Effect of Educational Guidelines on Mothers' Knowledge, Attitude, and Practice regarding Dengue Fever Complications Prevention among their Children

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Abstract

Background: Dengue, also known as break-bone fever, is a viral infection transmitted from mosquitoes to children. It is particularly prevalent in tropical and subtropical regions. Evaluating mothers' knowledge, attitudes, and practices (KAP) is considered essential; however, current understanding in this area is limited. **Aim**: The aim of this study is to determine the effect of educational guidelines on mothers' knowledge, attitude, and practice regarding dengue fever complications prevention among their children. **Subjects and Method: Design:** A quasi-experimental research design was employed to achieve the study's objectives. **Setting**: The research was conducted in the Pediatric outpatient clinics at Sohag University Hospital. **Subjects**: A purposive sample of 100 mothers participated in this study from the designated settings. **Four tools were utilized**: Tool (I) a structured interview questionnaire, which consisted of two sections: Part (1): Personal data of mothers, Part (2): Personal data of children; Tool (II) mothers' knowledge about dengue fever, Tool (III) mothers' attitudes towards dengue fever (pre/post), and Tool (IV) mothers' practices regarding dengue fever. **Results**: A statistically significant difference was observed in the levels of knowledge, attitudes, and practices of pregnant mothers concerning the prevention of dengue fever complications in their children following the implementation of educational guidelines (P= <0.001). **Conclusion**: The implementation of educational guidelines has had a positive impact on mothers' knowledge, attitudes, and practices related to the prevention of dengue fever complications in their children. **Recommendations**: It is recommended that educational instructions regarding dengue fever be implemented in various maternity healthcare settings. Educational booklets should be distributed to mothers, focusing on the prevention of dengue fever complications, and these should be supplemented with illustrated pamphlets to enhance their understanding.

Keywords: Children, Dengue fever, Educational guidelines, Knowledge and practice, Mothers.

Introduction

Young children, particularly infants are at a higher risk of developing severe dengue illness and complications than healthy adults. This is because their immune systems are weaker. So, it‟s especially important to keep infants and young children safe from mosquito bites. With quick medical attention, the worst impacts of severe dengue in children can be avoided (**WHO, 2021**).

Dengue fever is a viral illness caused by the dengue virus, affecting both children and adults. It is transmitted through the bites of infected mosquitoes, primarily those of the Aedes species. The disease, spread by these mosquitoes, can manifest as fever, weakness, exhaustion, and persistent low energy throughout the day. Children are particularly susceptible to these symptoms due to their underdeveloped immune systems.

Water pools serve as prominent breeding grounds for dengue-carrying mosquitoes. When children play near such areas or in places filled with filth and mosquitoes, their risk of contracting the disease increases **(WHO, 2019).**

Dengue fever, classified as a neglected tropical disease, causes significant disruption in developing countries, especially in Asia. Although it was first identified in 1780, the initial case of dengue in Bangladesh was reported in 1964, referred to as Dhaka/ Dacca fever **(Bashar et al., 2020).**

Dengue fever is caused by four similar viruses spread by mosquitoes of the genus Aedes, which are common in tropical and subtropical areas worldwide. In rare cases, dengue fever can lead to a more serious form of the disease

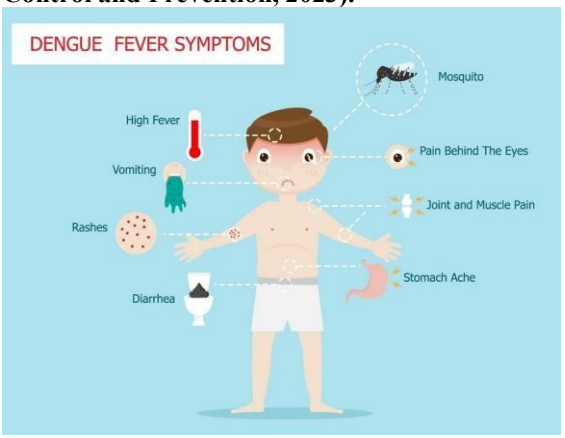
called dengue fever (DF), dengue hemorrhagic fever (DHF), and dengue shock syndrome (**WHO, 2021**).

Children are particularly susceptible to dengue due to their low immunity. Consequently, high fever and weakness are among the initial symptoms of the disease in children. Their low immunity significantly increases their vulnerability to this condition **(Centers for Disease Control and Prevention, 2023).**

Dengue fever in children is categorized into three distinct stages: Febrile Phase - This is the initial phase of the fever caused by the disease, which may persist for 2 to 7 days. During this stage, the affected child may experience vomiting, diarrhea, and weakness. Persistent symptoms necessitate immediate medical attention, as neglecting them could result in severe health complications such as respiratory issues, skin rashes, bleeding gums, and other related problems. Critical Phase - This phase is characterized by symptoms such as heavy breathing, vomiting, nosebleeds, excessive stool passage, and other similar concerns. This critical stage may require urgent medical intervention to address the symptoms, and hospitalization along with continuous monitoring may be necessary to prevent serious complications. Recovery Stage - This is the healing phase for the child, where symptoms gradually diminish. However, close observation and diligent care are advised to prevent sudden complications **(WHO, 2022).**

Symptoms of dengue fever in children that can aid in timely identification and treatment include High Fever - A high fever reaching up to 104 degrees Fahrenheit is one of the earliest signs of dengue in children. This fever can result from the virus transmitted through mosquito bites. If not treated promptly, the fever may be accompanied by weakness, joint pain, nosebleeds, and other related conditions.

