

## Effect of Educational Guidelines on Pregnant Women's Knowledge, Practice, and Anxiety Regarding Dengue Fever

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### Abstract

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**Background:** Dengue fever is one of the leading causes of hospitalization. Educating the patient is the responsibility of the nurse, which is one of the most important aspects of patient post-cardiac surgery.

**Aim:** To determine the effect of educational guidelines on pregnant women's knowledge, practice, and anxiety regarding dengue fever. **Subjects and method:** Design: A quasi-experimental research design was used to achieve this study. **Setting:** The study was applied in antenatal outpatient clinics at Sohag University Hospital. **Subjects:** A purposive sample of 100 pregnant women involved in the study from the previously selected settings. **Four tools were used:** Tool (I) a structured interview questionnaire,

Tool (II) pregnant women's knowledge regarding dengue fever, Tool (III) pregnant women's practice regarding dengue fever, (pre/post), and Tool (IV) a State-Trait Anxiety Inventory scale. **Results:** A statistically significant difference was detected between pregnant women's level of knowledge and practice regarding dengue fever after educational guidelines intervention. Also, the study demonstrated that there was a highly statistically significant difference in anxiety scores at ( $P = <0.001$ ) among the studied pregnant women after educational guidelines intervention. **Conclusion:** Educational guidelines intervention has a positive effect on enhancing pregnant women's knowledge and practice and decreasing their anxiety level regarding dengue fever. **Recommendations:** Educational instruction intervention regarding dengue fever is recommended in various maternity healthcare settings.

Educational booklets should be provided about dengue fever for pregnant women and taught using the booklet and illustrated pamphlets for each one to improve their information and reduce their anxiety levels in addition to replication of the current study with a larger sample of patients undergoing cardiac surgery in different settings is required for generalizing the results.

**Keywords:** Anxiety, Dengue fever, Educational guidelines, Knowledge and practice, Pregnant women.

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### Introduction

Through the bite of an infected mosquito, dengue is transmitted. An already-infected pregnant mother who has dengue can transmit the virus to her fetus during pregnancy or right before delivery. The fetus's mortality, poor birth weight, and early birth are only a few of the negative impacts of dengue. Dengue was previously categorized by the World Health Organisation (WHO) into three illness categories: dengue fever (DF), dengue hemorrhagic fever (DHF), and dengue shock syndrome (WHO, 2021). Due to several flaws in the classification system, most notably the underestimating of some patients' disease severity (WHO, 2019).

There are currently two categories for dengue cases: severe dengue and dengue with or

without warning signals. Without any prior symptoms, dengue manifests as an acute febrile illness with at least two of the following symptoms: rash, aches and pains, leukopenia, and a positive tourniquet test. The diagnosis of dengue with warning signs requires the observation of at least one of the following: abdominal pain, prolonged vomiting, fluid buildup, mucosal bleeding, fatigue, liver enlargement, and increasing hematocrit with decreasing platelets. Organ failure, severe bleeding, or significant plasma leakage are all symptoms of severe dengue. Studies that have looked into the health effects of dengue during pregnancy have yielded mixed results and these effects are not fully understood (Paixao et al., 2019).

The most common virus that infects people and is transmitted by mosquitoes is dengue. Dengue virus, which is carried by Aedes and has four different serotypes, is the main culprit. It belongs to the family Flaviviridae and is a form of flavivirus. A majority of tropical and subtropical nations, if not all of them, have an endemic dengue outbreak, and roughly half of humanity is thought to be in danger (**Ministério et al., 2018**). The country's greatest dengue outbreak 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 (**WHO, 2020**).

In the previous 20 years, there have been eight times as many dengue cases as there were. The reappearance of the dengue virus serotype 2 (DENV-2) at this time may be responsible for the rise in cases (**Governo et al., 2020**). Such an expressive increase can immediately lead to both the emergence of severe forms of the disease as well as a larger exposure of at-risk groups, such as pregnant women. A febrile sickness called DENV infection can cause anything from asymptomatic cases to death. People with a fever in Brazil who also have at least two of the following symptoms, such as rash, myalgia, headache, retroorbital pain, petechiae, a positive tourniquet test, or leukopenia, and who have experienced a relevant epidemiological exposure should be checked for DENV infection (**Ministério et al., 2019**).

Individuals' physical health has a significant impact on their psychological well-being (**Mushtaq & Zahir, 2019**). It is generally known that dengue infection may have an impact on the body's central nervous system, according to research that has already been published (**Pawaria et al., 2018**). They are more likely to have a wide range of psychological problems, such as depression, anxiety, and distress, at rates that are twice as high as the general population as a result, and they may have psychiatric symptoms along the

course of the disease (**Jhanjee et al., 2019**).

There have been case reports of patients with acute dengue infection exhibiting psychological symptoms. Anxiety and depression symptoms are significantly more common in dengue fever patients, according to a Pakistani study (**Hashmi et al., 2019**). According to additional research, dengue fever patients have afflictions including phobic disorders and post-traumatic stress disorder. The acute clinical context, when the patients were admitted for treatment, is where the majority of this research, however, was conducted. It is reasonable to assume that these severe psychological symptoms may have been caused by the pressures associated with having a physical disease and being hospitalized (**Khan et al., 2018**).

A suspected case of dengue is divided into one of three severity categories by the clinician during the initial evaluation: dengue, dengue with warning signs (abdominal pain, persistent vomiting, mucosal bleeding, lethargy, liver enlargement or an increase in hematocrit concurrent with a rapid decrease in the platelet count), and severe dengue (severe plasma leakage, severe bleeding, or severe organ involvement). Regardless of the severity of dengue, the health services recommend in-hospital management for all pregnant women (**Shafique et al., 2022**).

