

Knowledge and Attitudes of Mothers Regarding Febrile Convulsions among Children under Five – Years at Assiut City

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Abstract

Background: Febrile convulsions are the most prevalent convulsive disorder among children. These conditions, which commonly cause parental distress and fear, are benign neurological disorders in children under five and can significantly reduce the quality of care provided. **Aim:** to assess mothers' knowledge and attitudes regarding febrile convulsions among children under five years. **Subject and Methods:** A descriptive research design was applied on (1010) mothers in three maternal and child health centers at Assiut City. **Tools:** Data were collected by structured interview questionnaire, which consisted of four parts: **Part 1:** Personal data. **Part 2:** Family experience with febrile convulsions. **Part 3:** Mothers' knowledge regarding febrile convulsion episodes. **Part 4:** Mothers' attitudes toward febrile convulsions. **Results:** the present study revealed that a significant proportion of mothers, 65.2%, exhibited a poor level of knowledge about febrile convulsions, while only 12.3% demonstrated good knowledge. Furthermore, the study findings indicated a positive attitude towards febrile convulsions among 61.3% of the mothers, whereas 38.7% held negative attitudes. There was a highly statistical significance difference between total scores of mothers' knowledge and their age, education, occupation, residence and attending previous training program. Mothers' attitudes varied significantly based on their occupation and residence & having a child with febrile convulsions. **Conclusion:** Existence of poor level of knowledge regarding febrile convulsions. Mothers' attitudes were not influenced by their educational level. **Recommendations:** Educational campaigns and health promotion programs targeted women to increase regarding febrile convulsions.

Keywords: Attitudes, Convulsions, Febrile, Knowledge & Mothers

Introduction

Febrile convulsions represent the highest incidence of neurological disorders in the pediatric population, characterized by convulsions associated with a fever above 38°C and no evidence of intracranial infection (Skotte et al., 2022). Febrile convulsions are a complex interplay of genetic, environmental, and immunological factors. They arise from increased susceptibility of the immature central nervous system to fever, particularly in response to viral infections, bacterial infections, or immunizations, such as the MMR vaccine. Roseola infantum is a common viral infection associated with febrile seizures (Millichap et al., 2021, Casabona et al., 2023 & Soti Khiabani et al., 2023).

There are many risk factors have been associated with febrile convulsions, including male gender, a positive family history, prenatal and perinatal complications, electrolyte imbalances (such as hypocalcemia, hyponatremia, and hypoglycemia), microcytic hypochromic anemia, and deficiencies in zinc and iron. Additionally, certain medications may increase susceptibility (Chockalingam, 2020). Additional risk factors include prolonged neonatal intensive care unit (NICU) stays exceeding 30 days, developmental

delays, and attendance at daycare centers (El-Esrigy et al., 2021).

Febrile convulsions can be categorized into simple and complex types based on seizure duration, clinical features, and recurrence patterns. Simple febrile convulsions, the most common type, typically present with generalized tonic-clonic convulsions the duration of convulsions less than 15 minutes and a single occurrence within a 24-hour period. Loss of consciousness is a consistent feature, often accompanied by additional symptoms such as excessive salivation, respiratory difficulties, pallor, or cyanosis (El Sayed et al., 2022).

Complex febrile convulsions are characterized by focal onset, prolonged duration (>15 minutes), frequent recurrences within 24 hours, and a fever exceeding 38°C. Additional clinical features may include respiratory distress, cyanosis, excessive salivation, ocular deviation, generalized or focal clonic movements, and altered mental status (irritability, confusion, or drowsiness) in the postictal period (Boshra et al., 2021).

The diagnosis of febrile seizures is primarily a clinical one, relying heavily on a detailed medical history and a thorough physical examination.

Laboratory investigations, such as a complete blood count, serum glucose, electrolytes, creatinine, and blood urea nitrogen, may be considered in specific circumstances, particularly in children with signs of systemic illness or significant dehydration. A urinalysis may be helpful in cases of unexplained fever, with urine culture recommended for abnormal urinalysis results (Mohamed et al., 2023).

Children who have experienced simple febrile convulsions may experience a range of potential complications, including accidental injuries, respiratory complications (aspiration pneumonia), adverse drug reactions, cognitive impairment, epilepsy, recurrent febrile seizures, and, in rare instances, death (El Sayed et al., 2022).

In developed countries, a significant proportion of children, up to 60%, have a history of febrile illness before the age of five (Verma & Minu, 2021). Globally, approximately 20-30% of febrile children are admitted to emergency departments. Recurrence rates are estimated to be around 30%. The peak incidence occurs between 12 and 18 months among children aged 6 months to 5 years. Certain ethnic groups, including Guamanian (14%), Japanese (6-9%), Indian (5-10%), and South Korean (6.92%) populations, exhibit higher incidence rates (El Sayed, 2020).

Community health nurses, in their role as health educators, should equip mothers with accurate and current knowledge regarding etiology, risk factors, and management of febrile convulsions. This information should be delivered through both written and verbal communication channels. Additionally, Nursing interventions should focus on psychological & social needs of both the child and family. Parents should be informed that fever is a symptom, not a disease, and often indicates an underlying infection (El Sayed et al., 2022).

Parental attitudes regarding the long-term health implications of febrile convulsions are prevalent, encompassing fears of recurrence, cognitive impairment, physical disabilities, and mortality. These anxieties can significantly impact parental well-being, leading to sleep disturbances, diminished quality of life, and disruptions in social activities (Koivula, 2023). There are common misconceptions include fears of brain damage, future epilepsy, and death, which contribute to heightened anxiety (Arnav, 2019).

Significance of the study:

Febrile convulsions are a prevalent reason for pediatric emergency department visits among children younger than five years. Those experiencing their initial febrile seizure exhibit a notably elevated mortality risk, with an 80% higher risk in the first

year and a 90% higher risk in the second year after the initial event (Srinivasa et al., 2018). Worldwide, 2.4 million people are thought to have been diagnosed with febrile convulsions (Bhavsar et al., 2024). The prevalence of febrile convulsions among children in Saudi Arabia was 6.8% and significantly more common in females than males (Alhumaidy et al., 2020). In Egypt, febrile seizures are most common in the 18-month age group, with an overall prevalence of 5%. Boys are twice as likely to experience these seizures compared to girls. Moreover, a 2-7% risk of developing epilepsy during adolescence exists among children with a history of febrile convulsions (El Sayed, 2020).

Mothers' knowledge concerning febrile convulsions significantly influences their attitude toward their children's febrile convulsions episodes. Also, misconceptions surrounding fever can foster the use of risky and ineffective treatments, such as alcohol baths or excessive administration of antipyretics (Vicens-Blanes et al., 2021).