Rashes - In cases where symptoms worsen, affected children or infants may develop rashes. These rashes can manifest anywhere on the body and may appear as dark red spots that are itchy and irritating, complicating daily activities. If left untreated, the rashes may spread rapidly. Nausea and Diarrhea – Nausea and diarrhea are among the symptoms associated with the illness. If not addressed in a timely manner, the condition can result in dehydration and fainting. The child experiencing these symptoms may struggle with activities such as walking, eating, or maintaining focus. Decreased Appetite – A child who is irritable may find it difficult to consume adequate meals due to the previously mentioned symptoms **(Centers for Disease Control and Prevention, 2023).**



Signs of dehydration in children include Unusually sleepy, lack of energy, very fussy, Dry mouth, tongue, and lips, Fast breathing, Sunken eyes, Few or no tears when crying, Cool, discolored hands or feet, urinating less often, Urine is dark yellow and strong smelling. Children and infants with dengue may also become more irritable than usual and their appetite and sleep patterns may change **(Bhatt, 2018).**

Diagnostic laboratory testing is given priority in these situations. The justification for this behavior is that there is evidence to show that this disease is linked to serious clinical problems in expectant mothers. Data from referral health services are used in the majority of studies looking into the connection between dengue and pregnancy. The inclusion of more severe cases in this research may result in a selection bias, though **(Friedman et al., 2018).**

At times, dengue can result in serious complications, including dengue hemorrhagic fever or dengue shock syndrome, both of which can be life-threatening. It is crucial to seek immediate medical assistance if a child exhibits symptoms of dengue fever (Brady, 2019).

The treatment options for dengue fever in children facilitate rapid recovery and promote healing. One of the primary concerns in dengue is the high fever

experienced by affected children. Therefore, utilizing medications such as paracetamol and sponge baths can effectively reduce fever and alleviate discomfort. This approach also aids in promptly cooling down elevated body temperatures (Shafique et al., 2022).

Children with severe dengue often require hospitalization. It is also vital to monitor for signs of dehydration in children, which can occur when the body loses excessive fluids due to fever, vomiting, diarrhea, or insufficient fluid intake. Most instances of dengue fever resolve within one to two weeks without causing any long-term issues. However, if an individual experiences severe symptoms or if symptoms worsen within the first couple of days after the fever subsides, it is imperative to seek medical attention immediately, as this may indicate a medical emergency related to dengue fever. In all cases of dengue infection, measures should be taken to prevent the infected individual from being bitten by mosquitoes, thereby reducing the risk of transmission to others (Governo et al., 2020).

In terms of preventive measures, there is no specific surgical intervention or treatment available to alleviate the high fever caused by dengue in children. To safeguard children from such complications, it is advisable to keep them away from areas populated by mosquitoes that transmit dengue. Employing mosquito nets can help prevent bites and the spread of the virus, along with ensuring adequate rest, consuming plenty of water, maintaining hydration, and eating a nutritious diet, and using paracetamol to alleviate pain and fever, as advised by your healthcare provider, Moisten the skin with cool water to help lower fever, Refrain from using non-steroidal anti-inflammatory medications, such as ibuprofen and aspirin, since they may heighten the risk of bleeding, Monitor for severe symptoms and reach out to your physician promptly if you observe any.
Symptoms of dengue can escalate rapidly within a few hours. Should you or your child exhibit any signs of severe dengue, seek immediate medical assistance without delay.

Preventing mosquito bites remains a crucial form of protection. Ensure that you:

- - Install screens on doors and windows, and promptly fix any broken or damaged screens. Ensure that unscreened doors and windows remain closed.
- - Ensure that children wear long-sleeved shirts, long pants, shoes, and socks when outdoors, and utilize mosquito netting over their beds during the night.
- - Apply insect repellent to children as instructed. Opt for a product containing oil of lemon eucalyptus.
- - Minimize the duration of time children spend outdoors during the day, particularly during dawn and dusk when mosquitoes are most active.
- Avoid providing mosquitoes with breeding grounds. They deposit their eggs in water, so eliminate standing water in items such as containers and discarded tires, and remember to refresh the water in birdbaths, dog bowls, and flower vases at least weekly. By adhering to these precautions and steering your family clear of areas experiencing dengue fever outbreaks, the risk of contracting dengue fever remains low for international travelers **(Shafique et al., 2022).**

The role of the pediatric and community health nurses can help mothers seeking the advice of a health professional for early diagnosis; cover, empty, and cleaning of domestic water storage containers every week; dispose of solid waste properly and remove artificial man-made mosquito breeding sites (vehicle tires, fruit cans, plastic bags) from the environment; drainage of water collection points around the house; and raising community awareness for mosquito control **(Ribeiro et al., 2020 a).**

Significance of the study:

There is no specific vaccine or medicine for dengue treatment. Because mosquitoes can bite through thin clothing, spray clothing with an insect repellent containing icaridin. Icaridin is less prone to irritate skin and doesn't harm plastics or synthetic materials. Sleep with bed nets (mosquito netting) that have been treated with an insecticide like permethrin or deltamethrin. Around sleeping areas inside, use flying bug repellent **(Shafique et al., 2022).**
The incidence of dengue fever in increase in the past three decades, with 186,101 documented cases and more than 320 fatalities, occurred after a spike in yearly dengue infections. The health industry took extensive measures to contain the

outbreak. However, the number of reported dengue cases increased once more in 2019, reaching 102,746, which was double the number of reported cases in 2018, which were 51,659, indicating the re- emergence of an outbreak. "In 2000, we had about half a million cases and in 2022 we recorded over 4.2 million, which really shows an eight-fold increase," he said in Egypt (WHO, 2020).
Furthermore, it is presumed to illustrate the interplay among the KAP domains of respondents **(WHO, 2021)**. Moreover, this type of research could facilitate the development of interventions that promote favorable behavioral changes **(Dauda Goni et al., 2019).**

Research on Knowledge, Attitude, and Practice (KAP) regarding dengue fever (DF) is crucial, especially among vulnerable groups like children and mothers. Studies have shown that KAP surveys can help evaluate the DF level for at-risk groups and inform policies to reduce the risk of DF **(Abir et al., 2021).** There is thus an urgent need to conduct such studies to assess the impact of Dengue fever on children.