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, including an eightfold increase in mortality risk and a high incidence of thrombocytopenia, hemorrhagic presentations, premature delivery, miscarriage, and stillbirth. 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**).

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), Use insect repellent with icaridin (Picaridin). It is available in greater strength in other parts of the world. However using strengths greater than 50% does not significantly increase protection (**Ribeiro et al., 2020**).

Use precaution if applying insect repellents, especially on children. Make careful you read and abide by the label's instructions. 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**).

There is no specific vaccine or medicine for dengue treatment. The treatment of dengue during pregnancy is like any other disease. The doctor may ask a pregnant woman to take a blood test. If the result is positive, a few more tests were suggested to calculate the level of infection and then start the treatment, as paracetamol may be recommended to treat the fever as it is considered to be safe for pregnant women, Staying hydrated is important for maintaining embryonic fluid level, so to prevent dehydration from vomiting, you will be asked to drink lots of water and fresh juices, etc, To control joint or muscle pain, doctors recommend pain killers and antibiotics. Self-medication and taking counter medicines like aspirin and related drugs for dengue during pregnancy are not safe (**Barroso et al., 2020**).

Mild instances can often be handled at home with rest and lots of water to avoid dehydration. For pain relief, you can take paracetamol (Tylenol). However, avoid using NSAIDs like aspirin, ibuprofen (such as Advil or Motrin), or naproxen (such as Aleve). They could make bleeding more likely. When using medications, exercise caution. Read and abide by all directions on the label. People with mild

cases of dengue fever typically recover within two weeks (**Shafique et al., 2022**).

In severe cases, pregnant women may need to be admitted to the hospital and given fluids via a drip to prevent dehydration and stabilize blood pressure, blood pressure, platelet count, oxygen, and intravenous fluid will be monitored regularly and if needed, infuse platelets (in extreme cases). If there is excess bleeding, a blood transfusion might also be done (**Barroso et al., 2020**).

The role of the obstetric and community can help pregnant women seeking the advice of a health professional for early diagnosis; z covering, emptying, and cleaning of domestic water storage containers every week; z disposing of solid waste properly and removing artificial man-made mosquito breeding sites (vehicle tires, fruit cans, plastic bags) from the environment; z drainage of water collection points around the house; and z raising community awareness for mosquito control (**Ribeiro et al., 2020 a**).

### **Significance of the study:**

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The health of around half of the world's population is at risk from dengue, a viral infection spread by the bite of numerous species of Aedes mosquito. Despite gradually spreading to southern Europe and US states due to climate change, 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 birth outcomes after pregnancy (**Ribeiro et al., 2020b**).

The research, which was reported in the American Economic Journal: Applied Economics, established a link between mild and moderate dengue illness during pregnancy and a drop in newborns' average birth weights. The incidence of low, very low, and extremely low birth weights increased by 15%, 67%, and 133%, respectively, for infants at the lower end of the birth weight scale as a result of the effect (**Shafique et al., 2022**). Due to the limited information on the effect of dengue during pregnancy, despite the high prevalence of this

illness, no well-designed studies are looking at the prevalence of psychiatric symptoms in patients with Dengue. There is thus an urgent need to conduct such studies to assess the impact of Dengue on mental health, hence the study was conducted to determine the effect of educational guidelines on pregnant women's knowledge, practice, and anxiety regarding dengue fever.

### Aim of the study:

This study aimed to determine the effect of educational guidelines on pregnant women's knowledge, practice, and anxiety regarding dengue fever through:

- Assessing pregnant women's knowledge regarding dengue fever.
- Assessing pregnant women's practice regarding dengue fever.
- Assessing pregnant women's anxiety regarding dengue fever.
- Analyzing the association between pregnant women's knowledge, practice, and their anxiety pre and post-educational guidelines.
- Evaluating the effect of educational guidelines on pregnant women's knowledge, practice, and anxiety regarding dengue fever.

### Research hypothesis:

**H<sub>1</sub>**. Pregnant women' who received educational guidelines implementation regarding dengue fever would experience an improvement in the knowledge and practice levels post-implementation than pre-implementation.

**H<sub>2</sub>**. Pregnant women' who received educational guidelines implementation regarding dengue fever would experience fewer anxiety levels post-implementation than pre-implementation.

### Subjects and Methods:

#### Research design:

A quasi-experimental research design was used to achieve the aim of this study.

#### Setting:

The study was conducted in the Sohag University Hospital's Antenatal Outpatient Clinics.

This setting was chosen because it serves the population in the nation and has a high

frequency of pregnant women among the settings. One room in this clinic is separated into a diagnostic and examination space. Additionally, the researchers conducted interviews with the recruited pregnant women in a waiting room for women's admission to put the instructional instructions into practice. From 9 am until 12 pm it was open.

#### Sample:

Based on the non-probability purposive sampling technique, a sample of 100 pregnant women who participated in the study from the previously chosen locations was employed. The following criteria were used to choose the pregnant women who participated in this study:

#### The inclusion criteria were:

- Ranging in age from 20 to 40.
- They consented to participate in the study
- Pregnant women in the second trimester

#### The exclusion criteria were:

- Refused to participate.
- Women who are pregnant who have 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.

