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Effect of Nursing Management Protocol for Dengue Fever Patients on their Awareness, Activities Daily Living and Health Outcomes

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Abstract: **The study aimed to determine the effect of nursing management protocol for dengue fever patients on their awareness, activities daily living and health outcomes. It was conducted at Qena Tropical Medicine Hospital. . Convenience samples comprised of 60 adult patients from both sex and were confirmed with dengue fever. Three instruments were used in this study. Tool 1: Basic data interview schedule it includes (socio-demographic data, medical history information and Patients' awareness assessment) Tool 2: Activity of daily living according to fever (The Barthel Index) Tool 3: it includes (patients' complaints assessment, vital signs assessment and laboratory investigations assessment .Nursing management protocol which include educational part and therapeutic clinical management(supportive care and fluid volume replacement) in addition to diet regimen Results/conclusion: The study findings revealed that mean ages for study and control group was 34.02 ± 10.77 and33.95 ± 10.48. According to knowledge assessment there was a significant difference between the study and control group pre and post implementation of the nursing protocol (P= <0.001), Also, there was statistically significant difference in related to post period as regard mobility, dressing, Bathing, transfer, bowels, bladder and total score of activity daily living related to fever (p= <0.001, 0.023, <0.001, <0.001, 0.001, 0.002, and 0.031). As regard laboratory investigations assessment related to post period were significant difference RNA-PCR, platelets count, WBCs , coagulation time/second and tourniquet test (P = 0.001, 0.035, <0.001, <0.001 and 0.083) respectively. Recommendations: Establish therapeutic clinical management with diet regimen. Therapeutic management depends on fluid replacement, control fever, and prevent using of antibiotic and NSAID.**

Keywords: **Nursing management protocol, Dengue fever, awareness, Activities daily living and Health outcomes.**

1. INTRODUCTION

Dengue fever (DF) is one of the most common tropical diseases worldwide and is caused by a Flavi virus which transmitted to humans by infected Aedes aegypti mosquitoes **(Lolekha R., et al 2011).** The natural habitat of this disease comprises tropical and subtropical regions with warm and humid climates. The mosquito will reproduce in small water collections such as in flower vases, uncovered water and storage vessels**(Althouse BM, 2014).** Man and mosquito are reservoirs of infection, the infected female mosquito transmit the virus via bites and injects the saliva into the wound of the person **(Sotomayor BJ, 2014)**

During the acute febrile (viraemia) phase of dengue illness after an extrinsic incubation period of 8 to 10 days **(Shah Y, 2012)**. Host immune responses play an important role in the pathogenesis of (DF) which characterized by an acute febrile illness of 2-7 days duration. Fever can affect activities daily living, it has many musculoskeletal effects that decrease athletic performance, decreased muscle strength and endurance, decreased exercise tolerance, increased perceived fatigue. However, decreased speed, precision, and coordination, can potentially impair performance and also lead to injury **(Dias LB et al., 2016).**

Patient may have two or more of the following manifestations: Headache, retro-orbital pain, myalgia, arthralgia, rash, nausea and vomiting, plus clinically Positive tourniquet test , Petechiae, ecchymosis or purpura **(Sharma SP. 2016).** Compatible with the clinical description that is laboratory confirmed dengue virus serum antibody titers by polymerase chain reaction (PCR), blood biochemistry as CBC, Serum electrolytes, kidney function test and liver function test, stool examination for occult blood, and blood culture for excluding other causes **(Chanama S, 2015).**

As Dengue is a self-limiting acute disease management is symptomatic and supportive which depending on bed rest, diet soft meal, and fluid administration as drink plenty of (2-2.5 liters / 24 hours) it can be milk, sweet tea, syrup, and a bit of ORS. Also, Fluids and electrolytes therapy are recommended for patients with excessive sweating or vomiting. As the nurse at the bedside is the primary decision maker on antipyretic interventions may be used to lower the body temperature. NSAID like Ibuprofen and Aspirin should be avoided since it may cause gastritis, vomiting, acidosis and platelet disfunction but Paracetamol is preferable **(Stephenson JR, 2015).**

Patients should be monitored general condition, changes in vital signs every 3 hours (temperature, pulse, blood pressure, respiration) until they become afebrile for two days without the use of antipyretics and after platelet and Hematocrit determinations are stable. If the patient's condition worsens as laboratory results deteriorate like hemoglobin, hematocrit and platelets the strict observation of the patient should be each hour for monitoring signs of bleeding and shock (**Lolekha R., et al 2014).**

Nurses play an important role in health care system in both institutionalized settings and community care centers. In a hospital nurses come across various types of patients. So the nurse should have wide knowledge about all diseases especially infectious diseases like dengue fever. Having adequate knowledge can help the nurses in providing health education to general public and patients thus helping in minimizing the occurrence of dengue (**Charmagne G B .,et al 2015).** Usually the nurse is the first point of patient contacts, which play a crucial role in advising patients suspected of having dengue, so prevention remains a huge challenge for nurses involved in care of these patients. Implementing the prevention undertake in different role as program coordination and leader's educations and facilitators (**Kevin R, 2015)**. They work in collaboration with regional leaders or decision makers and all staff in the health care setting with different characteristics in terms of educational and economic levels and cultures, have the responsibility to reach the target of zero mortality, decrease numbers of cases and prevent outbreaks, therefore in implementing dengue prevention and management programs nurses work with high goals to achieved effective nursing care **(Tuoriniemi P, and Schott-B D, 2016).**

Significant of the study

Dengue is one of the most important emerging viral diseases of humans in the world afflicting humanity in terms of morbidity and mortality and the risk of dengue has shown an increase in recent years due to rapid proliferation of mosquito breeding sites. The number of patient with dengue fever admitted in Tropical Medicine Hospital in Qena government in the last year was 301 cases according to the Hospital Statistical Record, 2017. However, symptoms are similar to influenza, it results in dengue hemorrhagic fever (DHF) and in its severe form dengue shock syndrome (DSS) can threaten the patient's life primarily through increased vascular permeability and shock. So, this study was the first study in this geographical area which will help such group of patient to prevent or reduce risk of dengue fever complications.

