% of children, with an overall estimated incidence of 460/100,000 children. (Leung AK et al., 2018).

Febrile infection-related (or refractory) epilepsy (FIRES) is a very different disorder seen predominantly in older (>5 yr.) usually male children and associated with an encephalitis-like illness but without an identifiable infectious agent. Children with FIRES were previously normal but subsequently develop difficult-to-treat epilepsy (Seinfeld SA et al., 2016).

Between 2% and 5% of neurologically healthy infants and children experience at least one, usually simple, febrile seizure. Simple febrile seizures do not have an increased risk of mortality even though they are concerning to the parents. Complex febrile seizures may have an approximately 2-fold long-term increase in mortality rates, as compared with the general population, over the subsequent 2 yr., probably secondary to a coexisting pathology. There are no long-term adverse effects of having one or more simple febrile seizures. Compared with age-matched controls, patients with febrile seizures do not have any increase in the incidence of abnormalities of behavior, scholastic performance, neurocognitive function, or attention. Children who develop later epilepsy, however, might experience such difficulties. Febrile seizures recur in approximately 30% of those experiencing a first episode, in 50% after two or more episodes, and in 50% of infants younger than 1 yr. of age at febrile seizure onset. Several factors affect the

recurrence risk .Although approximately 15% of children with epilepsy have had febrile seizures, only 5% (range 1–33%, dependent on risk factors) of children who experience febrile seizures proceed to develop epilepsy later in life. There are several predictors of epilepsy after febrile seizures (Leung AK et al., 2018).

There was a wide variation in management of cases of fever associated with seizures among physicians (Natsume J et al., 2017).

Ethical considerations:

1. Written consent was obtained from participating physicians.
2. Approval of ethical committee, Faculty of Medicine Al-Azhar University.
3. The participating physicians have the right to withdraw from the study at any time.
4. All the obtained data are confidential, and the physicians have the right to keep them.
5. The authors declare that there is no any financial support regarding the research and publication.
6. No conflict of interest regarding the study and publication.

Sampling and sample size:

Using a snowballing sample method and the sample size was calculated by Raosoft sample size calculator (<http://www.raosoft.com/samplesize.html>). Based on 95% confidence level, 5% margin of error, and anticipated response of 50%, the minimum sample size required was 377. We were able to collect 380 completed questionnaires.

SUBJECT AND METHODS

The scope of the present study is concerned with doctor's knowledge and attitude towards management of children with fever and seizures in Behaira Governorate, Egypt.

Study design:

This study is a cross-sectional study included graduated physicians, dealing with pediatric age group, working at governmental and private health sectors, within Behaira Governorate, regardless age and gender, who were social media users and agreed to take part in this survey during the period from February-August 2021.

A self-administered web-based questionnaire using a Google form was developed for wider and rapid distribution and to avoid any social contact, while curfew and

social distancing measures for COVID-19 were implemented (APPENDIX).

Target population and inclusion criteria:

This study included graduated physicians, dealing with pediatric age group, working at governmental and private health sectors, within Behaira Governorate, - including Kom Hamada, Etay El Baroud, Delengat, Edku, Rashid, Hosh Eisa, Abou hommos, Kafr Al Dawar, Shubrakheet, El Mahmoudya. El Rahmany. Abo Elmatamir, Wadi Alnatroun general hospitals, Pediatrics specialized Behaira hospital, Dar Altefl, El Moasah and Dar AL shifaa private hospitals- regardless age and gender, who agreed to take part in this survey.

Exclusion criteria:

Physicians not dealing with pediatric age group.

