

## **An Experimental Study To Assess The Effectiveness Of Tepid Sponging Among Children (6 Months To 6 Years)**

### **With Hyperpyrexia Admitted In Rajeev Hospital Hassan, Karnataka.**

P.Vani, Senior Nursing Officer, AIIMS, Bhopal, M.P., India

**Corresponding Author:** P.Vani, Senior Nursing Officer, AIIMS, Bhopal, M.P., India

**Type of Publication:** Original Research Article

**Conflicts of Interest:** Nil

#### **Abstract**

Fever has been recognized as an important sign of a disease since the beginning of recorded history. Opinions have changed substantially, however, as to whether ill patients are better off neither with nor without it. For Hippo crates and other ancients, fever was the body's defense mechanism for "cooking off" an excess of one of the four bodily humors, blood, phlegm, yellow bile and black bile. In the 19<sup>th</sup> century by Thomas Sydenham, the noted English physician defined "fever is nature's engine which she brings into the field to remove her enemy". Pyrexia is defined as a rise in body temperature above normal 98.4<sup>0</sup>F to 99<sup>0</sup>F orally. Pyrexia results from alteration in the hypothalamic set point.

Vulnerable children between 6 months and 5years of age may experience convulsions as the result of fever. Boys are affecting more than the girls. Applying tepid sponging to the child skin can reduce fever. If the temperature is above 101.4<sup>0</sup>F.it is continued for 10 to 15 minutes, until the child temperature returns to normal. Febrile convulsions are usually occurring during a rise in temperature rather than during an extended period of temperature. Tepid sponging is the effective preventive measure of febrile convulsions.

The statement of the present study is "An Experimental study to assess the effectiveness of tepid sponging for the children (6 months to 6 years) with hyperpyrexia admitted in Rajeev hospital, Hassan, Karnataka with objectives –

(1) To assess the children for hyperpyrexia before administering tepid sponging and paracetamol, (2) To assess the effectiveness of tepid sponging with paracetamol after administering to experimental group. (3) To compare the effectiveness of tepid sponging with paracetamol and with paracetamol alone. (4) To associate the effectiveness of tepid sponging in experimental group with selected socio demographic variables.

**Materials and methods:** the present experimental study was conducted at Rajeev Hospital, Hassan to assess the effectiveness of tepid sponging for the children with hyperpyrexia. Structured questionnaire was designed to assess back ground variables and temperature assessment tool was prepared to monitor temperature for 1 hour. Sample assigned randomly 40 children for experimental and 40 children to control group from the accessible population, and given tepid sponging for experimental group and control group followed doctor orders. Validity and reliability of the tool was assessed and data collected were analyzed by using descriptive and inferential statistics. Permission was obtained from concerned authority before actual collection of data.

#### **Results**

There is statistically significant difference between experiment and control group when considering the temperature in each point of time. In both group there is a significant temperature reduction from baseline to 1 hour. But in experiment the reduction in 1 hour was more than

control group. Both groups are having reduction but pattern of difference between experiment and control group is statistically significant. The difference in experimental group is 3.44<sup>0</sup>F and in control it is 1.96<sup>0</sup>F. The effectiveness of tepid sponging was 1.47<sup>0</sup>F.

### **Conclusion**

The findings of the study support that tepid sponging was effective measure in reducing body temperatures among children. Tepid sponging can be recommended for the children to deduce body temperature.

### **Introduction**

Fever is most commonly seen problem in children. Causes of fever in children are mostly upper respiratory tract infections like acute nasopharyngitis or common cold, tonsillitis, otitis media. Fever is not a disease that itself it is a sign. It is a protective function of the body. As a rise in body temperature prevents the growth of Micro organisms like bacteria, fungus, virus and certain antigens and pyrogens. When these enter in to the body, the bodies' first line of defense gets activated and phagocytes are released in the body to destroy the infectious agent. They also acts on the hypothalamus to set point are increased.

Although it is a protective function of the body, fever is consider harmful for pediatric age group, as it may lead to febrile seizures, stupor, dehydration, increased pulse rate, increased work of breathing and discomfort. Fever can also cause confusion due to decreased oxygen levels in the brain. Febrile convulsions are usually occurring during a rise in temperature rather than during an extended period of temperature among children 1 to 6 years of age group.

According to statistics of pediatric hospitals 30% of children are visited emergency department with fever. In that 2 to 5% children are developing febrile seizures. These incidences vary according to nations. In US it is 2% to 5%, in India it is 5% to 10%, 7% to 8% in Japan 0.35% in Hong Kong. According to these statistics in India more

number of children is developing febrile seizures. If it is not treated reoccurrence occur in about one third of children having first seizure.

A study conducted on "tepid sponging to reduce temperature in febrile children in tropical climate" in Bangkok, Thailand. The study concluded that in addition to antipyretics tepid sponging is more effective in reducing the body temperature in febrile children living in tropical climate. This study suggests that tepid sponging is more effective than the antipyretics in tropical climate.

Vulnerable children between 6 months and 5 years of age may experience convulsions as the result of fever. Boys are affecting more than the girls. Applying tepid sponging to the child skin can reduce fever. If the temperature is above 101.4<sup>0</sup>F. it is continued for 10 to 15 minutes, until the child temperature returns to normal. Febrile convulsions are usually occurring during a rise in temperature rather than during an extended period of temperature. Tepid sponging is the effective preventive measure of febrile convulsions.