#### Tools of data collection:

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

**Tool (I):- A structured interview questionnaire;** it consists of 7 items divided into two parts.

**Part I:** It was used to gather information on the demographics of pregnant women and included the following 4 items: age, educational attainment, occupation, and place of residence.

**Part II:** It was used to gather information about obstetric history and had three items: gravida, parity, and gestational age.

**Tool (II): Pregnant women's knowledge regarding dengue fever (pre/post):** It was

developed by the researchers after reviewing the related literature and research studies (**WHO, 2021; Governo et al., 2020; Barroso et al., 2020; Ministério et al., 2019**): It was created by the researchers and has fifteen multiple-choice questions within it. It was used to gauge the knowledge of pregnant mothers on dengue illness 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. Biting time of mosquitoes, prevention, treatment, source of information

#### Scoring system:

Pregnant women who chose one of the options (yes) received two points, while those who checked one of the options (no) received one point and those who checked one of the options (don't know) received one point (0). Furthermore, the following categories were used to group the women's overall knowledge scores. The overall knowledge score was out of 15, with 15 being the highest and 0 being the lowest. For those who received a score between 0 and 8, the knowledge score was deemed to be poor knowledge (<60%), and for those who had a score between 8 and 15, the knowledge score was deemed to be satisfactory knowledge ( $\geq 60\%$ ).

**Tool (III):- Pregnant women's 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 pregnant women's reported practice: It was created by the researcher after evaluating pregnant women's practice. It had ten multiple-choice questions (MCQs) on topics such as seeking the advice of a health professional for early diagnosis; covering, emptying, and cleaning domestic water storage containers every week; disposing of solid waste properly and removing 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. It included questions about 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?, and What measures do you take to prevent mosquito bites?

#### Scoring system:

The reported practice questions were in MCQ format, with a total score of 10 for the five elements; the right answer scored a 1, while the incorrect answer received a 0. If pregnant women reported their practices at a rate of greater than 60%, their practices were deemed adequate according to the method of total reported practices. - Pregnant women whose reported practices fell below 60% were considered to have inadequate practices.

#### Tool (IV) A State-Trait Anxiety Inventory:

The State-Trait Anxiety Inventory is a self-assessment questionnaire made up of brief items that were adopted by **Spielberger (1972)** to determine the level of State-Trait Anxiety. 20 items ask respondents to describe how they felt about themselves under specific circumstances while keeping in mind how they felt about the environment they were in.

Expressions are divided into direct and reversed forms in this section. The SPSS program was used in a computer setting to conduct the scoring. The direct and inverted expressions were first prepared on two independent scales. The total weighted score for negative expressions was deducted from the total weighted score for direct expressions post being positive for direct expressions and negative for negative expressions.

#### Scoring system:

The scale items measure the level of State-Trait Anxiety and are scored as follows: "none" (1), "some" (2), "many" (3), and "entirely" (4). The highest score obtained is 80 and the lowest score is 20.

#### 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 obstetrics and gynecology

nursing field, one professor; in the community, and one professor, in the Psychiatric nursing

field. No modifications were made according to the panel judgment to ensure sentence clarity and content appropriateness.

#### **Reliability of the tools:**

The first tool reliability was ( $r = 0.94$ ), the second tool's reliability was ( $r = 0.934$ ), The third tool's reliability was ( $r = 0.90$ ), and The State-Trait Anxiety Inventory 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, the researchers met with the directors of the selected setting to explain the study's aim and gain their cooperation. Ethical approval by the institutional review board of the Faculty of Nursing, Sohag University. To gain the cooperation of pregnant women, informal consent was gained. Both the study's objective and its anticipated results were stated. The pregnant women 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. Everyone who took part in the trial and was pregnant granted consent. 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 pregnant women after examining pertinent contemporary 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, practices, and anxiety. Each pregnant lady was given around 15 minutes to complete this questionnaire individually, after which each was subjected to an individual evaluation by the researchers.

Each in-person interview with the pregnant women lasted between 10 and 15 minutes and was performed by the researcher. Pregnant women were greeted and introduced to the researcher prior to each interview. She 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 pregnant women at the end of the sessions.

The subject contents have been sequenced through four sessions (three sessions for theoretical content and one session for practice), and each session took 40- 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 that was easy for pregnant women to comprehend, the researchers first assessed the women's knowledge, practise, and anxiety.

### Session 2:

The theoretical portion included information on pregnant women's 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. Biting time of mosquitoes, prevention, treatment, source of information

### Session 3:

Included information about the practical part 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?, and What measures do you take to prevent mosquito bites?

### Session 4:

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

### Phase III: Evaluation phase:

The post-test was done post one month to assess the effect of educational guidelines implementation on pregnant women's knowledge, practice, and anxiety regarding dengue fever 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 75% of pregnant women aged between 18 < and 30 years with mean  $\pm$  SD  $27.13 \pm 4.67$ , (36%) of them had basic education, meanwhile, and also, it is also pointed out that 63% of pregnant women were not working. Finally, (73%) of pregnant women lived in rural areas and 43% of them were from urban areas.

**Table 2** presented the obstetric history of the studied pregnant women, It was noticed that (55%) of the pregnant women were multigravida and (52%) were multipara. 53% of the women were between 20 weeks and 25 weeks and 47% of them were between more than 25 weeks to 30 weeks.

**Figure (1)** highlighted that the common source of information among the studied pregnant women was doctors (63%)

**Table 3** shows that before the implementation of educational guidelines, knowledge mean scores related to dengue disease had declined post the educational guidelines implementation, there was a significant increase in the knowledge means scores.