Aim of the study: This study aimed to:

1. Assess the level of awareness for patients with dengue fever disease
2. Develop and implement of suggested nursing protocol for patient with dengue fever.
3. Evaluate the effect of suggested nursing protocol on the patients' ADL and clinical health outcomes improvement at Qena Tropical Medicine Hospital.

Research Hypothesis:

1. The mean patients' improvement (Health outcomes) of a study group who was received nursing management protocol will be higher than the mean patients' improvement of a control group.

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2- Patients attending nursing protocol regarding dengue fever will exhibit a total mean score of knowledge (awareness) more than the control group.

3- The study group will exhibit improving in their ADL more than control group after received nursing management protocol.

2. SUBJECTS AND METHOD

Research Design

A quasi experimental, research design was utilized to fulfill the aim of the study.

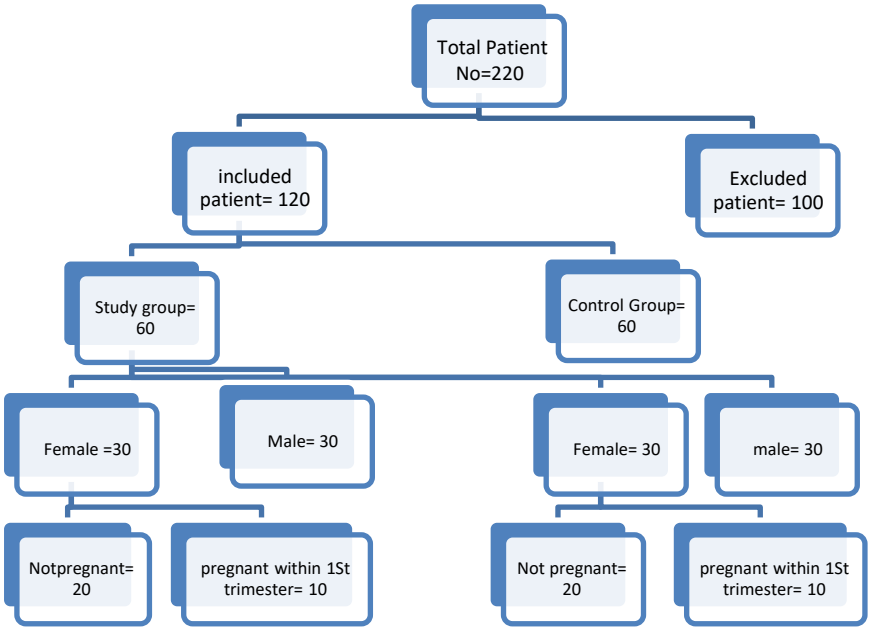
Setting:

The study was conducted at Qena Tropical Medicine Hospital.

Sampling and sample size:

Throughout nine months 220 dengue patients were admitted at the above mentioned settings. Among whom 120 consecutive patients fulfilling the inclusion criteria of the study; randomly were divided into two equal groups (60 patients for each) as follow:

- Control group who followed the routine prescribed medication only.
- Study group to whom assigned to pre and post study and receiving suggested nursing protocol, in addition to stopped prescribed medication with anti-inflammatory and antibiotics.
- An overview of sample recruitment for the present study is presented in the following sample:



The Subjects inclusion criteria were:

- Age from 20- 55years.
- Sudden high fever 39C^{o} or more continuing not less than four days
- Severe headache
- Joint and Retro-optical pain
- Positive tourniquet test
- Positive PCR for dengue

Tools of data collection: The tools utilized to collect data pertinent to the study are:

Tool (I) Basic data interview schedule:

It was developed by the researcher upon review of related literature. It includes three parts:

Part I: socio-demographic characteristics

It aimed to assess the patients' socio-demographic data as age, marital status, gender, residence, education level, and occupation.

Part II: Medical History information:

It aimed to assess medical history about dengue disease which involves questions about: family history, patient's previous history, patient's obstetrical history which includes (previous abortion before and related to dengue at first trimester). It also, includes questions related to prescribed medication for dunk which includes (anti-inflammatory drug, anticoagulant, and antibiotics).

Part III: Patients' awareness assessment:

This part was developed by the researcher. It aimed to determine the patient's knowledge related to information about dengue fever. It includes

definition, incubation period, source, mode of transmission, signs and symptoms, complications, preventive measures, in addition to, management as regard to diet, fluid replacement regimen and medications.

Scoring System:

For items related to knowledge, 4 point of responses were used no understand=0, Pass =1, good understand= 2, and Very good understand=3. Above or equal 60 % of total score is satisfactory and less than 60 % is unsatisfactory. The total score of the questionnaire was 30 marks. It comprised 10 questions about: definition, incubation period, source of infection, mode of transmission, signs and symptoms, complications, preventive measures, medical treatment, as well as, healthy diet and fluids replacement regimen.

Tool 2: Activity of Daily Living according to fever (The Barthel Index) assessment sheet:

The Barthel Index measure of physical disability which used widely to assess behavior relating to activities of daily living for patients with dengue or patients with other disabling conditions. It measures what patients able to do. Modifications to the Barthel Index include a variation of the 10-item version by (**O'Sullivan., et al 2014).** The scores for each item based on a points of Likert Scale, a total score range from 0 to 20 ranged from 0=total dependent and unable to 3= independent and able to do, satisfactory above 10 and unsatisfactory less than 10. It includes: mobility, dressing, stairs, bathing, grooming, toilet, use-feeding, transferring, bowels and bladder.

Tool 3: Clinical Health Outcomes Assessment: It was developed according to **(Karoli R., et al 2016)** and includes the following parameters:

Part I: Patients' Complaints Assessment:

It aimed to assess all patient's manifestations as related to pain, includes: abdominal pain, joints pain, headache mostly in the forehead, and retro- orbital pain. Gastrointestinal manifestations include: vomiting, loss of appetite, excessive thirst, constipation or diarrhea. Musculoskeletal manifestations (restlessness and sleepiness) and integumentary problems as skin bruising or rashes and pale /cold skin.