Aim of the study: This study aimed to assess mothers' knowledge and attitudes regarding febrile convulsions among children under five years at Assiut City.

Research questions:

1. What is the level of mothers' knowledge regarding febrile convulsions among children under five – years?
2. What are the attitudes of mothers towards febrile convulsions among children under five – years?
3. What is the relation between mothers' knowledge and attitudes towards febrile convulsions among children under five – years?

Subjects and Method

Research design:

Multistage random sample was used in this study.

Setting:

The study was conducted in three Maternal and Child Health Centers located in Assiut City namely:(Alwaledya Health Center, Kedwany Health Center, Ghrab El Balad Health Center).

Subjects:

All mothers who have children under five years who attended the Maternal and Child Health Centers at Assiut City and fulfilling the inclusion criteria was 1010 mothers with their children; all mothers of these children were included in the study.

Inclusion criteria:

1. Mothers having children under five years from both genders.
2. Mothers having children had or not had febrile convulsions.

Sample:

Multistage random sampling technique was implemented to select study participants.

First stage:

Ten Maternal and Child Health Centers in Assiut City were divided into two groups: six in the East and four in the West. Three centers were randomly selected for this study, including two from the East and one from the West.

Second stage:

Total number of mothers who having children under five – years in the previous ten maternal and child health centers were (18320) mothers with EPI Info software, version 3, with a 99% confidence interval. and the poor level of mothers' knowledge regarding febrile convulsions (80%) included the calculation, to compensate for potential participant dropout and refusal, the calculated sample size of 921 mothers was increased by 10% to a final sample size of 1,010 mothers. A proportionate sampling method was used to select the study population from the chosen Maternal and Child Health Centers.

Proportion sample of study

Maternal & Child Health Centers	Number of attended mothers with their children	Sample size	Percent
Alwaledya health center	2103	348	34.4%
Kedwany health center	1960	323	32%
Ghrab el balad health center	2053	339	33.6%
Total	6116	1010	100

Third stage:

After collection of the sample, mothers were selected by using systematic random samples from sick child clinics at the selected maternal and child health centers.

Tools of the study:**Study tools:**

Data were collected using a structured interview questionnaire divided into four parts:

Part (1): Personal data:

Which included eight questions as child age, sex, childbirth order, age of mothers, level of education, occupation, place of residence and number of children.

Part (2) Family experience with febrile convulsions:

Which included seven questions as age of first febrile seizure and the number of febrile seizures experienced in the past three months, duration of convulsions, presence of cyanosis during febrile convulsions, mothers' action during febrile convulsion

episode, previous training program and increasing occurrence of febrile episodes during extreme hot climate.

Part (3): Mothers' knowledge regarding febrile convulsion episodes:

Which included sixteen questions to assess mothers' knowledge regarding febrile convulsion episodes. That consisted of two types of questions Yes or No & don't know questions and multiple-choice questions regarding the definition, cause, risk factors, signs & symptoms, medications, ECG / CT scan, prognosis, complications, and traditional therapy (Mohamed et al., 2022).

Scoring system of knowledge:

The total score for knowledge item was (59) grade. The scoring system for these questions with responses varying from (yes), (no), or (don't know) was scored by giving each participant (1) point for right answer and (0) point for wrong or don't know answer. As regards the multiple-choice questions, the scoring system was scored by giving (2) points for complete correct answer, (1) point for incomplete correct answer, and (0) point for incorrect answer. The scoring was reversed for negative statements. Which were 1, 2, 4, 5 and 6 statements. Each item was summed up and then converted into a percentage score. Was classified into poor level of knowledge (< 60%) of total score, fair knowledge (60 to <75%) of total score and good level of knowledge (75% and more) of total knowledge. (Mohamed et al., 2022).

Part (4): Mothers' attitude toward febrile convulsions:

Likert scale was used to assess mothers' attitude toward febrile convulsions which was adapted by El Sayed et al., 2022. It included (12) questions about mothers' attitude toward febrile convulsions such as (treatment, prognosis, examination and traditional therapy). The responses were based on a three-point Likert scale (agree, uncertain, disagree). The attitude scale contained (12) statements, items were scored (2,1and 0) respectively, the scoring was reversed for negative statements. Which were 3,5,6,7 and 8 statements.

Scoring system for mothers' attitude: The total score for attitude was (24) grade. Each item was summed up and then converted into a percentage score. Mothers' attitude was classified into positive attitude (60% and more) or negative attitude (< 60%) for the studied mothers (Elbilgahy & Abd El Aziz, 2018).

Validity:

The face validity of the tool was assessed by three experts in community health nursing from the Faculty of Nursing, Assiut University. Each expert reviewed the tool's content and structure for clarity,

completeness, and relevance. Based on their feedback, necessary modifications were made to the wording and sequencing of items.

Reliability of the tool:

The reliability of the tool was assessed using Cronbach's alpha, a widely used measure of internal consistency. The calculated alpha coefficients of 0.877 for the knowledge scale and 0.894 for the attitude scale suggest strong reliability.

Method: The study phases:**Administrative phase:**

Before conducting the study, the study was preceded by obtaining official approval from the Dean of the Faculty of Nursing, Assiut University, and the Undersecretary of the Ministry of Health, Assiut Governorate. This approval process involved submitting a formal letter explaining the study's purpose, methodology, and anticipated outcomes.

Pilot study:

To refine the research instrument and estimate the time required for data collection, a pilot study was conducted with a 10% sample (n=101). This pilot study focused on assessing the clarity, comprehensibility, and overall suitability of the questionnaire. The data obtained from the pilot study was analyzed and no necessary changes were done, so the sample of the pilot study was included in the main study.

Data collection:

The data was collected from the first of January to the end of June 2024. Before administering the questionnaire, the researcher introduced herself, explained the study's objectives, and obtained verbal informed consent from each mother. An appropriate place for the interview had been prepared to ensure privacy and full explanation of each item in the structured interview questionnaire. On average, questionnaires were completed within 15-20 minutes, with completion time varying based on individual responses. Data collection occurred over two days (Saturday and Tuesday) each week, because these two days I have full time to collect data from studied mothers, yielding approximately 21-22 completed questionnaires daily. At the conclusion of the interview, the researcher thanked the mothers for their valuable contributions to the study.

Ethical considerations:

Prior to initiating the study, ethical approval was obtained from the Ethical Committee of the Faculty of Nursing, Assiut University (approval no. 1120230729). The study adhered to ethical guidelines, ensuring participant privacy and informed consent. Verbal informed consent was obtained from

all participants, who were informed of their right to withdraw from the study at any time.