**Figure (2):** Portrays that there were statistically significant improvements in all items of pregnant women's total knowledge pre and post-educational guidelines implementation. Additionally, it demonstrates that 20% of the pregnant women had a satisfactory knowledge level regarding dengue fever pre-educational guidelines implementation which increases to 78% post-educational guidelines implementation

**Figure (3):** Demonstrates statistically significant improvements in all items of pregnant women' total practices pre and one-month post-educational guidelines implementation .Also, it illustrates that 15% of the pregnant women had

adequate practice level regarding dengue fever pre-educational guidelines implementation which improved to 76% post-educational guidelines implementation.

**Table (4)** shows that there was a statistically significant difference between the trait anxiety mean scores among the studied pregnant women regarding dengue fever pre and post-educational guidelines implementation ( $p<0.001$ ). it was found that anxiety mean scores in post-educational guidelines implementation were lower in comparison to their anxiety mean scores pre- educational guidelines implementation

**Table (5):** Shows a moderately negative correlation ( $r= -0.567$ , P value 0.0001) between the knowledge and educational guidelines implementation of the pregnant women under study. Additionally, there was a weak negative correlation ( $r= -0.503$ , P value 0.0001) between pregnant women's residence and anxiety levels.

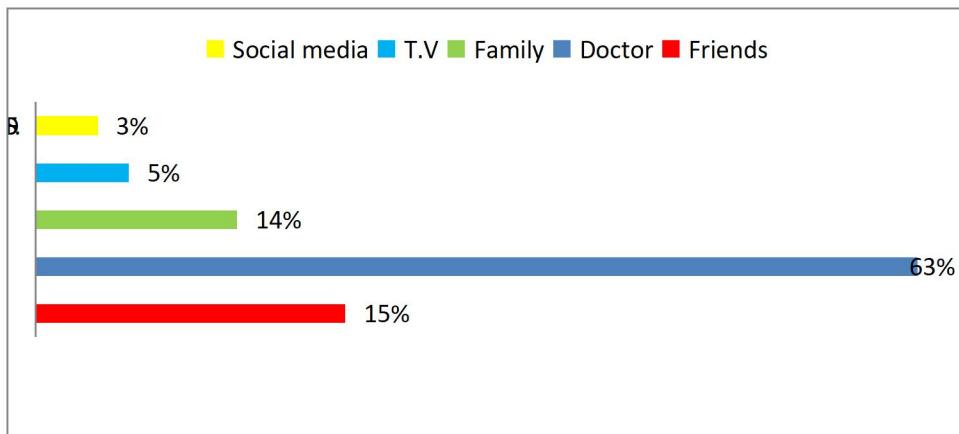
**Table (6):** A moderate negative correlation ( $r= -0.533$ , P value 0.013;  $r= -0.656$ , P value 0.017, respectively) was discovered between the study's pregnant women's knowledge, practice, and concern regarding dengue fever before and after the implementation of educational guidelines.

**Table (1): Demographic characteristics of studied pregnant women (n=100)**

Items	No.	%
<b>Age in years</b>		
18 < 30	75	75.0
30 < 40	25	25.0
<b>Mean ±Stander deviation</b>		27.13 ± 4.67
<b>Educational level</b>		
- Illiterate	15	15.0
-Basic education	36	36.0
-Secondary education	24	24.0
-University education	25	25.0
<b>Occupation</b>		
- Working	37	37.0
- Not working	63	63.0
<b>Residence</b>		
- Rural	57	57.0
- Urban	43	43.0

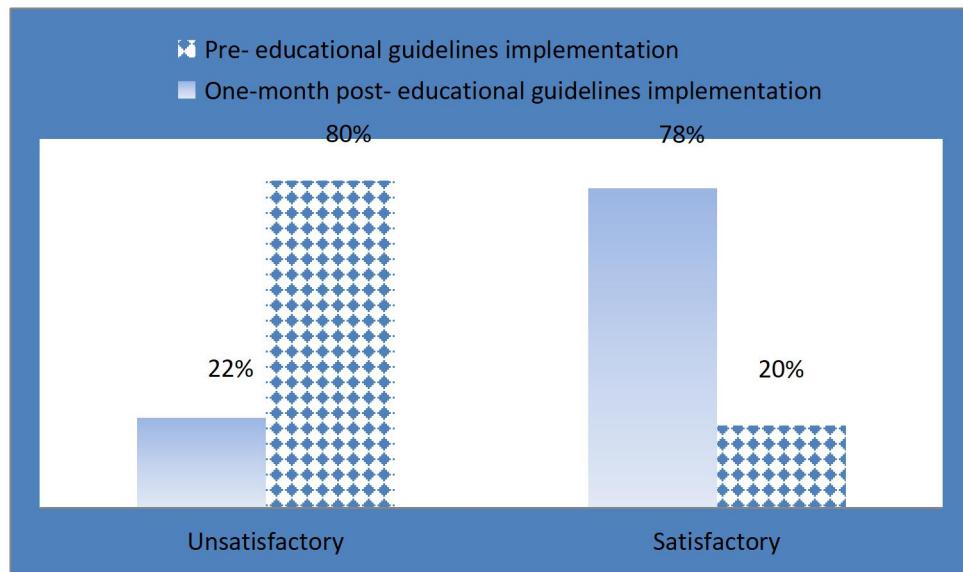
**Table (2): Obstetric history of the studied pregnant women (n=100)**