Part II: Vital signs assessment: it includes body temperature, chilling, blood pressure, pulse rate and respiratory rate

Part III: Laboratory investigations assessment: It aimed to confirm the diagnosis with dengue fever disease and to evaluate the effect of suggested nursing intervention protocol on their health outcomes. It included: polymerase chain reaction PCR, Platelets count, WBC, Coagulation time, and Tourniquet test. It was done pre and post nursing management protocol on 5^{th} and 10^{th} days of follow up. The rates of the parameters as follow:

Investigation	Patients' Normal value	Patients with dengue fever
Dengue RNA PCR	(+) = >100kU/l (-) = <100kU/l	Less than 100kU/l
Platelets count	150,000 to 450,000/mcL	Around 140.000/mm^3
WBC	(3,500 to 10,500 cells/mcL)	Less than 10,500 cell/mcL
Coagulation time	25 to 30 seconds	Less than 25 seconds
Tourniquet test	(+) = ≥ 20 Petechiae in a one square inch area (-) = < 20 Petechiae in a one square inch area **(Silvestr L, 2016)**	Less than Petechiae in a one square inch area **(Itoda., et al 2016)**

Nursing Management Protocol: It included the following:

Part I: Educational part: It was developed by (**Yboa B C, and Labrage L J, 2013)**. and designed by the researchers and comprised the following: definition of dengue fever disease, incubating period, sources, mode of transmission, effects of dengue fever disease on the different body system, signs and symptoms of dengue fever disease, complications, and methods of prevention.

Part II: Therapeutic Clinical Management and Diet Regimen:

It was approved by the doctor to prevent dehydration, hemorrhage and shock. It included supportive care, fluid volume replacement and prescribed high caloric diet

Method

Administrative approval:

- An official was forwarded from the dean of the faculty of Nursing, requesting a permission to conduct the study.

- A written approval was obtained from the director of Qena Tropical Medicine Hospital to carry out the acceptance for the study and from responsible physician to implement a therapeutic diet and rehydration regimen and supportive for patients with dengue fever disease.

Ethical considerations:

- An informed consent for participation in the study was taken from the participant after full explanation of the aim of the study. They were informed that their participation in this study was voluntarily. The participants were given the opportunity to refuse participation and they could withdraw at any stage of the data collection without giving any reason. The studied sample also assured that any information collected would be confidential and used for the research purpose only.

Validity and reliability:

The tools were tested for content validity by 7 experts of academic medical staff at Qina University and nursing staff at Faculty of Nursing at Qena and Benha University. Modifications were done accordingly, and then the tools were designed in its final format and tested for reliability using internal consistency for the tools using Cronbach test which were reliable (0.75).

A pilot study

It was done on (6) patients who were included in the sample to test the clarity, and applicability of the tool1and 2 to estimate the time required to fill the sheet. Modifications were done as needed by the researchers.

Data collection:

The data were collected in 9 months, from June 2018 to February 2019. Each interview took a time of about one hour utilizing **tool 1, 2 and 3 part I**. The data collection was done through the following phases:

Assessment phase: (Pretest)

Once all patients of the study groups confirming the diagnosis, the researchers interviewed with each patient (study and control group) individually and gets their written consent to participate. It was concerned by patients socio- demographic **characteristics and medical history information (tool 1 part I, II)**. Then the participants were asked about their awareness (knowledge) related to dengue disease utilizing **tool 1 part I**II and activity of daily living according to fever (The Barthel Index) using **tool 2** as a baseline assessment for study and control groups. Finally, clinical health outcomes were assessed by the researchers for confirming the patients' diagnosis with dengue fever disease and as a baseline assessment pre and post nursing intervention protocol. It includes patient's complaints **(Tool 3- part I)** which concerned by assessment all patients' manifestations and vital signs and took blood sample for laboratory investigations using **tool 3 part II, III**, it was assessed one time before implementing the nursing protocol as a baseline assessment for both two groups.

Implementation phase:

- The nursing protocol was developed by the researcher thorough review of related literature. All participants of study group got the suggested guidelines which conducted through two sessions for each patient and the duration of each session was around 20 to 30 minutes.

- At the beginning of the first session, patients were oriented regarding the contents, its purpose and the impaction on their health condition. Each session ends by summary and a feedback was elicited to ensure that all information was understood and maximized educational benefits. By the end of the first session, patients were informed about the time of the next one using simple Arabic language.

Supportive care as the following:

First bed rest and cold sponging to keep temperature below 38oC. Antipyretics is used to lower the body temperature Paracetamol is preferable as 500mg three times /day. Aspirin/NSAID and Ibuprofen …etc are avoided, as it causes gastritis, vomiting, acidosis and platelet dysfunction. In addition, fluids and electrolytes therapy for patients with excessive sweating, vomiting or/ and diarrhea.

Second volume replacement calculated as the following:

- Initial IV therapy 6ml /kg/ hr crystalloid solution for 1-2 hrs

- If the patient improved: I.V therapy continued and reduced to 6-3 ml/kg/hr with further improvement, I.V discontinues after 24 hrs.

- If no improvement noticed: I.V crystalloid was increased to 10ml/kg/hr for duration 2 hours with continuing the improvement, I.V reduced to 6 ml/kg/hr then, 3ml/kr/hr and then, it discontinued after 24-28 hrs, if noted there is no improvement with unstable vital signs I.V colloid dextran (40) 10ml/kg/hr duration 1 hs is given. With instruction reducing the flow to 6ml/kg/hr then to 3ml/kg/hr, if there is an improvement I.V therapy by crystalloid successively. Then it is discontinued after 24-48 hr.

B-Prescribed diet was included:

Three meals rich in high caloric diet to improve the general health and immunity as the following: High protein about (70 g/day), carbohydrates (225-325 g/day), fats (24g/day), Vitamin C (120mg/day) and zinc (12mg/day). This was given with each meal till symptoms reduced and body temperature decreased to normal level or with accepted level that approved to discharge for (platelets count, and WBCs,). The control group was compelling to hospital routine management.

Evaluation phase: (posttest)

After implementation of designed nursing protocol, evaluation of the patient's outcomes was done by using **tool 1 part III. Tool 2 and tool 3 part I, II and III** one time (after 5 and 10 day) as posttest evaluation for study and control group to monitor the difference rates in these parameters for both groups to evaluate the effect of suggested nursing protocol on dengue fever disease patient's awareness, activity daily living and their health outcomes.