The questionnaire was divided into 3 parts:

- The 1st part focused on general, qualification and occupational characteristics of the participants including age, gender, specialty, years in practice, scientific degree, current position, place of work, and level of care.
- The 2nd part measured the doctors' level of knowledge about fever with seizures. It included 6 items with "yes/no", "true/false" options and "multiple-choice" questions. They were asked whether they were aware of any guideline for management of febrile seizures, temperature needed for febrile seizures to occur, age of occurrence of febrile seizures, febrile seizures as the most common convulsive events in children younger than 6 years, the most important feature of complex type febrile seizures, possible development of epilepsy in children with simple febrile seizures.
- For each item, the correct answer was given (1 point) and wrong answer was given (0 point) with overall score of 6 that graded to good knowledge (score 5 – 6), fair (score 4) or poor (score 0 – 3).
- The 3rd part determined their attitude towards fever with seizures. It included 7 items that were measured by 5-point Likert scale of agreement (strongly agree, agree, neutral, disagree, or strongly disagree). They were asked about, their attitude towards serum electrolytes and random blood glucose as initial routine

investigations if febrile seizures are suspected, the minimum age to perform lumbar puncture in infant presents with febrile seizures without signs of meningeal irritation, EEG - as a routine investigation - to evaluate a child with a febrile seizure, neuroimaging for routine evaluation of any child with febrile seizure, continuous use of anti-epileptic drugs to prevent recurrence of febrile seizures, use of anti-epileptic drugs only during febrile illness to prevent febrile seizures, and regular use of antipyretic drugs to prevent recurrence of febrile seizures.

- For each item, a score of 2 was given for “agree/strongly agree” to a positive attitude question or “disagree/strongly disagree” to a negative attitude

question, a score of 1 was given for “neutral”, and a zero score was given for “disagree/strongly disagree” to a positive attitude question or “agree/strongly agree” to a negative attitude question. . Consequently, the overall attitude score was 14 that graded to good/favorable attitude (score 11 – 14), fair/undecided (score 8 – 10) or poor/unfavorable attitude (score 0 – 7).

- Both knowledge and attitude scores were approximately graded as good (based on > 75% of the summed scores), fair (50-75%) or poor (if < 50%).

Verified, assuming a significant level of $p < 0.05$ and a highly significant level of $p < 0.001$.

RESULTS

Our results will be demonstrated in the following tables:

Table (1): Distribution of Characteristics of Study Physicians

	Variables	n=380 (%)
Age (years)	Mean \pm SD	34.77 \pm 9.13
	Min – Max	25 – 67
Gender	Male	103 (27.1)
	Female	277 (72.9)
Specialty	General pediatrics	202 (53.1)
	Family medicine	132 (34.7)
	Emergency physician	22 (5.8)
	Adult neurology	21 (5.5)
	Pediatric neurology	3(.7)
Years in practice	Less than 10 ys	265 (69.7)
	10 – 20 ys	73 (19.2)
	More than 20 ys	42 (11.1)
Scientific degree	Egyptian fellowship	107 (28.2)
	M.B.B.ch	97 (25.5)
	Master	88 (23.5)
	Medical diploma	54 (14.2)
	M.D	22 (5.8)
	Master plus fellowship	7 (1.8)
Place of work	MRCPCH	5 (1.3)
	Pediatric department in hospital	283 (74.3)
	Primary health care unit	50 (13.5)
	Emergency room in hospital	19 (5)
	Neurology department in hospital	18 (4.6)
Are you dealing with cases of fever with seizures?	Private hospital	10 (2.6)
	Yes	351 (92.3)
	No	29 (7.6)

Out of 524 physicians who received the questionnaires, 380 responded, with response rate of 72.5 % with mean age 34.77 years, ranged from 25 to 67 years. About 72.9% were females and 27.1% were males. Regarding the specialty, more than half of participants (53.1%) were general pediatrics, about

one third (34.7%) were family physicians, (5.8%) were emergency physician and (5.5%) were adult neurologists, while those specialized in pediatric neurology were only .7%. About 92.3% of participants deal with cases of fever with seizures and the remaining 7.6% didn't face these cases before.