Items	No.	%
<b>Gravida</b>		
- Primigravida	45	45.0
- Multigravida	55	55.0
<b>Parity</b>		
- Nullipara	25	25.0
- Primipara	23	23.0
- Multipara	52	52.0
<b>Gestational age</b>		
- 20-25	53	53.0
- 25-30	47	47.0

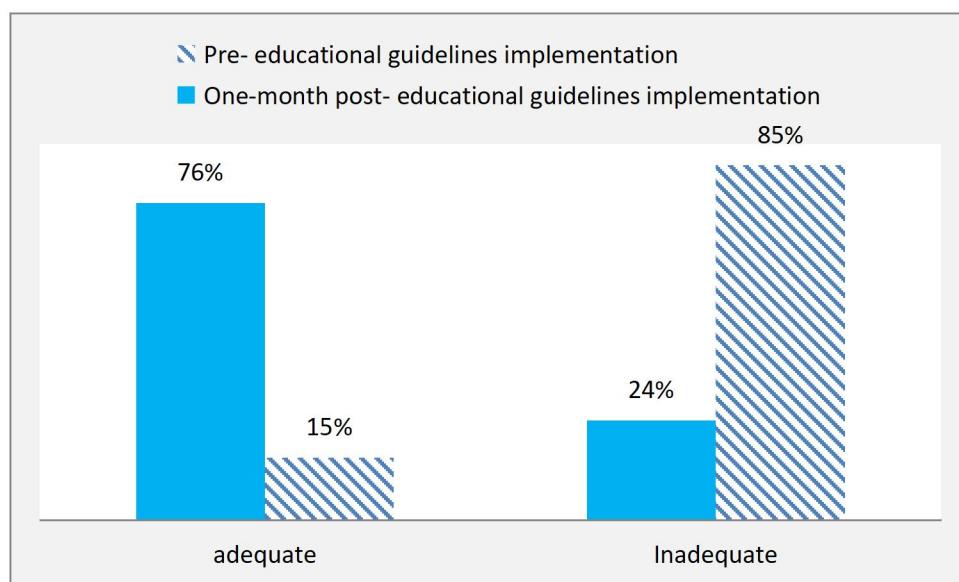
**Figure (1): Source of information about dengue fever of studied pregnant women (n=100)**

**Table (3) Comparison between the mean score of studied pregnant women's knowledge about dengue fever pre-, and post-one month of educational guidelines implementation (n=100).**

Variable	Pre- educational guidelines intervention	One-month post-educational guidelines intervention	Paired t-test	P-value
	Mean ±SD	Mean ±SD		
Definition of dengue fever	.54±.44	1.92±.54	14.2	<0.001
Types of dengue fever	.62±.46	1.62±.46	18.3	<0.001
Causes of dengue fever	.43±.64	1.36±.29	13.04	<0.001
Signs and symptoms	.72±.52	1.75±.34	15.3	<0.001
Risk factors of dengue fever	.52±.43	1.43±.36	8.04	<0.009
Transmission of dengue fever	.72±.23	1.13±.35	14.3	<0.001
Responsible for mosquito control	.73±.62	1.55±.26	11.3	<0.001
Management of dengue fever	.53±.62	1.65±.30	14.5	<0.001
Prevention of dengue fever	.35±.52	1.74±.22	10.4	<0.001



**Figure (2): Total knowledge level regarding dengue fever among the studied pregnant women pre and one-month post-educational guidelines implementation (n=100).**



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

**Table (4): Comparison between the studied pregnant women's anxiety means scores regarding dengue fever pre/post educational guidelines implementation (n=100)**

State and Trait Anxiety Scale Scores	Pre-educational guidelines intervention	One-month post-educational guidelines intervention	t-test	p-value
<b>State and Trait Anxiety Scale Scores</b>	41.42 ± 8.35	25.12 ± 2.34	12.024	<0.001*

\*= significant at p<0.001 level

**Table (5): Correlation between total knowledge, practice, and anxiety regarding dengue fever among the Studied pregnant women and their selected demographic data (n= 100).**

Items		Knowledge	Practice	Anxiety
pregnant women's age	R	-.131-	-.103-	.184
	P – value	.354	.451	.187
pregnant women's educational level	R	<b>-.567</b>	.021	-.043-
	P – value	<b>.0001**</b>	.861	.763
pregnant women's occupation	R	.071	<b>-.331</b>	<b>-.375</b>
	P – value	.609	<b>.017*</b>	<b>.007**</b>
pregnant women's residence	R	.045	<b>-.294</b>	<b>-.503</b>
	P – value	.741	<b>.034*</b>	<b>.0001**</b>

\*\*. Correlation is significant at the 0.01 level\*. Correlation is significant at the 0.05 level

**Table (6): Correlation between total Knowledge, practice, and Anxiety regarding dengue fever among the studied pregnant women pre/ post educational guidelines implementation (n= 100).**

Items	Variables	Pre- educational guidelines intervention	One-month post-educational guidelines intervention
		Knowledge	Knowledge
Pre- educational guidelines intervention	Practice	R	-0.100
		P – value	0.487
	Anxiety	R	-0.094
		P – value	0.546
One-month post-educational guidelines intervention	Practice	R	0.156
		P – value	0.547
	Anxiety	R	0.847
		P – value	0.175

\*. Correlation is significant at the 0.05 level

### Discussion

According to the findings of the current study, 75 percent of pregnant women were between the ages of 18 and 30. A descriptive survey of "Dengue Fever in the Indian Subcontinent" conducted in Rio de Janeiro (2019) by Raheel et al. revealed results that were comparable to those of Raheel et al., but lower than those of other series in French Guiana (Department of Health, 2022). The variance in first pregnancies' typical ages between nations, social variations, and levels of development could all help to explain the disparity in pregnant women's ages.