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Statistical Analysis:

The data obtained were reviewed prepared for computer entry, coded, analyzed and tabulated. Descriptive statistics as (number and percentage, mean scores and stander deviation) was done using computer program SPSS version (18). Chi-square, P-value and T-value used to compare differences in the distribution of frequencies between the pre and post study subjects.

3. RESULTS

Table (1): Frequency distribution of study and control groups according to their sociodemographic characteristics. (n = 60)

Demographic data	Study group (n = 60)		Control group (n = 60)		Test of sig	P
	No.	%	No.	%		
Age 20- 30 ≥30 – 40 ≥ 40 – 50 ≥50	23 19 11 7	38.3 31.7 18.3 11.7	24 17 12 7	40.0 28.3 20.0 11.7	χ^2= 0.176	0.981
Min. – Max. Mean ± SD.	19.0 – 59.0 34.02 ± 10.77		18.0 – 58.0 33.95 ± 10.48		t= 0.034	0.973
Marital status Single Married	28 32	46.7 53.3	27 33	45.0 55.0	χ^2= 0.034	0.855
Gender Male Female	30 30	50.0 50.0	30 30	50.0 50.0	χ^2= 0.000	1.000
Females: Pregnant Not pregnant	10 20	16.66 33.33	10 20	16.66 33.33	χ^2= 0.000	1.000
Residence Urban Rural	30 30	50.0 50.0	35 25	58.3 41.7	χ^2= 0.839	0.360
Education level Illiterate Read and write Primary or preparatory Secondary University	0 6 5 32 17	0.0 10.0 8.3 53.3 28.3	8 1 1 27 23	13.3 1.7 1.7 45.0 38.3	χ^2= 15.780*	^{MC}p= 0.001*
Occupational Not working Working	37 23	61.7 38.3	27 33	45.0 55.0	χ^2= 3.348	0.067

χ^2: **Chi square test** MC: **Monte Carlo** **t: Student t-test**

p: p value for comparison between the two studied groups *: Statistically significant at p ≤ 0.05

Table 1: Shows distribution of studied sample according to their sociodemographic characteristics. It showed that approximately more than half of patients in the study and control group were less than 30 years and more than half of the both groups were married also, they were equally 30 male and female, respectively. At the same time one third of those females for the both groups were pregnant. Regarding their educational level, the study group showed that more than half were have secondary school level on the contrary, the majority were secondary school in the control group (MCp = 0.001). Concerning their residence, half of both groups were from urban. Approximately, more than half of study group had no work but the control group were workers (p = 0.067).

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Table (2): Frequency distribution and significant difference of the study and control groups according to their medical history information (n = 60)

Medical history	Study group (n = 60)		Control group (n = 60)		χ^2	p
	No.	%	No.	%		
Family history						
No	37	61.7	41	68.3	0.586	0.444
Yes	23	38.3	19	31.7		
Patient's Previous history						
No	51	85.0	59	98.3	6.982*	0.008*
Yes	9	15.0	1	1.7		
Patient's Obstetrical History:						
Previous abortion before dunk						
Yes	5	8.3	3	5.0	χ^2=0.536	^{FE}p=0.717
No	5	8.3	7	11.67		
Abortion related to dunk (at first trimester)	10	16.7	10	16.7	χ^2=0.000 (1.000)	^{McN}p= 1.002

χ^2: **Chi square test** FE**: Fisher Exact** p: p value for comparison between the two studied groups

*: Statistically significant at $p \leq 0.05$

Table 2 : Shows distribution and significant difference of the study and control groups according to their medical history information**.** There was statistical significant difference between study and control group related to patient's previous history of dengue (p = 0.008) but, there was no significant according to family history and patient's obstetrical history as regard previous abortion before and related to dunk (p = 0.444, 0.717, and 1.002) respectively.

Table (3): Comparison between study and control group according to their knowledge (awareness) assessment (n=60)

Patients' knowledge assessment	Study group (n = 60)			Control group (n = 60)			$t_s(p_1)$	$t_s(p_2)$
	Pre	Post	$^tp_3$	Pre	Post	$^tp_4$		
Definition	0.70±0.50	2.12±0.56	<0.001*	0.48±0.50	0.67±0.51	0.001*	2.370* (0.019*)	14.902* (<0.001*)
Incubation period	0.23±0.43	2.0±0.49	<0.001*	0.18±0.39	0.67±0.51	0.103	0.670 (0.504)	19.946* (<0.001*)
Source of infection	0.63±0.49	2.08±0.53	<0.001*	0.43±0.50	0.25±0.47	0.006*	2.223* (0.028*)	15.497* (<0.001*)
Mode of transmission	0.42±0.50	2.12±0.58	<0.001*	0.33±0.48	0.58±0.53	0.103	0.938 (0.350)	17.368* (<0.001*)
Signs and symptoms	0.70±0.46	2.10±0.57	<0.001*	0.45±0.50	0.40±0.49	0.010*	2.839* (0.005*)	15.043* (<0.001*)
Complications	0.20±0.40	1.98±0.68	<0.001*	0.18±0.39	0.58±0.53	0.103	0.230 (0.818)	16.259* (<0.001*)
Preventive measures	0.48±0.50	2.13±0.57	<0.001*	0.35±0.48	0.25±0.47	0.013*	1.483 (0.141)	17.231* (<0.001*)
Medical treatment	0.13±0.34	1.98±0.57	<0.001*	0.17±0.38	0.45±0.50	0.045*	0.508 (0.613)	19.100* (<0.001*)
Diet	0.45±0.50	2.08±0.65	<0.001*	0.30±0.46	0.23±0.43	0.018*	1.703 (0.091)	15.845* (<0.001*)

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Fluid replacement regimen	0.15±0.36	1.92±0.17	<0.001*	0.13±0.34	0.42±0.50	0.159	0.260 (0.796)	17.137* (<0.001*)
Overall Patients' knowledge assessment Total score Percent score	4.10 ±3.16 13.67±10.52	20.52 ±4.85 68.39±16.16	<0.001*	3.02 ±3.54 10.06±11.80	4.0 ±3.63 13.33 ±12.09	<0.001*	4.152* (<0.001*)	2.179* (0.031*)

t_s: Student t-test t: **paired t-test** ***: Statistically significant at $p \leq 0.05$**

p_1: p value for comparing between study and control in pre implementing of nursing protocol
p_2: p value for comparing between study and control in post implementing of nursing protocol

p_3: p value for comparing between pre and post implementing of nursing protocol in study group

p_4: p value for comparing between pre and post implementing of nursing protocol in control group