Table (2): Physicians Knowledge about Fever with Seizures

Variable	n=380 (%)	
Are you aware of any guidelines for management of cases of fever with seizures	Yes	316 (83.2)
	No	64 (16.8)
Febrile seizures, in order to occur, temperature should be above 39.5 °C?	True	148 (38.9)
	False *	232 (61.1)
Febrile seizures occur between ages of ...?	1 – 2 years	46 (12.1)
	3 – 30 months	30 (7.9)
	5 – 7 years	24 (6.3)
	6 – 60 months*	280 (73.7)
Febrile seizures are the most common convulsive events in children younger than 6 years of age?	True *	342 (90.0)
	False	38 (10.0)
The most important feature of complex type of febrile seizures is?	Recurring within 24 hours	146 (38.4)
	Focal *	89 (23.4)
	Lasting more than 15 minutes	145 (38.2)
Children with simple febrile seizures usually develop epilepsy later on?	True	83 (21.8)
	False *	297 (78.2)
Overall knowledge score	Mean ± SD	4.09 ± 1.25
	Min – Max	1 – 6
	Good	164 (43.2)
	Fair	106 (27.9)
	Poor	110 (28.9)

*: correct answer

This table showed that about 83.2% of participants were aware of guidelines for management of cases of fever and seizures. The overall mean knowledge score

was 4.09 ± 1.25 out of 6. About 43.2% of participants had good knowledge, 27.9% had fair knowledge, while 28.9% had poor knowledge.

Table (3): Physicians Attitude towards Management of Fever with Seizures

Variable		n=380 (%)
Even if you suspect a case of febrile seizures, serum electrolytes and random blood glucose must be routinely performed initially?	Strongly agree *	82 (21.6)
	Agree *	149 (39.2)
	Neutral	55 (14.5)
	Disagree	81 (21.3)
	Strongly disagree	13 (3.4)
Lumbar puncture should be performed in any child younger than who presents with a seizure associated with fever without signs of meningeal irritation.	3 months	77 (20.3)
	6 months *	178 (46.8)
	18 months	84 (22.1)
	6 years	41 (10.8)
An EEG is routinely asked for in the evaluation of a child with a febrile seizure?	Strongly agree	17 (4.5)
	Agree	44 (11.6)
	Neutral	34 (8.9)
	Disagree *	213 (56.1)
	Strongly disagree*	72 (18.9)
Neuroimaging should be performed in the routine evaluation of any child with febrile seizure?	Strongly agree	11 (2.9)
	Agree	50 (13.2)
	Neutral	38 (10.0)
	Disagree *	205 (53.9)
	Strongly disagree *	76 (20.0)
Continuous use of anti-epileptic drugs is recommended for prevention of recurrence of febrile seizures?	Strongly agree	10 (2.6)
	Agree	10 (2.6)
	Neutral	17 (4.5)
	Disagree *	169 (44.5)
	Strongly disagree *	174 (45.8)
Use of anti-epileptic drugs only during febrile illness will prevent febrile seizures	Strongly agree	10 (2.6)
	Agree	36 (9.5)
	Neutral	40 (10.5)
	Disagree *	205 (53.9)
	Strongly disagree *	89(23.4)
Regular use of antipyretic drugs will prevent febrile seizures?	Strongly agree	3 (0.8)
	Agree	19 (5.0)
	Neutral	139 (36.6)
	Disagree *	39 (10.3)
	Strongly disagree *	180 (47.4)
Overall attitude score	Mean ± SD	10.69 ± 2.33
	Min – Max	1 – 14
	Good/Favorable	224 (58.9)
	Fair/Undecided	125 (32.9)
	Poor/Unfavorable	31 (8.2)

*: Good/Favorable Attitude

This table showed that overall means attitude score was 10.69 ± 2.33 out of 14. About 58.9% of participants had good/favorable

attitude towards fever with seizures, 32.9% had fair/undecided attitude, while 8.2% had poor/unfavorable attitude.