Statistical analysis

Data were analyzed using SPSS version 26. Descriptive statistics (frequencies, percentages, means, and standard deviations) were calculated. Chi-square tests were used to compare categorical variables, and Pearson correlation coefficients were used to assess the relationship between continuous variables. Statistical significance was set at the $P < 0.05$ level.

Results:

Table (1): Distribution of studied mothers' and their child according to their personal characteristic data at Assiut City, 2024 (N=1010)

Items	No. (1010)	%
Mothers' age: (years)		
< 20	147	14.6%
20 - < 30	484	47.9%
30 - < 40	287	28.4%
≥ 40	92	9.1%
Mean ± SD	28.27 ± 8.06	
Mothers' occupation:		
Housewife	707	70.0%
Employee	303	30.0%
Child's age:		
Less than one year	276	27.3%
1 - < 3 years	456	45.2%
3 - < 5 years	278	27.5%
Mean ± SD (months)	25.89 ± 15.44	
Child's gender:		
Male	586	58.0%
Female	424	42.0%
Number of siblings:		
Zero	227	22.5%
1 – 2	519	51.4%
3 – 4	171	16.9%
5 or more	93	9.2%
Childbirth order:		
First	227	22.5%
Second	315	31.2%
Third or another	468	46.3%
Residence:		
Rural	612	60.6%
Urban	398	39.4%

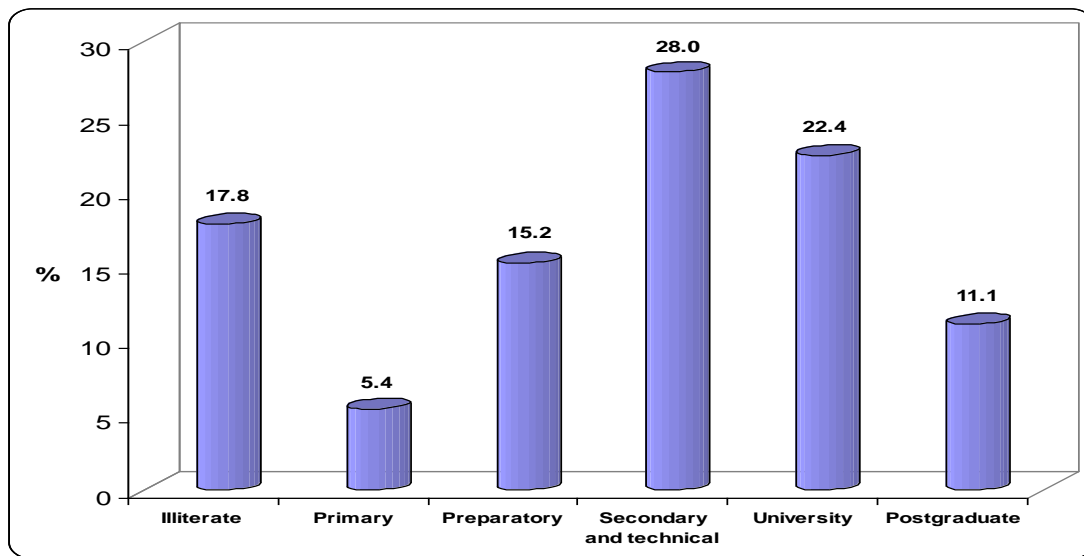


Figure (1): Distribution of the studied mothers according to their educational level.

Table (2): Distribution of the studied mothers according to their child medical history of febrile convulsions

Items	No. (1010)	%
Previous child exposure to febrile convulsions		
Yes	328	32.5%
No	682	67.5%
If yes, answer the following		
Child's age at of first attack of febrile convulsions:(n=328)		
Less than one year	137	41.8%
1 - < 3 years	150	45.7%
3 - < 5 years	41	12.5%
Number of episodes during the last 3 months:		
Once	168	51.2%
More than once	160	48.8%
Duration of febrile convulsions:		
< 5 minutes	192	58.5%
5 - < 15 minutes	115	35.1%
≥ 15 minutes	21	6.4%
Presence of cyanosis during febrile convulsions		
Yes	163	49.7%
No	165	50.3%
Action taken during the episode: #		
Shouting for help and go to the hospital (emergency)	158	48.2%
Putting child on a smooth and safe place	89	27.1%
Putting child on lateral position when child is drooling	33	10.1%
Picked up the child outside the house to find neighbor	36	11.0%
Take child to the doctor	275	83.8%
Attendance training program regarding febrile convulsions		
Yes	73	22.3%
No	255	77.7%
High temperature of climate increase number of episodes of febrile convulsions?		
Yes	199	60.7%
No	90	27.4%
Don't know	39	11.9%

#More than one answer

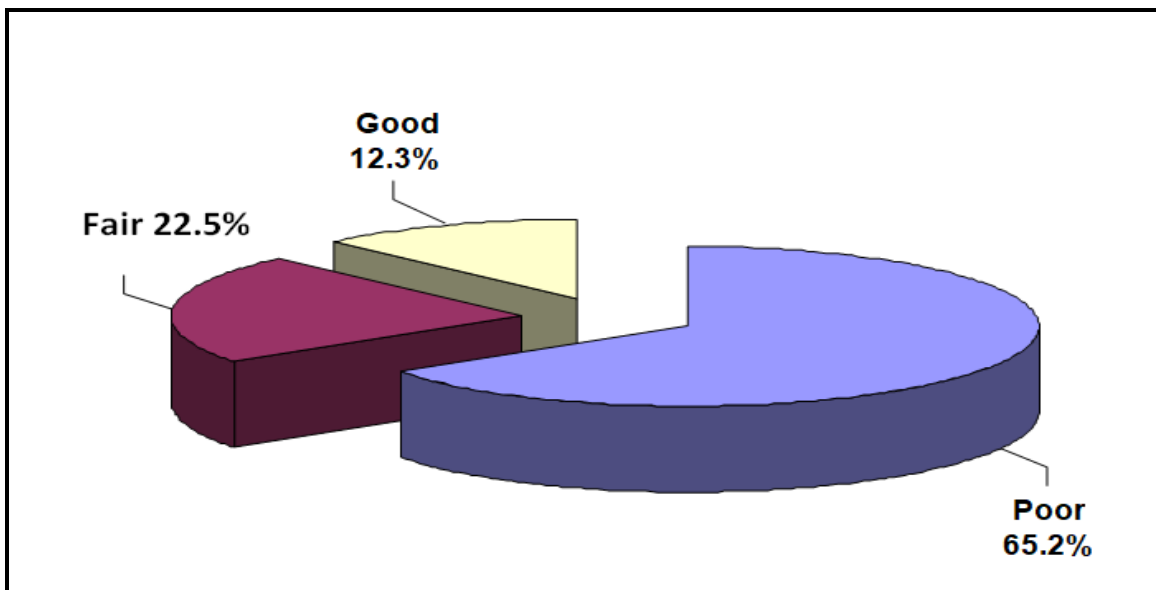


Figure (2): Distribution of the studied mothers regarding total score of knowledge about febrile convulsions.