Table 3: Exploring a comparison between the two studied groups according to their knowledge assessment. It revealed that the subjects of both study and control groups had a significant difference between pre and post implementation of the nursing protocol (P= <0.001), respectively. Also, it was noticed that there were insignificant differences between both group pre implementing the nursing protocol as regard incubation period, mode of transmission, complications, and Fluid replacement regimen and (0.103, 0.103, 0.103, and 0.159)respectively. On the other hand, a significant difference was found between both groups post implementing the nursing protocol concerning all items of knowledge. (P= <0.001)

Table (4): Comparison between study and control group according to their **activity daily living related to fever (the Barthel index) (n=60)**

	Study group (n = 60)			**Control group (n = 60)**			**$t(p_1)$**	**$t(p_2)$**
	Pre	**Post**	**$^tp_3$**	**Pre**	**Post**	**$^tp_4$**		
Mobility	0.58±0.50	1.85±0.52	<0.001*	0.18±0.39	1.22±0.42	<0.001*	4.902* (<0.001*)	7.414* (<0.001*)
Dressing	0.65±0.48	1.28±0.49	<0.001*	0.17±0.38	1.05±0.39	<0.001*	6.133* (<0.001*)	2.893* (0.023*)
Stairs	0.28±0.45	0.98±0.34	<0.001*	0.12±0.32	0.98±0.43	<0.001*	2.314* (0.023*)	0.0 (1.000)
Bathing	0.12±0.32	0.63±0.49	<0.001*	0.12±0.32	0.90±0.30	<0.001*	0.0 (1.000)	3.608* (<0.001*)
Grooming	0.47±0.50	0.83±0.38	<0.001*	0.33±0.48	0.92±0.28	<0.001*	1.492 (0.138)	1.380 (0.171)
Toilet use	0.85±0.480	1.27±0.45	<0.001*	0.40±0.49	1.20±0.44	<0.001*	5.460* (<0.001*)	0.821 (0.413)
Feeding	0.78±0.42	1.30±0.50	<0.001*	0.55±0.50	1.18±0.47	<0.001*	2.775* (0.006*)	1.322 (0.189)
Transfer	0.73±0.58	1.92±0.46	<0.001*	0.40±0.49	1.38±0.52	<0.001*	3.395* (0.001*)	5.916* (<0.001*)
Bowels	1.60±0.53	1.73±0.45	0.004*	1.77±0.43	1.95±0.22	0.001*	1.904 (0.059)	3.376* (0.001*)
Bladder	1.70±0.46	1.78±0.42	0.024*	1.92±0.28	1.97±0.18	0.083	3.110* (0.002*)	3.134* (0.002*)
Activity daily living fever (the barthel index) **Total score** **Percent score**	7.77 ±2.37 38.83±11.87	13.58±2.04 67.92±10.22	<0.001*	5.95 ±2.42 29.75±12.09	12.75±2.14 63.75±10.72	<0.001*	4.152* (<0.001*)	2.179* (0.031*)

t_s: Student t-test t: **paired t-test** ***: Statistically significant at $p \leq 0.05$**

p_1: p value for comparing between study and control in pre implementing of nursing protocol

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p_2: p value for comparing between study and control in post implementing of nursing protocol

p_3: p value for comparing between pre and post implementing of nursing protocol in study group

p_4: p value for comparing between pre and post implementing of nursing protocol in control group

Table 4: Show a comparison between study and control group according to activity daily living related to fever. It revealed that, the subjects of both study and control groups had a significant difference related to post period as regard mobility, dressing, Bathing, transfer, bowels, bladder and total score of activity daily living related to fever (p= <0.001, 0.023, <0.001, <0.001, 0.001, 0.002, and 0.031) respectively. On the other hand Stairs, Grooming, Toilet use and feeding as regarding activity daily living was insignificant in post implementing of nursing protocol (> 0.05)

Table (5): Comparison between study and control group according to patients' complaint (n = 60)

	Study group(n = 60)					Control group (n = 60)						
	Pre		Post		McN p_3	Pre		Post		McN p_4	$\chi^2(p_1)$	$\chi^2(p_2)$
	No.	%	No.	%		No.	%	No.	%			
1-Pain:												
A- Abdominal pain												
Yes	39	65.0	7	11.7	<0.001*	38	63.3	16	26.7	<0.001*	0.036	4.357*
No	21	35.0	53	88.3		22	36.7	44	73.3		(0.849)	(0.037*)
B- Joints pain												
Yes	59	98.3	19	31.7	<0.001*	60	100.0	46	76.7	<0.001*	1.008	24.470*
No	1	1.7	41	68.3		0	0.0	14	23.3		(FEp=1.000)	(<0.001*)
C- Severe headache mostly in the forehead												
Yes	43	71.7	8	13.3	<0.001*	46	76.7	18	30.0	<0.001*	0.391	4.910*
No	17	28.3	52	86.7		14	23.3	42	70.0		(0.532)	(0.027*)
D- Retro- orbital pain												
Yes	36	60.0	4	6.7	<0.001*	50	83.3	0	0.0	<0.001*	8.044*	4.138
No	24	40.0	56	93.3		10	16.7	60	100.0		(0.005*)	(FEp=0.119)
2- Gastrointestinal:												
- Loss of appetite												
Yes	51	85.0	22	36.7	<0.001*	48	80.0	19	31.7	<0.001*	0.519	0.333
No	9	15.0	38	63.3		12	20.0	41	68.3		(0.471)	(0.564)
- Nausea												
Yes	41	68.3	17	28.3	<0.001*	54	90.0	17	28.3	<0.001*	8.539*	0.000
No	19	31.7	43	71.7		6	10.0	43	71.7		(0.003*)	(1.000)
-Vomiting (with or without blood)												
Yes	25	41.7	0	0.0	<0.001*	24	40.0	2	3.3	<0.001*	0.034	2.034
No	35	58.3	60	100.0		36	60.0	58	96.7		(0.853)	(FEp=0.496)
- Constipation												
Yes	15	25.0	1	1.7	0.001*	15	25.0	3	5.0	<0.001*	0.000	1.034
No	45	75.0	59	98.3		45	75.0	57	95.0		(1.000)	(FEp=0.619)
- Diarrhea												
Yes	18	30.0	0	0.0	<0.001*	29	48.3	1	1.7	<0.001*	4.232*	1.008
No	42	70.0	60	100.0		31	51.7	59	98.3		(0.040*)	(FEp=1.000)
3- skin												
Skin bruising or rashes												
Yes	20	33.3	2	3.3	<0.001*	28	46.7	14	23.3	<0.001*	2.222	10.385*
No	40	66.7	58	96.7		32	53.3	46	76.7		(0.136)	(0.001*)
- Pale /cold skin												
Yes	37	61.7	1	1.7	<0.001*	50	83.3	11	18.3	<0.001*	7.064*	9.259*
No	23	38.3	59	98.3		10	16.7	49	81.7		(0.008*)	(0.002*)
4- Neurological:												
- Sleepiness												
Yes	34	56.7	21	35.0	0.007*	57	95.0	46	76.7	0.001*	24.055*	21.121*
No	26	43.3	39	65.0		3	5.0	14	23.3		(<0.001*)	(<0.001*)
- Restlessness												
Yes	25	41.7	7	11.7	<0.001*	32	53.3	13	21.7	<0.001*	1.637	2.160
No	35	58.3	53	88.3		28	46.7	47	78.3		(0.201)	(0.142)
-Excessive thirst (dry mouth)												
Yes	36	60.0	1	1.7	<0.001*	42	70.0	5	8.3	<0.001*	1.319	2.807
No	24	40.0	59	98.3		18	30.0	55	91.7		(0.251)	(FEp=0.207)