Less than 75 percent of pregnant women lived in rural areas, according to the study's findings. This could be one of the factors contributing to the knowledge and resource gaps that exist more in rural than in urban areas.

The findings of this study showed that approximately two-thirds of respondents indicated that doctors were the most prevalent source of information for pregnant women. The significance of medical guidance in preserving health reflects this.

This outcome differs from 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.

The findings of this study's knowledge mean score analysis showed that knowledge mean scores for dengue fever declined before the implementation of educational guidelines. According to the researcher, this demonstrated the significance of providing educational recommendations for expecting mothers to increase their understanding.

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.

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

The current study's findings portrayed that after one month of the implementation of educational guidelines, there was a rise in the knowledge mean scores with a strong statistical significance. This supported the good impact of offering educational guidelines from the researcher's perspective.

The results of this study demonstrated significant gains in the overall knowledge of pregnant women both before and after the use of educational recommendations. From the standpoint of the researcher, this demonstrated the effectiveness of educational guidelines implementation that is connected to knowledge advancements.

The people were also determined to need a fundamental knowledge of DF, according to the current study. This outcome is comparable to that of **Selvarajoo et al., (2020)** who discovered A small number of participants accurately identified the risk of dengue during pregnancy. Also found in Malaysia was a lack of understanding of the dangers of dengue during pregnancy. This risk has been mentioned in earlier research (**Mohamed et al., 2014; Selvarajoo et al., 2020**).

In all areas of pregnant women's total practices, both before and after the application of educational guidelines, the results of the current study revealed statistically significant changes. This demonstrated, in the researcher's opinion, the value of implementing educational principles that result in improvements in practice.

This result is supported by **Nguyen et al., (2019)** found that inadequate practices to prevent mosquito breeding have indicated the knowledge gap. It also corresponds to another study in Vietnam.

The current study's findings showed that there was a statistically significant difference in the trait anxiety mean scores among the pregnant women who were evaluated for dengue fever before and after the adoption of educational guidelines. According to the researchers, this may be due to a high level of stress, pregnant women's lack of knowledge about dengue fever and preventive measures, and pregnancy-related anxieties. The researchers hypothesize that this may be due to mothers' lack of familiarity with the issue and concern over potential difficulties for their developing fetus. Additionally, this result supported study hypothesis H2 and demonstrated the beneficial impacts of educational guidelines implementation on anxiety levels among pregnant women.

These results were expected because women experience anxiety at a higher rate than men (**Brasil & Ministério, 2019**). Similar to this, **Jhanjee et al., (2019)** study found that the majority of dengue fever patients had serious psychiatric morbidities. Additionally, **Udayanga et al., (2016)** study, which found that patients with prior dengue infections had considerably

higher levels of anxiety and despair, supports this finding.

Inflammatory cytokines are believed to play a significant role in the development and maintenance of certain of the symptoms of depression during systemic illness (Hayley, 2018). There is mounting evidence that the immune system and the brain communicate with one another, with peripheral immunological activity being linked to problems with behavior, mood, and cognition. Proinflammatory cytokines including Interleukin 4/6 and TNF-Alpha are known to rise in serum levels during viral infection (Wilkinson et al., 2020). These can subsequently result in or contribute to the emergence of depressive or anxious symptoms. Additionally, cytokines play a role in the recovery from viral illnesses, including infections with viruses in the Flaviviridae family (Lazear et al., 2019; Szretter et al., 2019; La Gruta et al., 2017; Sun et al., 2019).

These findings indicated that pregnant women who were studied experienced less overall anxiety following the introduction of instructional recommendations than before interventions. The difficulties in containing the disease, the dearth of medical facilities in the nation, and pregnant women's worries about their pregnancy ending up lost could all be considered causes of these results.

According to the current study, there was a moderately negative correlation between the investigated pregnant women's knowledge and educational guidelines implementation. Additionally, the current study shows that there was a moderately unfavorable link between pregnant women's work, degree of anxiety, and place of residence, particularly in rural areas, which was associated with high mean scores of anxiety. This outcome might be the result of pregnant women who work being 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 pregnant women 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. Pregnant

women's high levels of anxiety were also associated with their work.

The present study reveals that a moderate negative correlation was found between the studied pregnant women's knowledge, practice, and anxiety regarding dengue fever pre and post-educational guidelines implementation. This association between knowledge and practice implies that good knowledge does necessarily lead to good practice. Also, having good knowledge and practice can decrease the anxiety level. From the researchers' point of view, it reflected that a knowledge deficit leads to inadequate practices which increases anxiety about the unknown. This result reflects the benefit of administering the educational guidelines, which met the pregnant women's needs and provided them with sufficient knowledge and practice to cope with this disease. Also, reflected the success of the study's aim.

## Conclusion

Based on the results and hypotheses of the present study, the study findings concluded that educational guidelines intervention has a positive effect on enhancing pregnant women's knowledge and practice and decreasing their anxiety level regarding dengue fever. Pre- and post-educational guidelines, pregnant women's knowledge and practice regarding dengue fever, and their level of anxiety were found to be strongly statistically correlated.