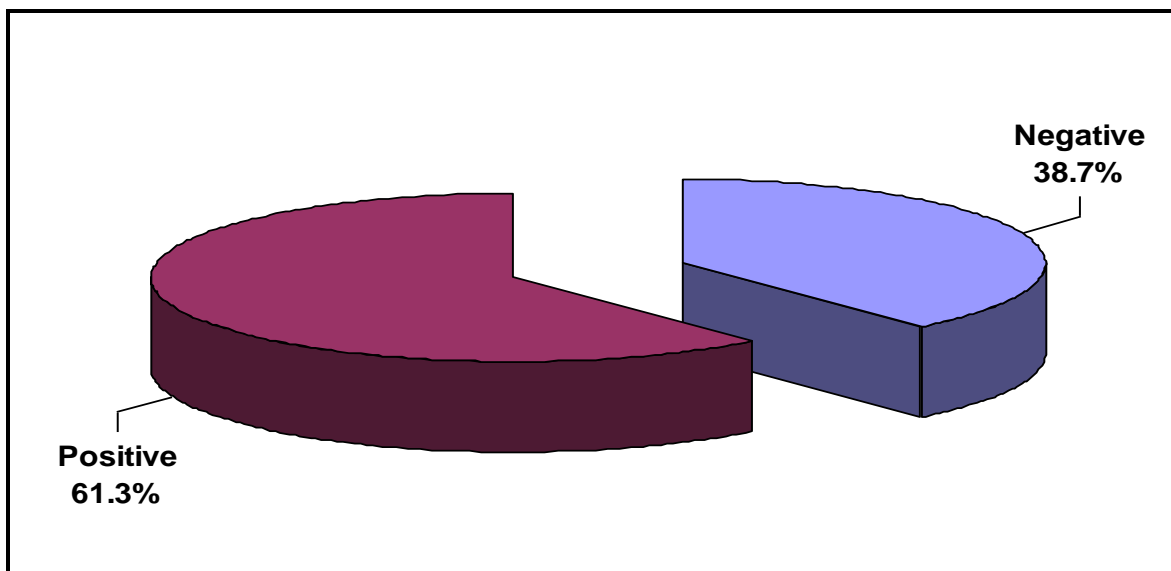


Figure (3): Distribution of the studied mothers regarding their attitude towards febrile convulsions.

Table (3): Relation between the levels of mothers' knowledge regarding febrile convulsions and their personal data

Personal data	Knowledge level						P-value
	Poor		Fair		Good		
	No.	%	No.	%	No.	%	
Mothers' age: (years)							
< 20	115	78.2	15	10.2	17	11.6	
20 - < 30	311	64.3	110	22.7	63	13.0	0.002**
30 - < 40	170	59.2	80	27.9	37	12.9	
≥ 40	63	68.5	22	23.9	7	7.6	
Mothers' education:							
Illiterate	144	80.0	22	12.2	14	7.8	
Primary	43	78.2	8	14.5	4	7.3	
Preparatory	111	72.1	26	16.9	17	11.0	0.000**
Secondary and technical	188	66.4	63	22.3	32	11.3	
University	116	51.3	72	31.9	38	16.8	
Postgraduate	57	50.9	36	32.1	19	17.0	
Mothers' occupation:							
Housewife	509	72.0	129	18.2	69	9.8	0.000**
Employee	150	49.5	98	32.3	55	18.2	
Residence:							
Rural	435	71.1	107	17.5	70	11.4	0.000**
Urban	224	56.3	120	30.2	54	13.6	
Have a child with febrile convulsions							
Yes	199	60.7	77	23.5	52	15.9	0.033*
No	460	67.4	150	22.0	72	10.6	
Have previous attending training program regarding febrile convulsions(n=328)							
Yes	37	50.7	27	37.0	9	12.3	0.003**
No	182	71.4	50	19.6	23	9.0	

** highly statistically significant (P-value <0.01)

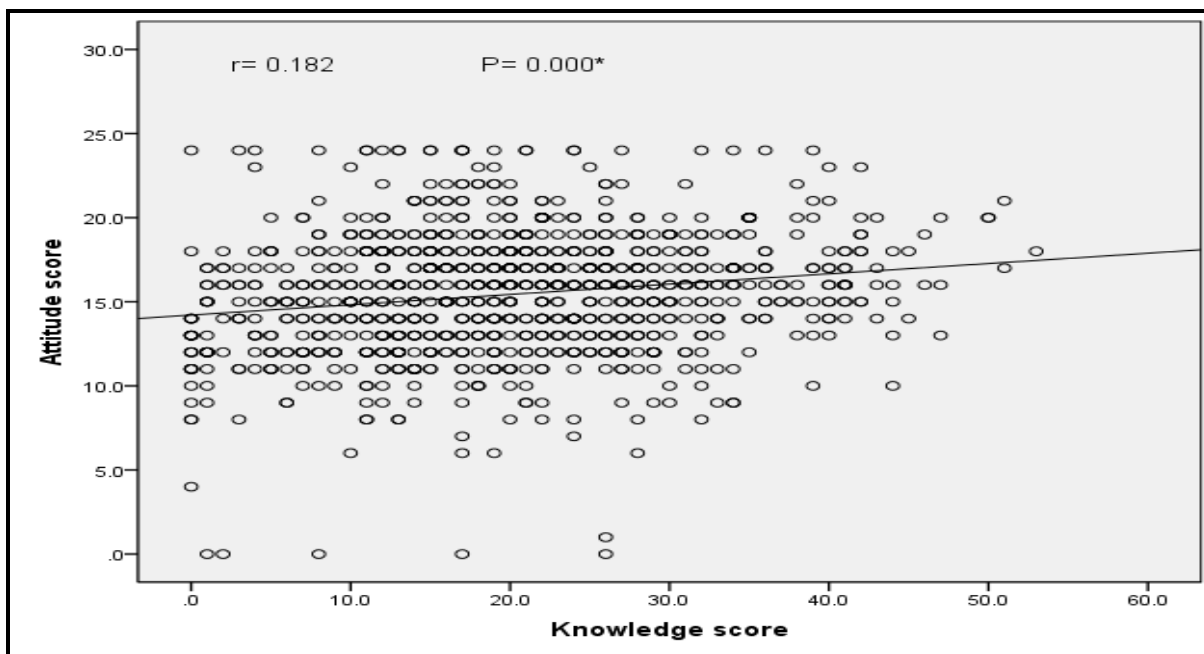
* Statistically significant difference (P. value ≤ 0.05)

Chi-square test

Table (4): Relation between mothers' attitudes toward febrile convulsions and their personal data (N=1010).