Aim of the study:

This study aimed to determine the effect of educational guidelines on mothers' knowledge, attitude, and practice regarding dengue fever complications prevention among their children through:

- Assessing mothers' knowledge regarding dengue fever complications prevention among their children.
- Assessing mothers' attitudes regarding dengue fever complications prevention among their children.
- Assessing mothers' practice regarding dengue fever complications prevention among their children.
- Analyzing the association between mothers' knowledge and practice pre and post- educational guidelines.
- Evaluating the effect of educational guidelines on mothers' knowledge, attitude, and practice regarding dengue fever complications prevention among their children.

Research hypothesis:

Mothers' who received educational guidelines regarding dengue fever complications prevention among their children would experience an improvement in their knowledge, attitude, and practice levels post-implementation than pre-implementation.

Subjects and Methods:

Research design:
A quasi-experimental research design was used to fulfill the aim of this study

Setting:
The study was carried out in Pediatric Outpatient Clinics at Sohag University Hospital. This setting was chosen because it serves the population in the nation and has a high frequency of children among the settings. One room in this clinic is separated into a diagnostic and examination space. Additionally, the researchers conducted interviews with the recruited mothers and their children in a waiting room for mothers' admission to put the educational guidelines into practice. From 9 am until 12 pm it was open.

Sample:
A purposive sample of 100 mothers was involved in the study from the previously chosen locations. The following criteria were used to choose these mothers:
The inclusion criteria were:

- Ranging in age from 20 to 35.
- They consented to participate in the study

The exclusion criteria were:

- Refused to participate. Mothers with mental illness or chronic conditions

Sample size calculation:

The power analysis level of significance of 0.95(=1-0.95=0.5) at alpha.05 (one-sided) with a big effect size (0.5) was used to determine the sample size, with 0.001 being utilized as the high significance level (**Thompson, 2012**).
Tools of data collection:

Four tools were used in this study as follows**:**

Tool (I): Mothers' interview questionnaire: it was developed by the researchers after analyzing related literature and expert comments for content validity. To avoid misunderstandings, it was translated into Arabic. It was adapted from **(WHO, 2020;**

Shafique et al., 2022). It was composed of five parts:

Part (1): Mothers' personal data: It contained data which consisted of 3 items related to age, educational level, and place of residence.

Part (2): Children's personal data: It contained data which consisted of 3 items related to age, gender, birth order, and educational level.

Tool (II) Mothers' knowledge regarding dengue fever: To assess mothers' knowledge. It was adopted by **(WHO, 2021; Governo et al., 2020; Barroso et al., 2020; Ministério et al., 2019);** It consisted of 12 questions. It was used for all mothers in the study and was completed by the researchers. Multiple Choice Questions (MCQ) such as definition, types, causes, signs and symptoms, transmission, risk factors, Mosquito vectors of dengue fever, breeding sites of mosquitoes, who should be responsible for mosquito control and biting time of mosquitoes, prevention, treatment, and source of information.

Scoring system:

The following response scores were assigned: Each question has one correct answer; if the mother's answer is correct, the mother receives two grade, and a zero is assigned for an erroneous response or I do not know, and all selected options were tallied, and a score was assigned. The scores ranged from 0 to 24. Based on statistical analysis, the overall grades were summed together, the percentage computed for all participants, and knowledge level was regarded as satisfactory at the cut of point 60%, and unsatisfactory at less than 60%.

Tool (III) Mothers' attitude regarding dengue fever (pre/post): The researchers created it following a thorough analysis of the pertinent literature **(WHO, 2021; WHO, 2020; Barroso et al., 2020)**; to assess the degree of mothers' reported attitude: It was created by the researcher after evaluating mothers' practice. It had nine multiple- choice questions on topics such as Remove Mosquito Breeding Sites: Regularly inspect your premises for potential breeding sites, such as stagnant water in flower pots, buckets, or discarded items. Eliminate these sites to prevent mosquito breeding.

- Use Mosquito Nets and Screens: Install mesh screens on doors and windows to keep mosquitoes out. Use mosquito nets when sleeping, especially during the day.

- Wear Protective Clothing: Wear long-sleeved shirts, long pants, socks, and closed shoes when outdoors, especially during peak mosquito hours (early morning and late afternoon).

- Apply Insect Repellent: Use EPA-registered insect repellents containing DEET, picaridin, or oil of lemon eucalyptus on exposed skin and clothing.

- Keep Your Home and Yard Clean: Regularly clean your house and yard to remove places where mosquitoes can hide. It is necessary to continue the removal of mosquito breeding sites at home even during the period when there‟s no outbreak, a Dengue outbreak in my community can be controlled if every household is committed to removing mosquito breeding sites, I will take part in a public activity for dengue control or removal of mosquitobreeding sites.

Scoring system:

In the Attitude assessment, which was three point Likert scale, strongly agree was scored 2/ agree was scored 1 whereas „Not sure/Disagree‟ was given a 0 score. Mothers who scored higher scores indicated positive attitudes and mothers who scored lower scores indicated negative attitudes.