Table (4): Relation between Occupational Characteristics of Participants and Both Knowledge and Attitude Scores

Variables		Knowledge score (Max.=6)	Attitude score (Max.=14)
Specialty	General pediatrics	4.47 ± 1.08	11.28 ± 2.24
	Pediatric neurology	6.00 ± 0.00	10.57 ± 2.44
	Family medicine	3.63 ± 1.29	10.00 ± 2.35
	Emergency physician	3.27 ± 1.08	10.45 ± 1.60
	Adult neurology	3.71 ± 1.10	9.76 ± 2.30
	P-value	<0.001*	<0.001*
Current position	Consultant	4.29 ± 1.38	10.97 ± 2.10
	Specialist	4.13 ± 1.17	10.36 ± 2.75
	Resident	4.21 ± 1.25	11.34 ± 1.86
	GP	3.56 ± 1.27	9.67 ± 1.81
	P-value	0.006*	<0.001 *
Scientific degreee	M.B.B.ch	3.98 ± 1.27	10.71 ± 1.72
	Master	4.35 ± 1.19	11.39 ± 2.47
	M.D	4.59 ± 1.59	10.82 ± 2.38
	Egyptian fellowship	4.00 ± 1.24	10.71 ± 2.18
	Medical diploma	3.87 ± 1.21	9.78 ± 2.81
	MRCPCH	4.40 ± 0.55	9.20 ± 4.38
	Master plus fellowship	3.86 ± 0.90	9.00 ± 1.00
	P-value	0.091	0.001*

This table showed that highest knowledge scores were obtained by those currently work as consultant, pediatric neurologists, those with MD as a scientific degree and those working in secondary level of care.

Regarding attitude score, interestingly, those currently

work as resident had highest scores in comparison with physicians with other positions. General pediatricians, those work in secondary level of care and those carting Master degree had significantly higher attitude score.

Table (5): Correlation between both Knowledge and Attitude Scores

Variable	Attitude score	
Knowledge score	R	0.23
	P-value	<0.001 *

R: Person Correlation Coefficient.

*: Significant

There is a significant positive correlation between knowledge and attitude scores (i.e., the

increase in knowledge score is significantly associated with increase in attitude score).

DISCUSSION

Cases of fever associated with seizures are commonly seen in pediatric age group with febrile seizures come as the most common cause of seizures accompanying fever. Febrile seizure is a seizure occurring in a febrile child between the ages of 6-60 months, with no evidence of intracranial infection, metabolic disturbance, or history of afebrile seizures. Febrile seizures affect approximately 2-5% of children, with an overall estimated incidence of 460/100,000 children. (Leung AK et al., 2018).

There was a wide variation in management of cases of fever associated with seizures among physicians (Sales JW. et al., 2011).

However, there was an insufficient data in the literature regarding this point except for only two studies. First one was by Chessare JB and Berwick DM in

1985 in US and the other one was carried out in Saudi Arabia in 2018 by **Fahad A. Bashiri et al.** Both studies were focusing mainly on physicians' knowledge and attitude towards management of febrile seizures while our study was implemented to assess knowledge and management attitude towards cases with fever with seizures in general including febrile seizures. In our study, we explored the diversity in the knowledge about the incidence, definition and attitude towards management of cases of fever with seizures.

The study showed that those currently work as consultant have the best knowledge and management attitude about fever with seizures cases, while interestingly, residents showed higher scores than specialists. This comes against **Fahad A. Bashiri et al., 2018** and **Chessare JB and Berwick DM 1985** whose study results showed that specialists'

scores were higher than residents. Corresponding to specialty, pediatric neurologists have significantly higher knowledge and management attitude scores in comparison to other specialties involved in the study, followed by general pediatricians. Adult neurologists' scores were not significantly higher than emergency physicians and general practitioners, showing parallel results with **Fahad A. Bashiri et al., 2018**.

There was great diversity regarding the minimum age necessitating doing LP in child who presents with seizures associated with fever without signs of meningeal irritation. Our study reflects this diversity; about 46.8% of participants chose the age of 6 months as the minimum age at which lumbar puncture should be performed in child presents with fever with seizures without signs of meningeal irritation, while 20.3% thought that LP should be done below age of 3 months, 22.1% had the choice of 12 months as a minimum age. Only 10.8% would do LP below 6 years of age. This is quite different from **Fahad A. Bashiri et al., 2018** who formulated that question to be a leading question as: Lumbar puncture should be performed in any infant younger than 12 months, who presents with

a seizure and fever, without meningeal signs? In that study results more than 60% of participants agreed with performing LP below 12 months in case of fever with seizures with 70% of consultants, 66% of specialists and 57% of residents chose that answer. There is no evidence to support routine LP in well-appearing, immunized children above 6 months of age (**Michelson K.A et al., 2017**).

