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Effect of Warm Water Foot Bath Therapy on Body Temperature Among Children with Fever

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Abstract:

Fever in children is a traditional warning for parents. The current study aimed to evaluate effect of warm water foot bath therapy on body temperature among children with fever.

Methodology: A quasi-experimental design was utilized. A purposeful sample of 100 children with fever in an outpatient clinic at RUIA hospital participated in the current study.

Results: The results revealed that near to three-quarters of the children in the study group return their body temperature to normal level versus more than one-third of the children in the control group after application with a statistically significant difference. The mean body temperature among children in the study group in the baseline was 38.7 ± .417 versus 38.6 ± .587 among children in the control group decreased to 37.4 ± .496 versus 37.8 ± .554 oC after application of warm water foot bath therapy respectively, with statistically significance difference.

Conclusion: The current study concluded that applying warm water foot bath therapy in children with fever is effective in reducing body temperature than plain water compresses with statistically significant differences. Provide the hospital with written protocol on methods of warm water foot bath therapy to be applied in the hospitals was recommended.

Keywords: children, fever. Body temperature, warm water, foot bath therapy

Introduction

Fever in children is a common problem for the parents and a significant cause of laboratory investigation and hospital admission is now one of the most prevalent concerns of emergency care . The word "Fever" is simply a high body temperature of more than 36.5°C to 37.5°axillary than the natural physiological range . Fever is the body's innate reaction to combat foreign substances like microorganisms and toxins. Fever is a biochemical phenomenon of beneficial effect on infection management, rather than a primary disease . Fever can be the result of various causes, such as an infectious or pathological mechanism, an exercise in severity, or a reaction to the use of certain medications. Most fevers, including bacterial, fungal, and yeast infections, are typically the result of microbial infections .Initially, fever control is symptomatic, but it is the actual cause that can be identified and control begun as soon as possible. Body temperature mitigation is the essential component of administration and can be achieved with the use of a tepid sponge, the use of ice bags, or agriculture, is a comfortable, well-ventilated, and warmwater football climate. Rest and comfort are essential mechanisms of help in order to decrease metabolic rate and allow more oral fluids to prevent dehydration .Warm application to the feet allows the blood congested to flow into distal areas of the

body and into the vessels of the foot and leg that are stretched. As a hot water foot bath is placed 15-20 minutes in the feet, the vessels tend to extend and improve circulation, neutralize acids and destroy bacteria. The increased circulation of the blood resets hypothalamic heat flow points from higher to lower heat.

The quasi-experimental trials performed by Ishita, Sunita, and Ahmed (2014), on 60 children using a fever-induced non-probable sampling technique assess the effectiveness of warm water foot bath therapy. The study found that after warm water foot bath treatment, the temperature decreased.

Sunar (2017) performed an experimental study to determine the effects of hot water foot baths in fever patients and Retnam and Sophia (2018) experiments on hotwater foot baths with body temperature reduction. Hot-Water footbath treatment has been shown to decrease the body temperature in fever-related patients effectively. Pediatric nurses are responsible for supporting and maintaining their patients' wellbeing and health. A core aspect of this is to provide efficient and evidence-based services for patients. Pediatric nurses play a vital role in the control of fever in infants, as both the first responders to patient fever diagnosis in the stationary surroundings and as the person in charge of the administration of antipyretic medications (Clark, 2019).

SUBJECTS AND METHOD

Research design

A quasi-experimental research design (study and control groups) were used in the current study.

Subjects

A purposeful sample of 100 children having fever participated in the current study at the age of 2-10 years who randomly divided into two equal groups by using a simple random sampling technique. Study group: Consisted of 50 children who received warm water foot bath therapy and control group: Consisted of 50 children who received routine care. According to the statistical equation in which the sample size was 10 % from the total population size, the entire pediatric population admitted to the outpatient clinic in RUYIA general hospital was 1000 children with fever.

DATA COLLECTION TOOL :-

1- Interview Questionnaire Sheet: It was developed by the researchers after an extensive review of related recent literature. It included two parts:

Part 1: It concerned with the Bio -demographic data about the child, it consisted of 4 items such as child's age, sex, child's diagnosis, and use of antipyretic.

Part II: Mercury thermometer to check the axillary temperature of the children and bath thermometer to check the temperature of the water.