Tool (IV) Mothers' practice regarding dengue fever: pre/post): The researchers created it following a thorough analysis of the pertinent literature (WHO, 2021; Barroso et al., 2020); to determine the degree of mothers' reported practice: It was created by the researcher after evaluating mothers' practice. It had 13 multiple-choice questions (MCQs) on topics such as what you do in the first stage of fever. At home, what do you do in the first stage of fever? Do you store water at home? If yes, do you frequently change the stored water until it runs out?, Use mosquito repellent equipment, Use mosquito repellent creams, Use bed nets, Use window screens, Use a fan to drive away mosquitoes, Use smoke to drive away Mosquitoes, Cover the body with clothes, Cleaning of garbage/trash, Disposing of water-holding containers, and Cover water containers at home.

Scoring system:

The reported practice questions were in MCQ format, with a total score of 26 for the five elements; the right answer scored a 2, while the incorrect answer received a 0. If mothers reported their practices at a rate of greater than 60%, their practices were deemed adequate according to the

method of total reported practices. Mothers whose reported practices fell below 60% were considered to have inadequate practices.

Validity of the tools:
The content validity of the tools, their clarity, comprehensiveness, appropriateness, and relevance were reviewed by five experts; three professors in the pediatric nursing field, one professor; in the community, and one professor; in the pediatric medicine field. No modifications were made according to the panel judgment to ensure sentence clarity and content appropriateness.

Reliability of the tools:
The first tool's reliability was (r = 0.932), the second tool's reliability was (r = 0.945), the third tool's reliability was (r = 0.93), and the fourth tool's reliability was rated as being good with a total score Cronbach's alpha of 0.87.

Fieldwork:
The researchers visited the previously selected settings three days / a week from 9 a.m. to 12 p.m. from the beginning of July to the end of August 2023. Approximately, 40-50 minutes were taken to complete each interview tool.
A pilot study:

To assess the clarity and feasibility of the data collection tools, a pilot study was conducted on 10% (10 pregnant women) of the total sample. To produce the final form of the tools, modifications were made. Pregnant women included in the pilot study were excluded from the study

Ethical considerations:

Before beginning the study, Ethical approval by the institutional review board of the Faculty of Nursing, Sohag University. The researchers met with the directors of the selected setting to explain the study's aim and gain their cooperation.

To gain the cooperation of mothers, informal consent was gained. Both the study's objective and its anticipated results were stated. The mothers were informed of the study's objectives. The study's chosen participants were advised that their participation was completely voluntary and that they might leave the study at any moment, for any reason. Additionally, they were informed that their data would be protected and solely utilized for research purposes.

Administrative design:
Administrative permission was obtained through an issued letter from the Sohag University Director of the previously selected setting to achieve this study.

The actual study was divided into three phases: Phase I: Preparatory phase:
Once the research directors were made aware of the investigation's objectives, formal approval was obtained for data collection. Consent was obtained from the mothers who took part in the study. A survey of the literature on the various aspects of the concerns from the past and the present, both locally and globally, was conducted using books, essays, periodicals, and magazines. Guidelines were prepared in the Arabic language to cover many parts of the study topic created to close knowledge and practice gaps among mothers after examining pertinent Arabic and English literature.

Phase II: Implementation phase:

The researcher introduces herself to start a conversation and goes over the goals of the study during the first interview. Each participant in the study completed a pre-and post-test to gauge her degree of knowledge, attitude, and practices.

Specific objectives: At the end of instructional guidelines implementation each mother should be able to:

-Explain the definition of dengue fever
-List the types, causes, and risk factors for dengue fever.
- Discuss the symptoms of dengue fever
- Recognize transmission methods of dengue fever.
-Explain Mosquito vectors of dengue fever.
- Describe Breeding sites of mosquitoes with dengue fever.
- Define mosquito control of dengue fever
- Identify the Biting time of mosquitoes of dengue fever
- Recognize the treatment of dengue fever.
- Describe preventive measures for dengue fever and its complications among children.

Each in-person interview with the mothers lasted

between 40 and 50 minutes and was performed by the researcher. Mothers were greeted and introduced to the researcher prior to each interview. The researcher then went on to describe the study's scope and goals and obtain their informed consent. The researcher conducted a face-to-face pre-test with structured questions before disseminating the educational guidelines and evaluating personal information.

The educational guidelines included simple and clear information about dengue fever. It also included the preparation of educational materials such as Photos, videos, and PowerPoint presentations. Arabic brochure designed by the researchers; including educational guidelines regarding dengue fever was introduced to mothers at the end of the sessions.

The Contents has been organized into four sessions (theoretical three sessions and one session for practical application), with each session lasting between 40 to 50 minutes.

Contents of sessions

Session 1:

Before going on to the learning objectives of the next session, all researchers first discussed the information from the educational guidelines session. While speaking in Arabic which was easy for mothers to comprehend, the researchers first assessed the mothers' knowledge, attitude, and practice.

Session 2:

The theoretical portion included information on mothers' knowledge regarding dengue fever such as definition, types, causes, signs and symptoms, transmission, risk factors, mosquito vectors of dengue fever, breeding sites of mosquitoes, who should be responsible for mosquito control and biting time of mosquitoes, prevention, and treatment.

Session 3:

Included a role play about the practical part such as personal cleaning and fever control at home. Also, simulation intervention about storing water at home and frequently changes of the stored water, use mosquito repellent equipment, Use mosquito repellent creams, use bed nets, use window screens, use a fan to drive away mosquitoes, use smoke to drive away mosquitoes, cover the body with clothes, cleaning of garbage/trash, disposing of water-holding containers, and Cover water containers at home.

Session 4:

The researchers talked about the need for follow-up care and how major problems require referrals to continue treatment and prevent consequences.