Personal data	Attitude level				P-value
	Negative		Positive		
	No.	%	No.	%	
Mothers' age: (years)					
< 20	59	40.1	88	59.9	
20 - < 30	182	37.6	302	62.4	0.825
30 - < 40	111	38.7	176	61.3	
≥ 40	39	42.4	53	57.6	
Mothers' education:					
Illiterate	81	45.0	99	55.0	
Primary	26	47.3	29	52.7	
Preparatory	58	37.7	96	62.3	0.141
Secondary and technical	102	36.0	181	64.0	
University	89	39.4	137	60.6	
Postgraduate	35	31.3	77	68.8	
Mothers' occupation:					
Housewife	288	40.7	419	59.3	0.044*
Employee	103	34.0	200	66.0	
Residence:					
Rural	252	41.2	360	58.8	0.046*
Urban	139	34.9	259	65.1	
Have a child with febrile convulsions					
Yes	113	34.5	215	65.5	0.054*
No	278	40.8	404	59.2	
Previous attending training program regarding febrile convulsions(n=328)					
Yes	23	31.5	50	68.5	0.548
No	90	35.3	165	64.7	

* Statistically significant difference (P. value ≤ 0.05)
 non- significant difference (P-Value > 0.05)
 Chi-square test



* Statistically significant difference (P. value ≤ 0.05)

Figure (4): Correlation between total score of mother's knowledge regarding febrile convulsions and their attitudes at Assiut city, 2024 (N=1010)

Table (1): Shows the distribution of studied mothers and their child according to their personal characteristic data. It was revealed that, 47.9% of the studied sample aged 20 - < 30 years with Mean \pm SD was 28.27 ± 8.06 years. As regard their occupation, it was obvious that 70 % of them were housewives. and 45.1% of their children aged between 1 to 3 years with Mean \pm SD (months) 25.89 ± 15.44 . Moreover, 58% of their children were males. Concerning the childbirth order, it was found that 31.2% of children were the second. According to residence, it was observed that 60.6% of the studied sample lived in rural areas.

Figure (1): This figure demonstrates that 28% of the mothers had completed secondary or technical education. Additionally, 17.8% were illiterate, and 5.4% had primary education.

Table (2): Illustrates the distribution of the studied mothers according to their child medical history of febrile convulsions. It was revealed that 32.5% of the studied mothers had children who were exposed to FCs. Regarding to child's age at the first attack, it cleared that 45.7% of the children were between 1 to 3 years and 51.2% of them had once episodes which reported to be less than 5 minutes by 58.5 % of the studied mothers , when asking mothers' action during attack, 83% of the studied mothers reported that they took the child to the doctor and 48.2% shouting for help and go to the hospital (emergency). Regarding previous training for febrile convulsions, it showed that 77, 7% of the studied mothers hadn't had training. In addition, 60.7% of them reported that high temperature increased the number of febrile convulsions episodes.

Figure (2): Demonstrates the total score of mothers' knowledge about febrile convulsions. It was found that 65.2% of the studied mothers had poor knowledge, while 22.5% of them had average knowledge and 12.3% of them had good knowledge regarding febrile convulsions.

Figure (3): Illustrates the distribution of maternal attitudes towards febrile convulsions revealed that a significant proportion (61.3%) held positive attitudes, while 38.7% held negative attitudes.

Table (3): Clarifies the relation between mothers' knowledge regarding febrile convulsions and their personal data. The majority (78.2%) of mothers who had a poor level of knowledge about febrile convulsions were under 20 years old, while 32.3% of those with fair knowledge among employed mothers. In contrast, 18.2% of mothers with good knowledge among employed mothers. The study explored the relation between mothers' knowledge of febrile convulsions and personal data. Significant associations were found between knowledge and age ($P = 0.002$), education level ($P < 0.001$), occupation

($P < 0.001$), residence ($P < 0.001$), and previous training ($P = 0.003$). Additionally, mothers with children who had experienced febrile convulsions were more likely to have better knowledge ($P = 0.033$).

Table (4): Presents the relation between mothers' attitudes towards febrile convulsions and their personal data. It was revealed that there were statistically significant differences between mothers' attitude toward febrile convulsions and their occupation, residence and having a child with febrile convulsions with P value = (0.044), (0.046), (0.054) respectively. while there wasn't a statistically significant relationship between mothers' attitude and their educational level (P value = 0.141).

Figure (4): Demonstrates a significant positive correlation was found between mothers' knowledge and attitudes regarding febrile convulsions ($R = 0.182$, $P < 0.001$).

Discussion

Febrile convulsions (FCs) constitute the most prevalent form of paroxysmal neurological episodes in early childhood, defined by seizures occurring concurrently with a fever exceeding 38°C and without evidence of central nervous system infection (Ferretti et al., 2024). Insufficient and inaccurate information about FCs can cause significant parental distress, including severe depression. First-time witnesses of a febrile seizure often experience shock and fear. To minimize parental anxiety, it is essential to provide comprehensive education about FCs, its association with fever, and its generally benign nature (El Sayed et al., 2022). Thus, this study aimed to assess mothers' knowledge and attitudes regarding febrile convulsions among children under five years of age.

The current study revealed that less than half of the participating mothers were within the age range of 20 to 29 years, with a mean age of 28.27 ± 8.06 years. This finding may be attributed to the fact that the mothers were in a relatively young age group, which could potentially impact their perspectives on health, parenting, and awareness of pediatric conditions such as febrile convulsions.

These results agreed with Shabeeb & Altufaily, 2019 who conducted a study to assess parental knowledge and practices concerning febrile seizures, finding that the average age of mothers was 27.81 ± 8.21 years. Also, these results were closed to Tamilarasi et al., 2023 who studied effectiveness of a home care management module in improving mothers' knowledge of febrile seizures. Participants were predominantly young mothers, with half aged between 20 and 30 years. In contrast, these results diverge from those of Mohamed et al. 2022 who

conducted study about effectiveness of the educational program on mothers' knowledge and practices regarding care for their children with febrile convulsions, and they found that less than one third of mothers were in age group from 30 > 40 years old with mean age \pm SD (31.6 \pm 7.313).