Body temperature categories :-

BODY TEMPERATURE CATEGORIES		
1	Low fever	37.5-38 o C

2	Moderate fever	38.1-38.9 o C
3	High fever	≥ 39 o C

DATA COLLECTION PROCEDURE:

The official permissions obtained from the medical superintendent, and explaining the nature of the study performed. Formal written consent was obtained from the mothers who have visited the clinics and fulfilling the inclusion criteria. The baseline temperature axillary was measured before the implementation of the study (pretest) by using a mercury thermometer for both the study and control group.

The children in the study group were placed in a sitting position and his feet including ankles was immersed in a basin with warm water, the warm water temperature was adjusted to be 38-40 ^{0}C by using a bath thermometer and the child was completely wrapped with a sheet or blanket except their head and neck exposed. Warm water was periodically added to the footbath to maintain adjusted temperature; researchers' hand was placed between the warm water being poured and the children's feet (to avoid burning the feet). The duration of the warm water feet bath was15 minutes, after that time, body temperature was measured by using the same thermometer and recorded (post-test). The children were not administered antipyretic medication.

The children in the control group received the routine general measures to reduce fever in the hospital as plain water compresses on the forehead, axilla or armpits, and the groin area for 15 minutes after that time, body temperature was measured by using the same thermometer and recorded (post-test). The data collection procedure was done at the period of six months from the beginning of September 2022 to the end of February 2023

STATISTICAL ANALYSIS:-

Data entry was done using a compatible personal computer and the content of the tool was analyzed, categorized, and then coded. After data were collected it was revised, coded, and fed to statistical software (SPSS) IBM 25. The given graphs were constructed using Microsoft Excel software. All statistical analysis was done using two-tailed tests and an alpha error of 0.05. P-value less than or equal to 0.05 is considered to be significant. The following statistical tests were used:

Descriptive statistics: included the mean with standard deviation and percent to describe the scale, categorical data, chi-square test, and a comparison of means was performed using "t-test" .

RESULTS:

Table (1): Comparison between Study and Control Groups Regarding their Bio demographic Data (n = 100).

Biodemographic data	**Studygroup (n= 50)**		**Controlgroup (n= 50)**		**X2**	**P-value**
	No.	%	No.	%		

Age / years						
2-4	14	28.0	11	22.0	.693	.707 NS
5-7	28	56.0	32	64.0		
8-10	8	16.0	7	14.0		
Gender						
Boys	13	26.0	19	38.0	1.654	.198 NS
Girls	37	74.0	31	62.0		
Child'sdiagnosis						
Upper respiratory disorder	34	68.0	27	54.0	2.060	.151 NS
Gastroenteritis	16	32.0	23	46.0		

NS means no statistical significance

Above table shows that 56.0% & 64.0% of the study and control groups aged between 5- 7 years with mean age 5.6 ± 1.9 vs 5.7 ± 1.8 respectively, 74.0% versus 62.0% of them was female and 68.0% vs 54.0% of them their diagnosis was upper respiratory disorders respectively with no statistically significant differences in which P – value < .707, .198, .151 respectively.

Table (2): Comparison Between Study and Control Groups Regarding their Use of Anti-pyretic (n = 100).

Anti-pyritic	**Studygroup (n= 50)**		**Controlgroup (n= 50)**		**X2**	**P-value**
	No.	%	No.	%		
Anti-pyritic						
Yes	42	84.0	36	72.0	2.098	.148
No	8	16.0	14	28.0		NS
If yes, from/hours						
6	12	28.6	14	38.9	1.144	.565
8	20	47.6	16	44.4		NS
10	10	23.8	6	16.7		

NS means no statistical significance

Above table presents that 84.0% vs 72.0% of the study and control groups administered antipyretic drugs when their children with elevation in the body temperature and 47.6% vs 44.4% of them the last duration of antipyretic were 8 hours.

Table (3): Comparison Between Study and Control Groups Regarding their Axillary Body temperature (Baseline – After warm water foot bath therapy) (n = 100).