Phase III: Evaluation phase:

The post-test was done one month to assess the effect of educational guidelines using the same pretest data collection tools.

Statistical analysis:

The data were analyzed using SPSS statistical software version 20. Continuous data were obtained before and after the intervention and expressed as mean standard deviation (SD). Categorical data were expressed using numbers and percentages. The paired t-test was used to examine variations between each group before and after the intervention. A one-way repeated-measures analysis of variance (ANOVA) was used to examine changes in anxiety levels. Variables that did not adhere to the parametric assumptions were tested using the Mann-Whitney test. In the instance of noncontiguous data, the association between two variables was evaluated using the chi-square test. For statistical significance, a P value under 0.05 was required.

Results

Table (1): Shows that 80% of mothers aged between 18 < and 30 years with mean ± SD 26.22 ± 4.57, (34%) of them had secondary education, meanwhile, and also, it is also pointed out that 53% of mothers were not working. Finally, (57%) of mothers lived in rural areas and 43% of them were from urban areas.

Table (2): Indicates that less than half (45%) of studied children ranged from three to less than six years old with a mean of 3.45±2.67. Furthermore, 52% of the studied children were girls, and 43% of them were the second child among family children. Regarding educational level, it was observed that 45% of studied children were in nursery school.

Figure 1: Portrays that all of the studied mothers had not received any training regarding **dengue fever**.

Figure (2) highlights that the common source of knowledge about dengue fever among the studied mothers was doctors (80%)

Table (3): Shows that there was a highly significant difference and improvement between all items of knowledge **regarding dengue fever** among the studied mothers as the mothers had higher knowledge scores in all knowledge items post-educational **guidelines implementation** than pre-educational **guidelines implementation** (p-value <0.001**).

Figure (3): Portrays that there were statistically significant improvements in all items of mothers' total knowledge pre and post-educational guidelines implementation. Additionally, it demonstrates that 18% of the mothers had a satisfactory knowledge level regarding dengue fever pre-educational guidelines implementation which increases to be 80% post-educational guidelines implementation total attitude pre and post-educational guidelines implementation. Additionally, it demonstrates that 17% of the mothers had a positive attitude level regarding dengue fever prevention pre-educational guidelines implementation which improved to be 79% post-educational guidelines implementation.

Figure (4): Portrays that there were statistically significant improvements in mothers' total attitude pre and post-educational guidelines implementation. Additionally, it demonstrates that 17% of the mothers had a positive attitude level regarding dengue fever prevention pre-educational guidelines implementation which improved to be 79% post-educational guidelines implementation.

Figure 5 illustrates that 86% of the studied mothers had an inadequate level of practice pre-educational guidelines as compared with only 25% post-educational guidelines. On the other hand, only 14% of the studied mothers had an adequate level of practice pre-educational guidelines as compared with three-quarters (75%) post-instructional guidelines. This figure also shows highly statistically significant improvements and differences in the total practice level in pre/post-educational guidelines implementation.

Table (4): The multivariable analysis identified key factors associated with knowledge, attitude, and practice regarding dengue prevention. Occupation was identified as an independent predictor of good knowledge about dengue prevention. Age was recognized as an independent predictor of good practices related to dengue prevention. Age, education, and occupation emerged as independent factors significantly associated with a positive attitude towards dengue prevention.

The mean knowledge score was 10.4 out of 20, with a range of 2 to 18 and a standard deviation (SD) of 3.7. The mean attitude score was 4.5 out of 6, with a range of 2 to 6 and an SD of 1.1.The mean practice score was 3.9 out of 6, with a range of 2 to 6 and an SD of 0.9. A significant correlation ($p < 0.001$) was observed between knowledge and attitude, indicating that increased knowledge is associated with more positive attitudes. A significant correlation ($p < 0.001$) was found between knowledge and practice, suggesting that better knowledge translates into improved practices. A significant correlation ($p < 0.001$) was noted between attitude and practice, indicating that a positive attitude is associated with better practices in (table 5).

Table (1): Personal data of studied mothers (n=100)

Items	No.	%
Age in years		
18 < 30	80	80.0
30 < 40	20	20.0
Mean ±Stander deviation	26.22 ± 4.57	
Educational level		
- Illiterate	17	17.0
-Basic education	26	26.0
-Secondary education	34	34.0
-University education	23	23.0
Occupation		
- Working	37	47.0
- Not working	53	53.0
Residence		
- Rural	57	57.0
- Urban	43	43.0

Table (2): Personal data of the studied children (n=100)

Items	No.	%
Age		
3-<6 years	45	45.0
6-<9 years	35	35.0
9-12 years	20	20.0
Mean ± SD	3.45±2.67	
Gender		
Boys	48	48.0
Girls	52	52.0
Birth order		
First	33	33.0
Second	43	43.0
Third or more	24	24.0
Educational level		
Nursery school	45	45.0
First to third	40	40.0
Fourth to sixth	15	15.0

Figure 1: Distribution of the studied mothers regarding attendance previous training about dengue fever (N = 100)