Regarding the occupational status of participating mothers, the current findings indicate that less than three-quarters were housewives. This result may be indicative of broader socio-economic and cultural trends. This high percentage of housewives could indicate traditional family roles within the community, where women often take on caregiving responsibilities at home.

These results are consistent with **Mohamed et al., 2022** who reported that more than two-thirds of the mothers in their study were housewives. Similarly, **Bhavsar et al., 2024** conducted a study in India to evaluate the effectiveness of an educational package on maternal knowledge regarding the prevention and management of febrile seizures. Who found that less than two-thirds of the participating mothers were housewives. Conversely, **El-Esrigy et al., 2021** conducted a study in Menoufia to evaluate the impact of an educational program on parental knowledge and practices related to febrile convulsions. Who found that over three-fifths of the mothers in the study were employed.

Regarding the age of the children of the study participants, over two-fifths were between one and three years old, (25.89 \pm 15.44 months). These findings align with those of **Bhavsar et al., 2024** who reported that less than half of the children were in the one to three-year age group. However, contrast with the findings of **Mohamed et al., 2022** who reported that less than half of the children were three years of age or older, with mean age \pm SD (2.1 \pm 0.98 years).

Concerning the gender of the studied mothers' children, the results of the current study viewed that less than three fifths of the mothers' children were boys. This result was in line with **Shibeeb & Altufaily, 2019** who reported that less than three fifths of the children were boys. Moreover, this result supported by **Shneshil, 2021** who studied parental knowledge and practice regarding febrile seizure in their children, and he found that less than three fifths of the children were boys. However, this result disagreed with **Alhashim et al., 2022** who reported that less than three-fifths of the children in their Saudi study were female.

Less than one-third of the children in the current study were second-born. This result was closed to **Mohamed et al., 2022** who disclosed that more than one-third of the children were second-born.

Concerning mothers' residence, the present study observed that slightly more than three fifths of the

studied mothers were from rural areas. This finding agreed with **El-Esrigy et al., 2021** who conducted study in Menoufia about the effect of implementing an educational program on parental knowledge and practice about febrile convulsion, and they reported that three fifths of the mothers were from rural areas. This finding was supported **El Sayed et al., 2022** who stated that more than three fifths of the studied sample were from rural areas. On the other hand, the study conducted in Mansoura found that the majority of the participated mothers lived in urban areas (**Elshafie et al., 2021**). Also, this result was inconsistent with **Majid et al., 2023** who conducted a study in Saudi about knowledge, concerns and beliefs of mothers towards febrile convulsions and its management, and they observed that the majority of the studied mothers lived in urban areas.

The current study showed that over one-quarter of the mothers had attained a secondary education level. This finding may be attributed to various socioeconomic, cultural, and educational factors within the study community. These results are consistent with the findings of **Hamed et al., 2021 & El-Esrigy et al., 2021** who reported that over one-quarter and one-third of their respective study participants had secondary education. Conversely, this result diverges from the findings of **Alhashim et al., 2022** who reported that the majority of their study participants were university graduates.

More than one-third of the children in this study had a history of febrile convulsions, and less than half of these children experienced their initial seizure between the ages of one and three years. Moreover, slightly more than half of them had recurrent episodes. These results may be related to susceptibility of children to infections that can cause fever during this developmental stage, leading to a higher incidence of febrile convulsions. Additionally, the finding that slightly more than half of the children had recurrent episodes suggested that once a child experience febrile convulsions, he may be prone to recurrent episodes.

The current study demonstrated that less than one-third of the children had experienced a febrile convulsion. This result is consistent with **Almoussa et al., 2023** who reported that less than one-third of their study participants had children with a history of febrile convulsions. Furthermore, both studies found that two-fifths of these children experienced their first seizure during toddlerhood. However, these findings diverge from those of **Alhashim et al., 2022** who reported that more than one-tenth of the study participants had children with a history of febrile convulsions and that two-fifths of these children experienced their first seizure during toddlerhood.

The current study found that slightly less than three-fifths of the children experienced febrile convulsions lasting less than five minutes. This finding is consistent with **Mohamed et al., 2022** who stated that more than half of the children had convulsion lasted for less than 5 minutes. But this result was indifferent with **Elbilgahy & Abd El Aziz, 2018** who reported that less than three-quarters of the children had seizures lasting less than five minutes among residents of Mansoura.

Regarding maternal actions during a febrile seizure, the majority of participants in this study reported took their child to a doctor. From the researcher point of view, the finding may be related to most of the studied mothers were educated and aware of the important of medical care and this is stressful and fearful situation for mothers to cope with. This result agreed with **Almousa et al., 2023** who reported that less than three-quarters of the mothers in their study sought medical attention. However, it contrasts with the findings of **Mohamed et al., 2022** who found that a minority of mothers sought medical attention.

Slightly more than three-fifths of the mothers surveyed indicated a correlation between increasing climate temperatures and a higher frequency of febrile convulsions in their children. This result may be explained by higher temperatures can lead to an increase in infections such as respiratory and gastrointestinal tract illnesses. Which are common triggers for fever and subsequent convulsions in young children. Additionally, extreme heat can affect children's health in other ways, potentially leading to dehydration or heat exhaustion, further complicating their conditions. The present study's findings are consistent with those of **Barrett et al., 2024** who investigated the impact of inflammation on thermal hyperpnea and found that elevated ambient temperatures can exacerbate febrile convulsion episodes, potentially due to increased inflammatory responses.

Concerning mothers' knowledge about FCs, the current study found that approximately two-thirds of the participants had poor knowledge, while a minority demonstrated good knowledge. This result may be explained by most of them didn't attend the training program on FCs. These results came in agreement with **AlZweihary et al., 2021 & Alhashim et al., 2022** who also reported that a majority of their study participants had poor knowledge about febrile convulsions.

Regarding maternal attitudes towards febrile convulsions, the current study found that a minority (less than two-fifths) held negative attitudes, while a majority (more than three-fifths) expressed positive attitudes. From the researcher's point of view, these findings may be related to the majority of the studied

mothers had good educational level in combination with their previous experience with FCs contributed significantly to the positive attitudes toward FCs.

This finding was agreed with **Almousa et al., 2023** reported that over one third of the studied participants held negative attitude. On another hand, this finding contradicted by a study conducted in Saudi Arabia by **Alotaibi, 2023** who found that a minority of Saudi parents held a positive attitude. Additionally, this result is inconsistent with **AlZweihary et al., 2021**, who reported that a majority of their study participants held negative attitudes.