χ^2: **Chi square test** FE**: Fisher Exact** **McN: McNemar test**

p_1: p value for comparing between study and control in pre implementing of nursing protocol

p_2: p value for comparing between study and control in post implementing of nursing protocol

p_3: p value for comparing between pre and post implementing of nursing protocol in study group

p_4: p value for comparing between pre and post implementing of nursing protocol in control group

*: Statistically significant at $p \leq 0.05$

Table 5: Illustrates a comparison between study and control group according to patients' complaint. Results revealed that, there was a significant difference between study and control group pre and post as regarding abdominal pain, joint pains and severe headache mostly in the forehead (P= 0.037, <0.001, and 0.027) respectively. Also, the result show significant differences between the two groups pre and post as regarding skin bruising / rashes, pale /cold skin and sleepiness (P= 0.001, 0.002, and <0.001) respectively.

Table (6): Comparison between study and control group according to their vital Signs (n = 60)

Vital Signs	Study group(n = 60)					Control group (n = 60)					Test of Sig.(p_1)	Test of Sig. (p_2)
	Pre		Post		p_3	Pre		Post		p_4		
	No.	%	No.	%		No.	%	No.	%			
Temperature Min. – Max. Mean ± SD.	38.80–41.0 40.11 ± 0.53		36.80–37.60 37.04 ± 0.15		t p<0.001*	39.70–41.50 40.40 ± 0.59		36.90–38.20 37.30 ± 0.34		t p<0.001*	χ^2=2.796* (0.006*)	χ^2=5.360* (<0.001*)
Chilling Yes No	46 14	76.7 23.3	2 58	3.3 96.7	McN p<0.001*	47 13	78.3 21.7	14 46	23.3 76.7	McN p<0.001*	χ^2=0.048 (0.827)	χ^2=10.385* (0.001*)
Blood pressure **Systolic** Min. – Max. Mean ± SD.	90.0–140.0 105.4±10.18		100.0–140.0 120.0±9.58		tp<0.001*	90.0–130.0 111.5±10.94		100.0–135.0 113.8±9.28		tp=0.023*	χ2=3.179* (0.002*)	χ2=3.610* (<0.001*)
Diastolic Min. – Max. Mean ± SD.	50.0 – 85.0 67.58 ± 8.30		69.0 – 85.0 75.37 ± 5.08		tp<0.001*	30.0 – 85.0 70.43 ± 8.88		60.0 – 85.0 72.92 ± 5.62		tp=0.005*	χ2=1.816 (0.072)	χ2=2.506* (0.014*)
Pulse rate Min. – Max. Mean ± SD.	60.0 – 100.0 73.48 ± 9.41		60.0 – 82.0 65.40 ± 5.53		tp<0.001*	63.0 – 80.0 71.20 ± 4.28		60.0 – 70.0 64.0 ± 2.63		tp<0.001*	χ2=1.711 (0.091)	χ2=1.771 (0.080)
Respiratory rate Min. – Max. Mean ± SD.	13.0 – 33.0 20.93 ± 3.61		13.0 – 22.0 17.60 ± 1.64		tp<0.001*	16.0 – 25.0 20.47 ± 2.45		16.0 – 20.0 17.25 ± 1.02		tp<0.001*	χ2=0.829 (0.409)	χ2=0.602 (0.548)

χ^2: Chi square test FE: Fisher Exact t: Student t-test t: paired t-test McN: McNemar test

p_1: p value for comparing between study and control in pre implementing of nursing protocol

p_2: p value for comparing between study and control in post implementing of nursing protocol

p_3: p value for comparing between pre and post implementing of nursing protocol in study group

p_4: p value for comparing between pre and post implementing of nursing protocol in control group

*: Statistically significant at $p \leq 0.05$

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Table 6: represented the significant difference between study and control groups regarding their vital signs. Findings revealed that, there was a significant difference between study and control group related to post protocol implementation as regarding temperature, chilling, systolic and diastolic blood pressure (P= <0.001*, 0.001, <0.001, and 0.014) respectively**.**

Table (7): Comparison between between study and control group according to their laboratory investigations assessment (n = 60)