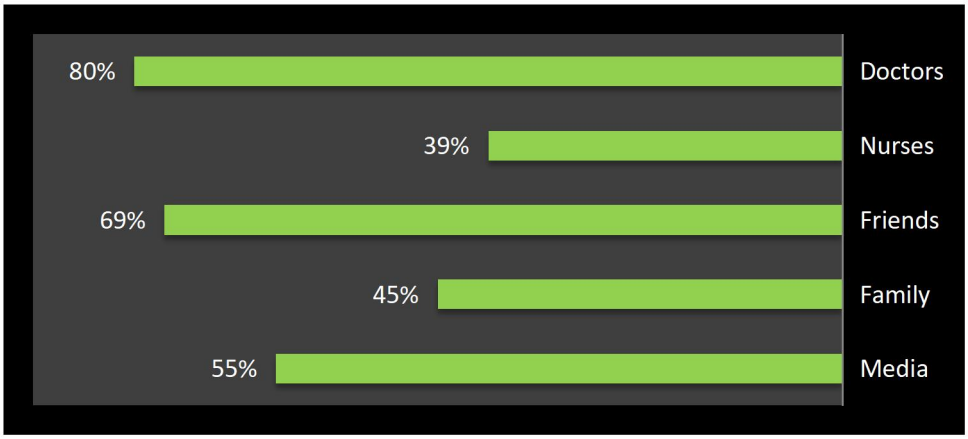


Figure 2: Source of knowledge among the studied mothers about dengue fever (N=200)

Table (3): Frequency and percentage distribution of the studied mother's knowledge regarding dengue fever pre and post- educational guidelines implementation (n=100)

Mother's knowledge	No =(100)				P-value
	Pre- educational guidelines		Post- educational guidelines		
	No	(%)	No	(%)	
Definition of dengue fever	10	10%	94	94%	<0.001*
Types of dengue fever	15	15%	86	86%	<0.001*
Causes of dengue fever	8	8%	82	82%	<0.001*
Signs and symptoms	16	16%	80	80%	<0.001*
Risk factors of dengue fever	9	9%	92	92%	<0.001*
Transmission of dengue fever	14	14%	86	86%	<0.001*
Mosquito vectors of dengue fever	10	10%	90	90%	<0.001*
Breeding sites of mosquitoes	16	16%	87	87%	<0.001*
Responsible for mosquito control	12	12%	90	90%	<0.001*
Biting time of mosquitoes	15	15%	79	79%	<0.001*
Management of dengue fever	18	18%	88	88%	<0.001*
Prevention of dengue fever	19	19%	89	89%	<0.001*

** Highly Statistical significant (P ≤ 0.001) P value a: McNemar test53

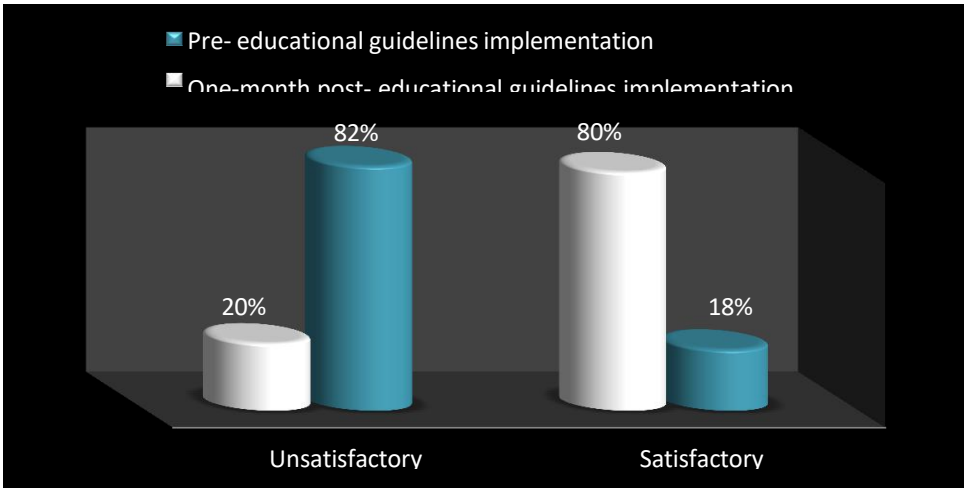


Figure (3): Total knowledge level among the studied mothers regarding dengue fever pre and one-month post-educational guidelines implementation (n=100).

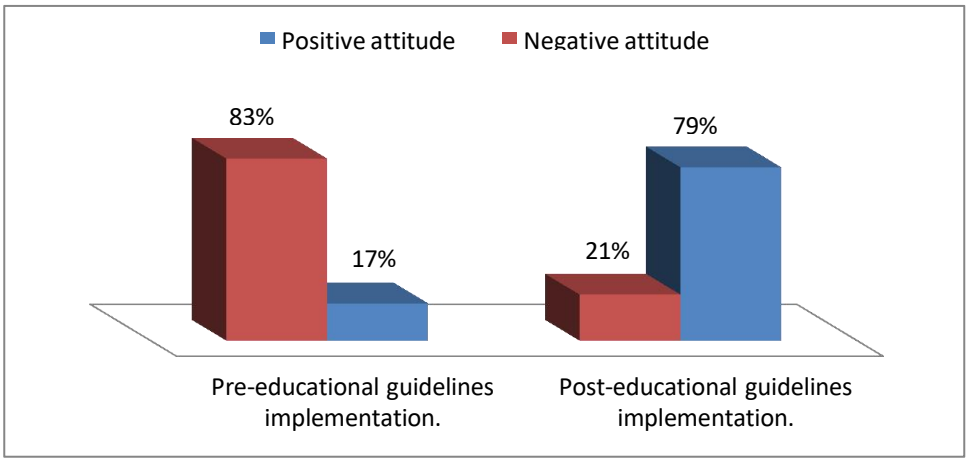


Figure (4): Total attitude level among the studied mothers regarding dengue fever prevention pre and post-educational guidelines implementation (n=100).