The current study revealed that a strong association exists between maternal knowledge of febrile convulsions & their personal data. Over three-quarters of mothers with poor knowledge were under 20 years old, while less than one-third of those with fair knowledge were employed. Additionally, less than one-fifth of mothers with good knowledge were employed. These findings align with **Almousa et al., 2023** who found that younger mothers (under 20) show a high percentage of poor knowledge regarding FCs and employed mothers demonstrate a higher percentage of fair knowledge compared to those with good knowledge less than one fifth.

Also, the current study revealed that mothers' knowledge levels varied significantly across different age groups, educational backgrounds, and occupational categories ($P < 0.001$ for all comparisons).

These findings are consistent with those of **Nurhayati & Anita 2022** who conducted a study in Cisungang about the link between parental knowledge, information, and attitudes towards the management of febrile seizures in toddlers and reported that mothers' knowledge influenced by their age, level of education and work & with increasing age, knowledge would increase. Moreover, our findings are consistent with **El Sayed et al., 2022** who reported that there was a statistically significant association ($P < 0.05$) between knowledge level & personal factors such as age and educational level. Additionally, these findings were conforming to **El-Esrigy et al., 2021** found that a significant positive correlation ($P < 0.05$) was found between knowledge level and both age and educational level among the study participants.

This study revealed a significant relationship between maternal knowledge and having a child with febrile convulsions (P value = 0.033). These results are consistent with **Almousa et al., 2023** stated that a higher knowledge score was more associated with having a child who experienced an episode of FC ($P < 0.001$), having child's siblings with FC & having a family history of FC. Conversely, **El Sayed et al., 2022** didn't found a significant association between

maternal knowledge and a family history of febrile convulsions.

This study investigated the association between maternal knowledge and attitudes towards febrile convulsions. The present study, it was found that less than two thirds of the studied mothers with positive attitudes were employed and resided in urban areas. A statistically significant positive correlation between total mothers' knowledge and their attitudes with (P-value 0.000).

The current study agreed with **Almoussa et al., 2023** who reported a positive association between employment status, urban residency, and positive attitudes towards febrile convulsions. Furthermore, a strong positive correlation was observed between maternal knowledge and attitudes ($R= 0.550$, $P < 0.001$), suggesting a causal link between the two variables. These results are also consistent with **AlZweihary et al., 2021** who found similar associations between demographic factors, attitudes, and knowledge levels.

Conclusion:

The present study answered the research questions first, there was a deficiency in knowledge concerning febrile convulsions was observed among the study participants. Second, Existence of positive attitude towards febrile convulsions among studied mothers. Third, mothers' knowledge level was significantly affected by age, education and residence.

Recommendations:

The study recommended that:

- Education campaigns and health promotion programs were implemented to improve maternal knowledge regarding febrile convulsions.
- Health education materials as pamphlets & booklet about FC should be available at MCH Centers and pediatric clinics.
- Training healthcare providers to discuss febrile convulsions with parents, helping to dispel fears and misconceptions during consultations.

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Reference

- **Alhashim L., Zakaria O., Alrubayii M., Alkhofi A., Alateeq S., Almaghlouth M., Almulla R., Al Abdulqader A., Almulhium L., & Alnaim A. (2022):** Perspectives of febrile convulsions among parents: a local cross-sectional study. Egyptian Pediatric Association Gazette (2022) 70(8),1-6. <https://doi.org/10.1186/s43054-022-00100-7>

- **Alhumaidy M., Al-Mulhim Y., Alabdullah W., Alshakhs F., Husain M., Alsubaie Z., & Al Khalifah Z. (2020):** Prevalence and risk factors of febrile convulsions among infants and children in Saudi Arabia. International Journal of Medicine in Developing Countries, 2020;4(10):1520–1526. <https://doi.org/10.24911/IJMDC.51-1592374528>
- **Almoussa A., Alshahrani D., Almubarak S., Allothman A., Alrashoudi M., Alsharif A., Almehaidib A., & Almohanna I. (2023):** Parents' Knowledge, Attitude, and Practice Regarding Febrile Convulsion in Children in Riyadh, Saudi Arabia. National Library of Medicine, 15(10):47314-47327.Cureus. <https://doi.org/10.7759/cureus.47314>
- **Alotaibi N., Abukhaled M., Aldehaim, F., Alfarhan A., Alhamoud A., Alruways A., & Alzahrani K. (2023):** Knowledge, Attitude, And Practices Regarding Febrile Convulsions Among Saudi Parents: A Cross-Sectional Study. Pharmacophore, 14(1), 723-8793.
- **AlZweihary A., Alkhalifah S., Alrayes M., Alshutily S., & Alotaibi A. (2021):** Knowledge, attitude, and practices of parents of children with febrile convulsion in Al-Qassim, Saudi Arabia. International Journal of Medicine in Developing Countries, 2021;5(1):229–236. doi:10.24911/IJMDC.51-1606835419
- **Arnav S. (2019):** Knowledge Attitude and Practices of Parents of Children with Febrile Seizure. journal of medical science and clinical research, 7(7) 5-10 doi: 10.18535/JMSCR/V7I7.118
- **Barrett K., Roy A., Ebdalla A., Pittman Q., Wilson R., & Scantlebury M. (2024):** The Impact of Inflammation on Thermal Hyperpnea: Relevance for Heat Stress and Febrile Seizures. American Journal of Respiratory Cell and Molecular Biology, 71 (2), 216-222. <https://doi.org/10.1165/rcmb.2023-0451OCIF:5.9Q1>
- **Bhavsar V., Sriram N., Wilson P., & Bhavsar A. (2024):** Study to Assess the Effectiveness of Educational Package on Knowledge Regarding Prevention and Management of Febrile Seizure Among the Mother of Children Admitted in Shri Vinoba Bhave Civil Hospital, Silvassa, Dnh. International Journal for Multidisciplinary Research6,(2),25822160. <https://doi.org/10.36948/ijfmr.2024.v06i02.15489>
- **Boshra N., Ragab H., Shedeed S., & Said H. (2021):** Frequency and characteristics of febrile convulsions among children in Belbeis family health center. Zagazig University Medical Journal, 27(3), 423-430.