## Recommendations

The following suggestions are made based on the current study's findings:

- Educational instruction intervention regarding dengue fever is recommended in various maternity healthcare settings.
- Educational booklets should be provided about dengue fever for pregnant women and taught to them using the booklet and illustrated pamphlets for each one to improve their information and reduce their anxiety levels.
- To make pregnant women more resilient throughout the dengue fever outbreak and to reinforce potential actions that are

crucial to assist and aid in psychological adjustment, psychological support should be promoted through the media.

- Pregnant women should get brochures and booklets with adequate information on dengue illness and associated prevention measures.
- To generalize the findings from the current investigation, a larger sample of patients undergoing cardiac surgery in various settings is needed.

## References

- Barreto, P., Braga, A., & Andrade, M. (2016): Avaliação da completitude dos registros de dengue: estudo exploratório de notificações compulsórias. *Online Braz J Nurs* [Internet]. [Aug 02]; 11(3). Available from: [http://www.objnursing.uff.br/index.php/nursing/rt/printerFriendly/3920/188\\_1](http://www.objnursing.uff.br/index.php/nursing/rt/printerFriendly/3920/188_1)
- Barroso, R., Betancourt, I., Saeta, Y., Navarro, M., & Guerre, G. (2020): Répercussion de la dengue sérotype 3 sur le produit Conception. *Rev Gynecol Obstet*;36:42–50 Cuba
- Brasil. & Ministério da Saúde. (2019): Dengue: manual de enfermagem. 2. ed. Brasília: Ministério da Saúde. Internet [cited Aug 02]. Available from: [http://bvsms.saude.gov.br/bvs/publicacoes/dengue\\_manual\\_enfermagem.pdf](http://bvsms.saude.gov.br/bvs/publicacoes/dengue_manual_enfermagem.pdf)
- Chatchen, S., Sabchareon, A., & Sirivichayakul, C. (2017): Serodiagnosis of Asymptomatic Dengue Infection. *Asian Pac J Trop Med* 10(1):11–4. Doi:10.1016/j.apjtm..12.002
- Department of Health. *Daily Dengue Status Report* (2022): Available from: <https://dghs.gov.bd/index.php/bd/home/5200-daily-dengue-status-report>.
- Governo, D., Paraná, A., Secretaria, E., & Estado, S. (2020): Situação da Dengue, Chikungunya e Zika vírus no Paraná. Informe Técnico; 1(44):1–20. <https://www.saude.pr.gov.br/Editoria/Dengue#>.
- Harapan, H., Rajamoorthy, Y., Anwar, S., Bustamam, A., Radiansyah, A., & Angraini, P. (2018): Knowledge, Attitude, and Practice Regarding Dengue Virus Infection Among Inhabitants of Aceh, Indonesia: a Cross-Sectional Study. *BMC Infect Dis* 18(1):96. doi:10.1186/s12879-018-3006-z
- Hashmi, A., Butt, Z., Idrees, Z., Niazi, M., Yousaf, Z., Haider, S., & Bhatti, M. (2019): Anxiety and depression symptoms in patients with dengue fever and their correlation with symptom severity. *Int J Psychiatry Med*; 44(3):199–210.
- Hayley, S. (2018): Toward an anti-inflammatory strategy for depression. *Frontiers in behavioral neuroscience*; 5:19. [DOI:10.3389/fnbeh.00019]
- Jhanjee, A., Bhatia, M., Srivastava, S., & Rathi, A. (2019): A study of psychiatric symptomatology in dengue patients. *Delhi Psychiatry J*; 16(1):21–3.
- Khan, M., Ahmad, M., Mir, S., Iftikhar, F., Fahad, M., & Khalid, M. (2018): Anxiety and depression in patients of dengue fever. *Rawal Med J*; 37(3):239–42.
- Kohli, C., Kumar, R., Meena, G., Singh, M., & Ingle GK. (2019): A Study on Knowledge and Preventive Practices about Mosquito-Borne Diseases in Delhi. *MAMC J Med Sci* 1(1):16. doi:10.4103/2394-7438.150054
- La Gruta, N., Kedzierska, K., Stambas, J., & Doherty, P. (2017): A question of self-preservation: Immunopathology in influenza virus infection. *Immunology and Cell Biology*; 85(2):85–92. [DOI:10.1038/sj.icb.7100026]
- Lazear, H., Pinto, A., Vogt, M., Gale, M., & Diamond, M. (2019): Beta interferon controls West Nile virus infection and pathogenesis in mice. *Journal of Virology*; 85(14):7186–7194. [DOI:10.1128/JVI.00396-11]
- Mahendraker, A., Kovattu, A., & Kumar, S. (2020): Knowledge, Attitude, and Practice toward Dengue Fever Among Residents in Raichur. *Indian J Health Sci Biomed Res* 13(2):112. doi:10.4103/kleuhjsj.kleuhjsj\_28\_20
- Ministério, A., & Saúde, S. (2019): Monitoramento dos casos de arboviroses urbanas transmitidas pelo Aedes (dengue, chikungunya e Zika), Semanas