Body temperature	Studygroup (n= 50)		Controlgroup (n= 50)		X2	P-value
	No.	%	No.	%		
Baseline temeperature						
Lower fever	6	12.0	10	20.0	4.899	.086
Moderate fever	29	58.0	18	36.0		NS
High fever	15	30.0	22	44.0		
After warm water foot bath therapy application						
Normal body temperature	37	74.0	20	40.0	12.576	.006**
Lower fever	9	18.0	20	40.0		
Moderate fever	4	8.0	8	16.0		
High fever	0	.0	2	4.0		

NS means no statistical significance **Highly statistically significant differences

Above table represenrs More than half (58%) of the study group versus more than one third (36%) of the control group had a moderate fever in baseline while near to three quarters (74%) of the study group versus more than one-third of the control group their body temperature return to normal levels after warm water bath therapy with high statistical significance difference in which P-value 0.006.

Table (4): Mean Body Temperature of the Study and Control Group (In the baseline body Temperature and After warm water Foot Bath Therapy Application) (n = 100)

Items	Studygroup (n= 50)	Controlgroup (n= 50)	T	P-value
Baseline temperature	38.7+/- .417	38.6+/- .587	.530	.597NS
After warm water application	38.7+/- .417	37.8+/- .417	4.105	.0001**

NS means no statistical significance **Highly statistically significant Differences.

It illustrates that, mean body temperature among the study group in the baseline was 38.7 ± .417 versus 38.6 ± .587 among the control group decreased to 37.4 ± .496 versus 37.8± .554 after application respectively, with statistical significance at P-value < .0001**

Table (5): Correlation Between Children Age and their Body Temperature at Baseline and after Warm Water Foot Bath Therapy Application among Study and Control Groups.

Items	Children age			
	Studygroup		Controlgroup	
	R	P-value	r	P-value
Antipyretic	-164-	.255	-084-	.562
Baseline temperature	-097-	.502	.019-*	-.329*
Temperature after warm application	-077-	.597	-094-	.516

*correlation significance at < .05

It shows that there was no association between children's age and their baseline and after warm water foot bath therapy application among study and control groups.

Table (6): Correlation between Children Diagnosis and Their Body Temperature at Baseline and After Warm Water Foot Bath Therapy Application among Study and Control Groups (n=100)

Items	Study group				Control group			
	Respiratory disease		Gastroenteritis		Respiratory disease		Gastroenteritis	
	No	%	No	%	No	%	No	%
Baseline temperature								
Lower fever	3	8.8	3	8.8	4	14.8	6	26.1
Moderate fever	20	58.8	9	56.3	8	29.6	10	43.5
High fever	11	32.4	4	25.0	15	55.6	7	30.4
X^2(p-value)	1.102 (.576) NS				3.232 (.199) NS			
After warm water foot bath therapy application								
Normal body temperature	24	70.6	13	81.3	6	22.2	14	60.9
Lower fever	7	20.6	2	12.5	17	63.0	3	13.0
Moderate fever	3	8.8	1	6.3	4	14.8	4	17.4
High fever	0	.0	0	.0	0	.0	2	8.7
X^2(p-value)	.653 (.722) NS				14.775 (.002)**			

NS means no statistical significance **Highly statistically significant differences

It presents that 22.2% of children had respiratory disease compared to 60.9% of children who had gastroenteritis their body temperature decreased to normal level after application of plain water compresses on the forehead, the axilla, and the groin area for 15 minutes in the control group with statistically significant differences which P-value < .002.

Discussion

Warm water foot bath treatment allows the blood vessels to dilate and increase the circulation of blood, releasing heat as sweat and supplying oxygen for brain cells to help eliminate toxins. Immersion in a bath of water promotes circulation, increases tissue nourishment, and loosens stress (Mandal, Datta, Ahmed, and De, 2014)

Conclusion

Based on the findings of the current study the following conclusion can be drawn: Applying warm water foot bath therapy in children with fever is effective in reducing body temperature among children in the study group than those using plain water compresses with statistically significant differences.

Recommendations

1. Provide the hospital with written protocol on methods of warm water foot bath therapy to be applied in the hospitals.
2. On job training program should be provided for all nurses working in different clinics regarding applying warm water foot bath therapy for hyperthermia children
3. Developing health education program to teach the mothers to apply warm water foot bath therapy in home to reduce fever.
4. Reapplication of the study on children with different age groups with fever
5. Further studies are recommended to examine the long-term effect of applying warm water foot bath therapy on body temperature among children with fever.

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