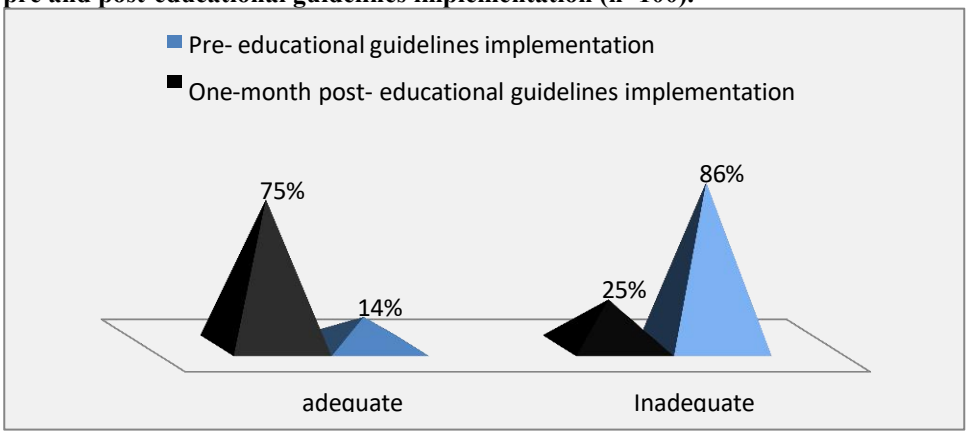


Figure (5): Total practice level among the studied mothers regarding dengue fever pre and one-month post-educational guidelines implementation (n=100).

Table 4. Multivariate analysis predictors of good KAP among the studied mothers

Data		Knowledge		Attitude		Practice	
		aOR	P	aOR	P	Aor	P
Age group	≤35	1.30 (0.87–1.94	0.198	1.56 (1.05–2.32)	0.030*	3.08 (2.03–4.67)	<0.001*
	>35	1.30 (0.87–1.94	0.198	1.56 (1.05–2.32)	0.030*	0.98 (0.66–1.46)	0.939
Education level	Primary education	1.78 (1.19–2.64	0.005*	1.68 (1.13–2.50)	0.010*	1.37 (0.92–2.02)	0.118
	Secondary education	1.00					
Occupation	Working	1.78 (1.15–2.79)	0.010*	1.70 (1.09–2.65)	0.020*	1.38 (0.90–2.12)	0.140
	Not working						

*Significant Pvalue (P <0.05).

Table 5. Correlation between knowledge, attitude and practice scores among the studiedmother

Items	r value* (95% CI)	P value
Knowledge – Attitude	0.865 (0.810-0.911)	<0.001
Knowledge – Practice	0.682 (0.611-0.746)	<0.001
Attitude – Practice	0.698 (0.627-0.761)	<0.001

*. Correlation is significant at the 0.05 level.

Discussion

Around half of the world's population is at risk from dengue, a viral infection spread by the bite of numerous species of mosquito, it is more prevalent in tropical and subtropical climes. Although many cases are asymptomatic, the virus can cause a mild to severe flu-like sickness, and on rare occasions, death, but until now there hasn't been much convincing evidence connecting it to poorer outcomes for children (**Pawaria et al., 2019).**

Dengue can be prevented by taking a few precautionary steps like keeping mosquitoes away. Empty still water collected in containers such as pots, vases, or cans in the area near your home as mosquitoes breed in still water. To avoid mosquito bites, wear loose long-sleeved clothes, stay in cool areas, and use mosquito repellents and bed nets. It is always better to prevent dengue. Wear protective clothing (long pants and long-sleeved shirts) and use insect repellent with icaridin (Picaridin) **(Ribeiro et al., 2020).**

Human knowledge and behavior towards the environment have been reported to play an important role in the transmission of dengue by affecting its vector **(Pai et al., 2020).** Hence, the researchers conducted this study on the effect of educational guidelines on mothers' knowledge, attitude, and practice regarding dengue fever complications prevention among their children.

The findings of this study showed that the majority of the studied mothers aged between 18 < and 30 years and more than half of them lived in rural areas. This could be one of the factors contributing to the knowledge deficit and resource gaps that exist more in rural than in urban areas.

The findings of this study showed that all of the studied mothers had not received any training regarding **dengue fever**. From the researchers' point of view, it confirmed the critical need for educational guidelines implementation.

The findings of this study showed that the common source of knowledge about dengue fever among the majority of the studied mothers was doctors. From the researchers' point of view, it reflected the significance of medical guidance. This result is similar to a study by **Swaddiwudhipong et al., (2018**), who highlights the importance of health professionals as primary sources of information about diseases. However, the findings also suggest that health professionals in the study area may not be adequately mobilized for awareness-raising programs.

1. Primary Source of Information: Respondents cited health professionals/workers as their primary sources of information about the disease, emphasizing the crucial role of healthcare providers in health education.

2. Limited Mobilization: The study indicates that health professionals in the area may not be adequately mobilized for awareness-raising programs, which could impact the effectiveness of health education initiatives.

3. Importance of Targeted Campaigns: The findings suggest that targeting future educational campaigns in key sites, such as healthcare facilities, could be essential for changing behavior and improving knowledge, attitude, and practice among the population.

This result is not similar to a study by **Rahman et al. (2020**) about "Climate Change and Dengue Fever Knowledge, Attitudes and Practises in Bangladesh" which found that social media in Bangladesh has grown to be a significant source of news and information. That study was conducted in Delhi, India's urban slums. Additionally, **Kohli et al., (2019**) research showed that for DF, television is the main source of information.

A study by **Pai et al. (2020)** highlights the significant role of media in disseminating information about dengue fever. The findings indicate that media, including television, radio, and newspapers, are primary sources of dengue knowledge for the general population **(Shuaib et al., 2019).**

The findings of this study showed that there was a highly significant difference and improvement between all items of knowledge regarding dengue fever among the studied mothers as the mothers had higher knowledge scores in all knowledge items post-educational guidelines implementation than pre-educational guidelines implementation. From the researchers' point of view, it reflected the positive effects of educational guidelines implementation.