- Epidemiológicas 01 a 52. Boletim Epidemiológico.
- Mohamed, N., Wan Abd Rahim, W., Salleh, S., Neoh, H., Jamal, R., & Jamil, M. (2014): Seropositivity of Dengue Antibodies during Pregnancy. *Scientific World Journal* 2014:436975. doi:10.1155/2014/436975
  - Mushtaq, M., & Zahir, M. (2019): Depression, anxiety, stress and their effect upon the self-efficacy in dengue patients. *J Postgrad Med Inst* (Peshawar-Pakistan);30(1):62–5
  - Nguyen, H., Hoang, C., Tran, T., Truong, N., & Nguyen, S. (2017): Knowledge, Attitude, and Practice of Dengue Fever Among Patients Experiencing the Outbreak in Vietnam. *Int J Environ Res Public Health* (2019): 12:976. doi:10.3390/ijerph16060976
  - Paixão, E.S., Campbell, O.M., Teixeira, M.G., Costa, M.C., Harron, K., Barreto, M.L., & Leal, M.B. (2019): Dengue during pregnancy and live birth outcomes: A cohort of linked data from Brazil. *BMJ Open*, 9, e023529.
  - Pawaria, A., Mishra, D., Juneja, M., & Meena, J. (2018): Atypical manifestations of dengue fever. *Indian J Pediatr*; 51(6):495.
  - Raheel, U., Faheem, M., Riaz, M., Kanwal, N., Javed, F., & Zaidi, N. (2019): Dengue Fever in the Indian Subcontinent: an Overview. *The J Infect Developing Countries* 5(04):239–47. doi:10.3855/jidc.1017
  - Rahman, M., Islam, ARMT, Khan, S., Tanni, K., Roy, T., & Islam, M. (2022): Dengue Fever Responses in Dhaka City, Bangladesh: A Cross-Sectional Survey. *Int J Public Health* 67:1604809. doi:10.3389/ijph..1604809
  - Rahman, M., Khan, S., Tanni, K., Roy, T., Chisty, M., Islam, M. (2022): Knowledge, Attitude, and Practices towards Dengue Fever Among University Students of Dhaka City, Bangladesh. *Int J Environ Res Public Health* 19(7):4023. doi:10.3390/ijerph19074023
  - Rahman, M., Karamehic-Muratovic, A., Baghbanzadeh, M., Amrin, M., Zafar, S., Rahman N. (2020): Climate Change and Dengue Fever Knowledge, Attitudes and Practices in Bangladesh: a Social media-based Cross-Sectional Survey. *Trans R Soc Trop Med Hyg* 115:85–93. doi:10.1093/trstmh/traa093
  - Ribeiro, C.F., Lopes, V.G., Brasil, P., Coelho, J., Muniz, A.G., & Nogueira, R. (2020): A Perinatal transmission of dengue: A report of 7 cases. *J. Pediatr*, 163, 1514–1516
  - Selvarajoo, S., Liew, J., Tan, W., Lim, Y., Refai, W., Zaki, R. (2020): Knowledge, Attitude, and Practice on Dengue Prevention and Dengue Seroprevalence in a Dengue Hotspot in Malaysia: A Cross-Sectional Study. *Sci Rep* 10(1):9534. doi:10.1038/s41598-020-66212-5
  - Shafique, M., Mukhtar, M., Areesantichai, C., & Perngparn, U. (2022): Effectiveness of Positive Deviance, an Asset-Based Behavior Change Approach, to Improve Knowledge, Attitudes, and Practices Regarding Dengue in Low-Income Communities (Slums) of Islamabad, Pakistan: A Mixed-Method Study. *Insects* 13(1):71. doi:10.3390/insects13010071
  - Spielberger, CD. (1972): Anxiety as an emotional state. *Anxiety Current Trends and Theory*. New York: Academic Press: 24-49.
  - Sun, J., Madan, R., Karp, C., & Braciale, T. (2019): Effector T cells control lung inflammation during acute influenza virus infection by producing IL-10. *Nature Medicine*; 15(3):277-284. [DOI:10.1038/nm.1929]
  - Szretter, K., Brien, J., Thackray, L., Virgin, H., Cresswell, P., & Diamond, M. (2019): The interferon-inducible gene viper in restricts West Nile virus pathogenesis. *Journal of Virology*; 85(22):11557-11566. [DOI:10.1128/JVI.05519-11]
  - Udayanga, L., Gunathilaka, N., Iqbal, M., Kusumawathie, D., Najim, M., & Abeyewickreme, W. (2016): Geo-informatics based approach for evaluation of trends in dengue outbreaks within Doluwa MOH area in the Central province of Sri Lanka. In: Proceedings of the 5th Young Scientist Forum (YSF)

- symposium, Sri Lanka. p. 102–105.
- Wang, T., Sewatanon, J., Memoli, M., Wrammert, J., Bournazos, S., Bhaumik, S. (2017): IgG Antibodies to Dengue Enhanced for Fc $\gamma$ RIIIA Binding Determine Disease Severity. *Science* 355(6323):395–8. doi:10.1126/science.aai8128
  - Wilkinson, J., Radkowski, M., Eschbacher, J., & Laskus, T. (2020): Activation of brain macrophages/microglia cells in hepatitis C infection. *Gut*; 59(10):1394-1400. [DOI:10.1136/gut.2009.199356]
  - World Health Organization. Dengue and Severe Dengue. (2021): Available online: <https://www.who.int/news-room/fact-sheets/detail/dengue-and-severe-dengue> (accessed on 22 November 2021).
  - World Health Organization. (2019): Dengue Guidelines for Diagnosis, Treatment, Prevention and Control: New Edition; World Health Organization: Geneva, Switzerland.
  - World Health Organization. (2020): *Global Strategy for Dengue Prevention and Control*. Geneva, Switzerland: World Health Organization.
  - Zaki, R, Roffeeli, SN, Hii, YL, Yahya, A, Appannan, M, & Said, MA. (2019): Public Perception and Attitude towards Dengue Prevention Activity and Response to Dengue Early Warning in Malaysia. *PloS one* 14(2):e0212497. doi:10.1371/journal.pone.0212497.