Regarding neuroimaging, a significant number of participating physicians (73.9%) strongly disagree/disagree with ordering brain imaging routinely in cases with febrile seizures. There is no evidence to support routine neuroimages for patients with febrile seizures (**Wilmshurst JM et al., 2015**).

Our results matches with **Fahad A. Bashiri et al., 2018** that found about 80% of participants not recommending neuroimaging routinely in all children presenting with febrile seizures, while in contrast, **Chessare JB and Berwick DM 1985** results showed that majority of clinicians tend to order Brain CT in any child with fever and seizures.

For recommending EEG, it was showed that around 75% of participants believe that it is unnecessary to ask for EEG, as a

routine investigation, to evaluate a child with fever with seizures. When compared to similar studies, **Fahad A. Bashiri et al., 2018** and **Chessare JB and Berwick DM 1985** had similar results with 70% and 66% - respectively - of participating physicians also not deciding to perform EEG for routine evaluation of children with febrile seizures.

Asking for EEG is only restricted when epilepsy is highly predicted and there is no recommendation to order EEG routinely when dealing with any case of fever with seizures (**Mikati and Hani, 2016**).

Using anti-epileptic drugs only during febrile illness to prevent febrile seizures has no evidence based medicine support (**Offringa M et al., 2021**). The study showed that around 12.1% of participants agreed/strongly agreed on using anti-epileptic drugs only during febrile illness to prevent febrile seizures while 77.3% were against their use. Nearly similar results were obtained by **Fahad A. Bashiri et al., 2018** with 80% of physicians had the negative attitude of using anti epileptics during febrile illness, but when comparing to **Chessare JB and Berwick DM 1985**, we found that more than 44% of doctors thought it's better to use antiepileptic drugs during periods of fever.

Still there is no evidence supporting regular use of antipyretic drugs to prevent recurrence of febrile seizures (**Murata S et al., 2018**). Study results showed significant diversity between physicians regarding this practice. It showed that about 57.7% of participants were against the regular use of antipyretic drugs to prevent recurrence of febrile seizures, 36.6% were neutral and only 5.8% tend to recommend antipyretics use. Both **Fahad A. Bashiri et al., 2018** and **Chessare JB and Berwick DM 1985** pointed to this diversity. **Fahad A. Bashiri et al., 2018** found that 61% of physicians thought that no role for regular use of antipyretic drugs to prevent recurrence of febrile seizures and about 22% of them preferred to use antipyretics regularly. **Chessare JB and Berwick DM 1985** met variations between physicians regarding that point with 40% of responding doctors recommended regular antipyretics use to prevent FS and about 38% were against that practice.

CONCLUSION

In conclusion, our study highlighted the wide variation in knowledge and attitudes among physicians in different specialties with different levels of experience in the management of FS. Although many physicians have

the adequate basic knowledge, a significant number need more education. The use of clinical practice guidelines will minimize this diversity.

RECOMMENDATIONS

Although many physicians have the adequate basic knowledge, a significant number need more continuous medical education. The use of unified clinical practice guidelines will minimize this diversity.

STUDY LIMITATIONS

The study has some limitations. It's difficult to make causal inferences with the cross sectional design.

The snowball method is a non-random sampling method and thus not representative. The use of web-based survey may lead to selection bias. The self-reported information may not be entirely accurate (recall bias) and should be viewed with caution (social desirability bias). compliance with protective measures may diminish, so results should be taken with caution. Finally we tried to include larger numbers of physicians to participate in questionnaire but this couldn't be accomplished plus response rate was only 72.5% of targeted subjects.

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APPENDIX

Direct link to the web - based questionnaire used in the study:

<https://docs.google.com/forms/d/1Q72tatw2HfOnDpdJoitwM1hoo4BNeFnOgATx7mRTBRC/edit?chromeless=1&fbclid=IwAR1bujPI1-HvMrkTqTBYSMezGfbV8R8GnUe7kledneiZHT5MyWE7RwHjQKc>