Observational assessment	Study group(n = 60)					Control group (n = 60)					Test of sig. (p_1)	Test of sig.(p_2)
	Pre		Post		p_3	Pre		Post		p_4		
	No.	%	No.	%		No.	%	No.	%			
RNA- PCR												
Negative **(< 100KU/I)**	0	0.0	56	93.3	^{McN}p	0	0.0	40	66.66	^{McN}p	-	χ^2=5.436* (0.001*)
Positive **(> 100KU/I)**	60	100.0	4	6.7	<0.001*	60	100.0	20	33.33	<0.001*		
Platelets count(mel)												
Normal(**150.000-450.000**)	28	46.7	40	66.7	^{McN}p=	35	58.3	50	83.3	^{McN}p	χ^2=1.637	χ^2=4.444*
Abnormal(↓ **150,000**)	32	53.3	20	33.3	0.002*	25	41.7	10	16.7	<0.001*	(0.201)	(0.035*)
Min. – Max.	140000-147000		148500-300000		^{t}p=	135000-140300		137200-1420000		^{t}p=	t=1.859	t=1.896
Mean ± SD.	185838±91452		286328±93947		0.924	175440±85360		136146±280085		0.984	(0.066)	(0.060)
WBCs(ceel/mel))												
Normal **(3.500-10.500)**	4	6.7	20	33.3	^{McN}p	0	0.0	1	1.7	^{McN}p=	χ^2=4.138	χ^2=20.837*
Abnormal **(↓3.500)**	56	93.3	40	66.7	<0.001*	60	100.0	59	98.3	1.000	(^{FE}p=0.119)	(<0.001*)
Min. – Max.	1300 – 14000		9000 – 104000		^{t}p=	10950 – 14450		10500 – 107000		^{t}p=	t=5.172*	t=0.231
Mean ± SD.	11904 ± 1689		12393 ± 12048		0.756	13117 ± 668		12908 ± 12364		0.896	(<0.001*)	(0.818)
Coagulation time(second)												
Normal **pt =(25-30)**	21	35.0	48	80.0	^{McN}p	19	31.7	27	45.0	^{McN}p=	χ^2=0.150	χ^2=15.680*
Abnormal **pt (↓25)**	39	65.0	12	20.0	<0.001*	41	68.3	33	55.0	0.008*	(0.699)	(<0.001*)
Min. – Max.	20.0 – 40.0		25.0 – 49.0		^{t}p	19.8 – 38.6		21.0 – 38.0		^{t}p=	t=1.250	t=4.288*
Mean ± SD.	28.98 ± 3.45		34.52 ± 6.44		<0.001*	26.52 ± 3.41		23.65 ± 4.50		0.083	(0.214)	(<0.001*)
Tourniquet test												
Negative **(< 20 spot)**	31	51.7	42	70.0	^{McN}p=	24	40.0	35	58.3	^{McN}p=	χ^2=1.645	χ^2=4.476*
Positive **(≥ 20 spot)**	29	48.3	18	30.0	0.003*	36	60.0	25	41.7	0.001*	(0.200)	(0.083*)

McN: McNemar test t: **paired t-test** *: Statistically significant at $p \leq 0.05$

p_1: p value for comparing between study and control in pre implementing of nursing protocol

p_2: p value for comparing between study and control in post implementing of nursing protocol

p_3: p value for comparing between pre and post implementing of nursing protocol in study group

p_4: p value for comparing between pre and post implementing of nursing protocol in control group

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Table 7: Illustrates comparison between study and control group according to their laboratory investigations assessment. It revealed that there was a significant difference between study and control group related to post period as regarding RNA-PCR, platelets count, WBCs , coagulation time/second and tourniquet test (P = 0.001, 0.035, <0.001, <0.001 and 0.083) respectively.

Table (8): Correlation between overall patients' knowledge assessment and activity of daily living with their age, patient complaints, vital signs and Lab. investigation at post implementing of nursing protocol for the study group (n = 60)

Post-Operative	Study group			
	Overall Patients' knowledge assessment		Activity daily living for fever (the barthel index)	
	R	P	R	p
Age	-0.228	0.079	-0.132	0.315
Patient complaints	0.159	0.224	-0.250	0.045*
Vital signs				
Temperature	-0.253	0.046*	-0.252	0.044*
Systolic Blood pressure	-0.255*	0.049*	-0.046	0.729
Diastolic Blood pressure	-0.144	0.274	-0.137	0.297
Pulse rate	-0.254	0.048*	-0.184	0.158
Respiratory rate	0.116	0.377	-0.005	0.969
Lab. investigation				
Platelets count (mel)	0.075	0.567	0.243	0.061
WBCs (ceel/mel))	0.117	0.375	0.151	0.250
Coagulation time (second)	0.118	0.369	-0.123	0.348
Overall Patients' knowledge assessment			0.014	0.918

r: Pearson coefficient

*: Statistically significant at $p \leq 0.05$

Table 8: Illustrates correlation between patients' knowledge assessment and activity of daily living with their age, patient complaints, vital signs and lab. investigation post-protocol in the study group. It revealed that there was a significant correlation between patients' knowledge assessment and vital signs as regarded temperature, systolic blood pressure, and pulse rate (p= 0.046, 0.049, and 0.048) respectively. Also there was a significant correlation between activity daily living for fever and temperature (P= 0.044) respectively.

4. DISCUSSION

Dengue fever is associated with significant morbidity, mortality, and economic cost, mostly in developing countries. Dengue can produce a broad range of clinical manifestations presents as varied clinical spectrum of dengue fever (DF), dengue hemorrhagic fever (DHF), dengue shock syndrome (DSS), and expanded dengue syndrome (EDS) (**Pai H., et al 2015).**

In this study, researcher provided nursing protocol for improving patients' awareness, activities of daily living and clinical outcomes. Regarding to their sociodemographic variables and clinical characteristics, our results showed that more than half of patients were less than 30 years, this is consistent with the study by **(Simmons M., et al 2010)** who reported that patient with severe dengue fever has an equal distribution in all ages affected adults over 15 years of age comprise 30–40% of dengue cases, the average age of patients with dengue infection between adolescents and adults as international travellers returning from endemic areas.

In the present study, the female with dengue fever who were pregnant in first trimester, they had abortion. This supported by study was done on 25 patients suffering with DF, data was collected regarding obstetric and fetal outcome during a period of one year. An upward trend was observed with 72% as multigravida and 28% as Primigravida 12% patients were in first trimester, there were six cases of early pregnancy with DF, out of which four had abortion **(Prabhat Agrawal., et.al 2014).**

Regarding patients' knowledge assessment, this study revealed that, the subjects of both study and control groups had a significant difference post implementing of nursing protocol. It means that the study group subjects' knowledge had improved rather than the control group. This result is similar to (Thilak J ., et al 2018) which indicated that study population subdues educational programs their knowledge of means of dengue transmission was very high, also, most of the candidates were aware of the measures to be taken to protect themselves against mosquito bites and the majority have a good knowledge regarding symptoms of dengue. In which knowledge and attitude of dengue provides a better outcome.