- **Casabona G., Berton O., Singh T., Knuf M., & Bonanni P. (2023):** Combined measles-mumps-rubella-varicella vaccine and febrile convulsions: the risk considered in the broad context. *Expert Review of Vaccines* 22, 764–776. <https://doi.org/10.1080/14760584.2023.2252065>
- **Chockalingam G. (2020):** Effectiveness of Video-assisted Teaching on Knowledge Regarding Management and Prevention of Febrile Seizure among Mothers of Children Aged under Five Years. *Population, Pondicherry Journal of Nursing* 2020; 13(2):29–32. <https://doi.org/10.5005/jp-journals-10084-12155>
- **El Sayed H. (2020):** Recognition of parent's knowledge, attitude and practice regarding febrile seizures in children under-five. *American Journal of Nursing Research*, 2020, 8, (1), 72-8. <https://doi.org/10.12691/ajnr-8-1-8>
- **El Sayed H., Mahfoz F., & Ahmed H. (2022):** Effect of Bite-Sized Teaching Sessions on Parent's Knowledge, Attitude, and Practice Regarding Febrile Seizures in Children. *Tanta Scientific Nursing Journal*, 26(3), 44–64. <https://doi.org/10.21608/tsnj.2022.253969>
- **Elbilgahy A., & Abd El Aziz R. (2018):** Effect of implementing an educational module on improving mothers' knowledge, home management and attitude about febrile convulsion. *Journal of Nursing Education and Practice*, 8(3), 1-11. <https://doi.org/10.5430/jnep.v8n3p1>
- **El-Esrigy A., Farahat M., & Othman E. (2021):** Effect of Implementing an Educational Program on Parental Knowledge and Practice About Febrile Convulsion. *The Egyptian Journal of Hospital Medicine*, 85,(1),3061-3071 <https://doi.org/10.21608/ejhm.2021.194056>
- **Elshafie W., Elemam F., Esmat H., Saad M., Farouk S., & Sayed H. (2021):** Effect of Video Assisted Teaching Program on Mothers' First Aid Management of Convulsions for their Children. *Egyptian Journal of Health Care*, 12(4), 1781-1794.
- **Ferretti A., Riva A., Fabrizio A., Bruni O., Capovilla G., Foadelli T., Orsini A., Raucci U., Romeo A., Striano P., & Parisi P. (2024):** Best practices for the management of febrile seizures in children. *Italian Journal of Pediatrics*, 2024 May 12; 50(1):95 <https://doi.org/10.1186/s13052-024-01666-1>.
- **Hamed W., El Emam F., Esmat H., Saad M., Farouk S., & Sayed H. (2021):** Effect of Video Assisted Teaching Program on Mothers' First Aid Management of Convulsions for their Children. *Egyptian Journal of Health Care*, 12(4), 1781-1794. <https://doi.org/10.21608/ejhc.2022.242099>
- **Koivula K. (2023):** Couple resilience, dyadic emotion regulation, and mental health of parents with a seriously ill child (Doctoral dissertation, Itä-Suomen yliopisto).
- **Majid A., Alghamdi A., Aljedaani A., Alghamdi T., & Algarni Z. (2023):** Knowledge, Concerns and Beliefs of Mothers Towards Febrile Convulsions and its Management at King Abdul-Aziz Medical City, Western Region, Saudi Arabia. *Journal of Coastal Life Medicine*, 11(1), 1110–1122.
- **Millichap J., Nordli Jr D., & Dashe J. (2021):** Treatment and prognosis of febrile seizures. UpToDate. Waltham, MA: [Google Scholar].
- **Mohamed Z., Tang C., Thokerunga E., Deng Y., & Fan J. (2023):** Pediatric infection with the Omicron variant increases the risks of febrile seizures among COVID-19 infected children. *Frontiers in Pediatrics*. 2023 Aug 17; 11: 1226403.
- **Mohammed A., Soliman R., Hassan M., & Abd El-Ghany R. (2022):** Effect of Educational Program on Mothers' Knowledge and Practices regarding Care for their Children with Febrile Convulsions. *Journal of Nursing Science Benha University* 3, (2), 1–14. <https://doi.org/10.21608/jnsbu.2022.244316>
- **Nurhayati N., & Anita N. (2022):** The relationship of knowledge, information, attitude to the handling of febrile seizures toddlers in Cisungsang health center. *ScienceMidwifery*, 10,(5),4350–4356 <https://doi.org/10.35335/midwifery.v10i5.1040>
- **Shibeeb N., & Altufaily Y. (2019):** Parental knowledge and practice regarding febrile seizure in their children.” *Medical Journal of Babylon*, 16 (1), 58-64. https://doi.org/10.4103/mjbl.mjbl_89_18.
- **Shneshil O. (2021):** Assessment of Mothers' Knowledge about Febrile Convulsions of Children at Ibn-Albalady Hospital in Baghdad City. *Indian Journal of Forensic Medicine & Toxicology*, 15(1), 2465–2470. <https://doi.org/10.37506/ijfimt.v15i1.13771>
- **Sirnivasa S., Anjum S., Patel S., Harish S., & Bhavya G. (2018):** Parental knowledge, attitude, and practices regarding febrile convulsion. *International journal of Contemporary Pediatrics*, 5(2), 9-515.
- **Skotte L., Fadista J., Bybjerg-Grauholm J., Appadurai V., Hildebrand M., Hansen T., & Feenstra B. (2022):** Genome-wide association study of febrile seizures implicates fever response and neuronal excitability genes. *Brain*, 145(2):555-568. doi: 10.1093/brain/awab260IF: 10.6 Q1.

- **Soti Khiabani M., Ashrafi M., Haider S., Haider S., Mahmoudi S., & Mamishi S. (2023):** Evaluation of patients presenting with febrile seizures in an Iranian referral hospital: emphasis on the frequency of meningitis and co-infections. *BMC pediatrics*, 23(1), 1-6. <https://doi.org/10.1186/s12887-023-04120>
- **Tamilarasi B., Bharathi P., William J., Pracila A., Mohamed H., & Jayalakshmi R. (2023):** Effectiveness of Home Care Management Module on Knowledge Regarding Febrile Seizure among Mothers of under Five Children in Selected PHC, Chennai. *International journal of science and research*, 12, (10), 1371-1373. DOI: 10.21275/SR231011101139
- **Verma P., & Minu S. (2021):** A study to assess the effectiveness of video assisted teaching programme on knowledge regarding seizure among mothers of under five children in selected community area, Uttar Pradesh. *International Journal of Research and Review*, 8(4), 53-60. <https://doi.org/10.52403/ijrr.20210409>
- **Vicens-Blanes F., Miró-Bonet R., & Molina-Mula J. (2021):** Analysis of Nurses' and Physicians' Attitudes, Knowledge, and Perceptions toward Fever in Children: A Systematic Review with Meta-Analysis. *International journal of environmental research and public health*, 18(23),1-31doi: 10.3390/ijerph182312444.

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