The findings of this study showed that less than one-fifth of the mothers had a satisfactory knowledge level regarding dengue fever pre-educational guidelines implementation which increases to four-fifths post-educational guidelines implementation. According to the researcher, this demonstrated the significance of providing educational guidelines implementation for mothers to increase their knowledge.

According to the conclusions of the current study on this topic a study conducted by **Chatchen et al., (2017**) entitled "Slum Residents Lack Basic Awareness of Dengue Disease,". Most people were unaware of dengue.

Similarly, **Rahman et al., (2022**) discovered that many participants in our prior web-based research of the public and college students were unaware of the dengue virus's contagious behavior and a knowledge gap has been shown by inadequate mosquito breeding prevention methods. Additionally, it complies with a study from Bangladesh and Vietnam (**Nguyen et al., 2017**).

The current study's findings portrayed that there were statistically significant improvements in mothers' total attitude pre and post-educational guidelines implementation. This supported the good impact of offering educational guidelines from the researcher's perspective. Also, this demonstrated the effectiveness of educational guidelines implementation that is connected to knowledge advancements and reflected well on their attitudes.

The results of the current study revealed highly statistically significant improvements and differences in the total practice level in pre/post-educational guidelines implementation among the studied mothers. In the researcher's opinion, it reflected the success of the study's aim and the value of implementing educational guidelines that result in improvements in practice.

Several studies conducted in Malaysia have explored the knowledge, attitude, and practice (KAP) of communities regarding dengue fever prevention. These studies provide valuable insights into the effectiveness of public health interventions and community awareness.

Improved KAP in Dengue Hotspots: A study by **Ghani (2019)** found that participants from dengue hotspot areas showed better knowledge and attitudes after a proactive program was implemented to protect vulnerable groups in the community.
Good KAP in Urban/Suburban Communities: Research by **Zaki (2019) and Alhoot (2017)** reported

that urban and suburban communities in Malaysia generally have good knowledge of dengue fever, its symptoms, and prevention methods. These communities also demonstrated good practices and positive attitudes towards dengue prevention.

Consistent Findings: Other studies by **Abas et al. (2019) and Mahyiddin et al. (2019)** supported these findings, indicating that urban and suburban communities exhibit good knowledge, attitudes, and practices in dengue prevention.

Cross-Sectional Studies: Earlier cross-sectional studies in Malaysia, such as those by **Abdul Aziz (2019),** have also reported similar findings, highlighting the effectiveness of public health initiatives in improving community KAP.

According to the current study in analysis, multivariable model, occupation was the independent predictor for good knowledge. Also, age is considered the independent predictor for good practices.In the multivariable model, age, education, and occupation were independent factors significantly associated with a good attitude.

This outcome might be that the mothers who work are more exhausted for extended periods at work. This may help to explain why rural and urban areas have different cultures, values, and beliefs. It may also help to explain why mothers in rural areas experience greater stress due to a lack of medical supplies, a lack of social media awareness, and difficulty traveling to a hospital or health center in urban areas when their children exhibit signs of infection.

Similarly, Other Malaysian study done by **Ghani, (2019)** have reported employment status to be associated with a good attitude toward dengue prevention.

Also, **(Wan et al., 2016; Ghani, 2019; Wong et al., 2019)** found the same , while another study highlights the influence of employment on knowledge (**Naing et al., 2019)**. This may be attributed to the fact that working adults are more frequently engaged in health campaigns and educational initiatives at their workplaces, thereby acquiring more information about dengue fever than those who are unemployed.

The present study reveals that correlations were found between the studied mothers' knowledge and attitude; knowledge and practice; attitude and practice. This association implies that good knowledge necessarily leads to improved attitude and finally leads to good practice. From the researchers' point of view, it reflected that a knowledge deficit leads to inadequate practices and negative attitudes. However, after administering the educational guidelines, This result reflects the benefit of educational guidelines, which met the mother's needs and provided them with sufficient knowledge, attitude, and practice to cope with this disease.

The study reveals a significant positive correlation between knowledge, attitude, and practice among participants. As knowledge increases, attitudes and practices also improve, indicating a direct relationship between these variables. The findings closely align with several previous studies **(Kamel, 2017 and Nasaruddin et al., 2019),** whereas other research merely indicated the relationship between knowledge of dengue and a positive attitude towards dengue control53, as well as between a positive attitude and effective practices for dengue prevention (**Wan et al., 2016 and Lugova, & Wallis, 2017).**

A prior study indicated that the search and destroy method necessitates adequate knowledge and skills to effectively eliminate breeding sites **(Carandang et al., 2020).** Other researchers, such as **Azfar (2017), Lozano et al. (2018), and Mahyiddin et al. (2019),** found no significant correlation between strong knowledge and effective practices.

Conclusion

Based on the results and hypotheses of the present study, the study findings concluded that The implementation of educational guidelines has positively influenced mothers' knowledge, attitude, and practice regarding dengue fever prevention among their children. A significant positive correlation ($p < 0.001$) was found between knowledge , practices, and attitude, indicating that increased knowledge led to a more positive attitude.

Recommendations

The subsequent recommendations are proposed in light of the findings from the current study:

- The implementation of educational instruction concerning dengue fever is advised in multiple maternity healthcare environments.

- It is essential to provide educational booklets focused on the prevention of dengue fever

complications for mothers, utilizing these booklets along with illustrated pamphlets to enhance their understanding.

- In order to generalize the results from the present study, a more studies in different settings is required.

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