According to activity of daily living of the studied patients., it revealed that, the subjects of both study and control groups had a significant difference related to post implementing of nursing protocol as regard mobility, dressing, bathing, transfer, bowels, bladder and total score of activity of daily living related to fever, it means that the study group whom attended to therapeutic clinical management and diet regimen knotted significant improvement related to activity of daily living, these results affirmatively the study by (Dung N M., et al 2015) who reported that, there is no specific treatment for the dengue infection but management needs only supportive care with judicious fluids management during the critical phase coupled with continuous monitoring.

Also, **(Nimmannitya S, 2017)** confirmed in his study that dengue patients are susceptible to dehydration and hypovolemia due to high fever and concomitant anorexia, together with the pathophysiologic vascular leakage associated with the illness, so the fluids replacement lead to patients feel better, regain their appetite, and become more active.

According to patients' complaints, the findings of this study revealed that, there was a significant difference between study and control group pre and post therapeutic clinical management as regarding abdominal pain, joints pain and severe headache, mostly in the forehead. Also, the result showed a significant difference between both groups pre and post implementing of nursing protocol as regarding, skin bruising / rashes, pale /cold skin and sleepiness.

It may have attributed that the study group whom follow the instructions of the management protocol had farther improved more than the control group related to their patient's complaints, this is in line with **(Potts JA, 2011) & (Hunsperger EA., et al 2016)** who reported in their study results that they provided careful instructions to patients which is an important management strategy to maintain an appropriate level of concern, also, it is important to consider dengue in the differential diagnosis of all acute febrile illnesses.

Rapid diagnostic tests for dengue are become increasingly available and can be helpful if it is used judiciously. When fever is decreased and careful fluids management has taken place, recovery will be obvious at the bedside as blood pressure recovered (**Nimmannitya S, 2017).**

Our study findings revealed that, there was a significant difference between study and control group related to post protocol implementation as regarding temperature, chilling, and systolic blood pressure. This is supported by (**Wills B, 2018)** who mentioned that, the patient with dengue characterized by high fever, chills, headaches, body aches, although there is no antibiotics for dengue virus infection, but patient should immediately hospitalization. Oral rehydration should be given with antipyretics as Paracetamol and cold compresses, the hematocrit, platelet count and vital signs should be examined to assess the patients" condition and intravenous fluids therapy should be started, if there are signs of shock.

(Bhaskar M., et al 2010) who explained management of dengue infection does not have any specific treatment except cautious monitoring and appropriate fluids replacement therapy due to the plasma leakage which occurs from increased capillary permeability.

According to laboratory investigations assessment. It revealed that there was a significant difference between study and control group related to post period as regarding RNA-PCR, platelets count, WBCs, coagulation time/second and tourniquet test. It may be contributed to, remarkable amelioration in the laboratory results related to the study group farther than the control group, this is harmonious with **(Guilarde A O., et al 2018)** added**,** DF is manifested as an incapacitating disease in older, , and adults. It is characterized by Leukopenia as a common finding and thrombocytopenia. Also, **(Cardier JE., et al 2015)** confirmed that endothelial cell activation could mediate plasma leakage, which is thought to be associated with functional rather than destructive effects on endothelial cells.

This comparable to findings are in similar with **(Avirutnan P., et al 2016)** which say thrombocytopenia may be associated with alterations in megakaryocytopoieses by the infection of human hematopoietic cells and impaired progenitor cell growth, resulting in platelet dysfunction (platelet activation and aggregation), increased destruction or consumption (peripheral sequestration and consumption).

In the same line **(Deen J., et al 2018)** clarify that patient with lower platelet count was found to have higher chances of non-hemorrhagic complications when fluids correction occurs by fluids therapy which fever will diminish and rapid improves in the platelet and leukocytes as the bone marrow increased the production results in increasing immunity. The platelet count rises rapidly at this time and can easily cross the 150,000/μL mark in 2–3 days from values well below 50,000/μL.

Regarding, correlation, there was a significant correlation between overall patients' knowledge assessment and vital signs as regard to body temperature, systolic blood pressure, and pulse rate. This is quite plausible to the success of improving patient's knowledge about dengue is extremely necessary for established vital signs as temperature, blood pressure, and pulse rate. This finding is in accordance with that of a study conducted by **(Gamalat M, and Samia F, 2018)** who found that the level of knowledge regarding DF has a statistically significant relation with temperature, blood pressure, and pulse rate this finding of the respondents was supported by a research conducted by (**Meghnath D, 2014)** which reported similar results as improving patient's knowledge give chance for adhere to instruction for reducing fever as increasing fluids intake, cold compresses and as a result of establishing body temperature the remaining vital signs dependently will improved

Also, there was a significant correlation between activity of daily living for fever and body temperature. In comparing the results of the present study with similar study by **(Garratt., A S, and Mackintosh LA 2017)** specific physical activities, such as carrying groceries, climbing stairs, and walking a mile, whereas the fever involve are improved whenever it decreased. These domains showed a positive trend of improvement, increasing to the level of the general activities usually followed deceasing of the body temperature.

5. CONCLUSIONS

This study concluded to that there was significant effect of nursing management protocol for dengue fever patients on their awareness, activities daily living and clinical outcomes. Also, there was statistically significant improvement in patients' awareness, activities daily living and clinical outcomes post implementing the nursing protocol. Moreover, post implementation of nursing protocol, they gained their knowledge, their vital signs as temperature, pulse and blood pressure also lab. Investigations levels as platelets count, WBCs, coagulation time and tourniquet test are significantly improved.

Recommendations: The results of this study recommended with the following:

1. Establish therapeutic clinical management with diet regimen. Therapeutic management depends on fluid replacement, control fever, and prevent using of antibiotic and NSAID

2. Periodically, or annually schedule health education guidelines for all health care workers about DF and prevention of its complications.

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