A number of studies show that tepid sponge and Paracetamol is more effective at reducing fever than Paracetamol alone, and it is rarely associated with shivering and discomfort.

### **Objectives**

- (1) To assess the children for hyperpyrexia before administering tepid sponging and paracetamol,
- (2) To assess the effectiveness of tepid sponging with paracetamol after administering to experimental group.
- (3) To compare the effectiveness of tepid sponging with paracetamol and with paracetamol alone.
- (4) To associate the effectiveness of tepid sponging in experimental group with selected socio demographic variables.

**Hypothesis**

- 1) There will be a significant reduction in the body temperature, among hyperpyrexia children who received tepid sponging and anti-pyretic.
- 2) There will be a significant difference in reduction of body temperatures after a set period of time that who received tepid sponge and that who did not receive.

**Materials and methods:** the present experimental study was conducted at Rajeev Hospital, Hassan to assess the effectiveness of tepid sponging for the children with hyperpyrexia. Structured questionnaire was designed to assess back ground variables and temperature assessment tool was prepared to monitor temperature for 1 hour. Sample assigned randomly 40 children for experimental and 40 children to control group from the accessible population, and given tepid sponging for experimental group and control group followed doctor orders. Validity and reliability of the tool was assessed and data collected were analyzed by using descriptive and inferential statistics. Permission was obtained from concerned authority before actual collection of data.

**Statistical Analysis**

The data was recorded into a excel spread sheet after collection and was then analysed using statistical software SPSS. Descriptive statistics like frequency, percentage, and mean were calculated and inferential statistics to analyze repeated observations between experiment and control groups and to find out association between the demographic variable and reduction in the temperatures. Non Parametric test To analyzed demographic variable difference between experimental and control group.

**Results**

Table -1 Demographic data of experimental and control group

Demographic variables	Group			
	Experiment group	Control group		
	n	%	n	%

Age	6months - 1 year	6	15.0%	7	17.5%
	1 - 3 years	15	37.5%	18	45.0%
	3 - 5 years	10	25.0%	8	20.0%
	5 - 6 years	9	22.5%	7	17.5%
Sex	Male	21	52.5%	18	45.0%
	Female	19	47.5%	22	55.0%
Religion	Hindu	28	70.0%	25	62.5%
	Christian	8	20.0%	8	20.0%
	Muslim	4	10.0%	7	17.5%
Father_Education	Illiterate	3	7.5%	2	5.0%
	Primary	12	30.0%	14	35.0%
	Middle	11	27.5%	13	32.5%
	SSLC	10	25.0%	8	20.0%
	Graduate& others	4	10.0%	3	7.5%
Mother Education	Illiterate	5	12.5%	4	10.0%
	Primary	13	32.5%	14	35.0%
	Middle	13	32.5%	16	40.0%
	SSLC	7	17.5%	5	12.5%
	Graduate& others	2	5.0%	1	2.5%
Occupation	Daily wages	23	57.5%	20	50.0%
	Monthly salary	6	15.0%	8	20.0%
	Business	8	20.0%	6	15.0%
	Others	3	7.5%	6	15.0%
Income	< Rs.2000	12	30.0%	20	50.0%
	Rs.2000-4000	12	30.0%	6	15.0%
	Rs.4000-6000	9	22.5%	8	20.0%
	>Rs.6000	7	17.5%	6	15.0%
Type of family	Nuclear	27	67.5%	22	55.0%
	Joint	13	32.5%	18	45.0%

majority 15% of the children are between 6months to 1 year in experimental group whereas it is 17.5% in control group, 52.5% of the children are males in experimental group whereas it is 45% in control group, 70% of the children are belongs to Hindu community in experimental group whereas it is 62.5% in control group, 7.5% of the fathers of the children were illiterates in experimental group whereas it was 5% in control group, 12.5% of the mothers of the children were illiterates in experimental

group whereas it was 10% in control group, 57.5% of the children parents are daily wagers in experimental group whereas it is 70% in control group, 30% of the children family income is <2000 in experimental group whereas it is 50% in control group, and 67.5% of the children are from nuclear family system in experimental group whereas it was 55% in control group.

Table – 2: Temperature of children before administering tepid sponging in experimental and control group

Time	Temperature		Maximum Temperature	Minimum Temperature	Range Max-Min
	Mean	SD			
Base line of experimental group	102.52	.86	104.6	101.2	3.4
Base line of control group	102.24	0.84	104.2	101.2	3.0

Table- 2: shows the mean temperature, minimum temperature, maximum temperature and range of the temperature of children before administering intervention in the experimental group and control group.

Table – 3: Comparison between Experimental and control group on repeated observations of temperature

Time	group				Student independent t-test
	Experiment group		Control group		
	Mean temperature	SD	Mean temperature	SD	
Base	102.52	.86	102.24	.84	t=1.45 P= 0.15 Not significant
Min15	101.86	.83	102.24	.84	t=2.07 P= 0.04 Significant
Min30	101.18	.81	102.23	.85	t=5.64 P= 0.001 Significant
Min45	100.51	.68	101.12	.70	t=3.94 P= 0.001 Significant
Min60	99.09	.41	100.28	.53	t=11.3 P= 0.001 Significant

### Comparison between Experimental and control group on repeated observations of temperature

In base line both groups having almost equal temperature, after 15, 30, 45 and 60 minutes, it shows there is statistically significant difference between experiment and control group.

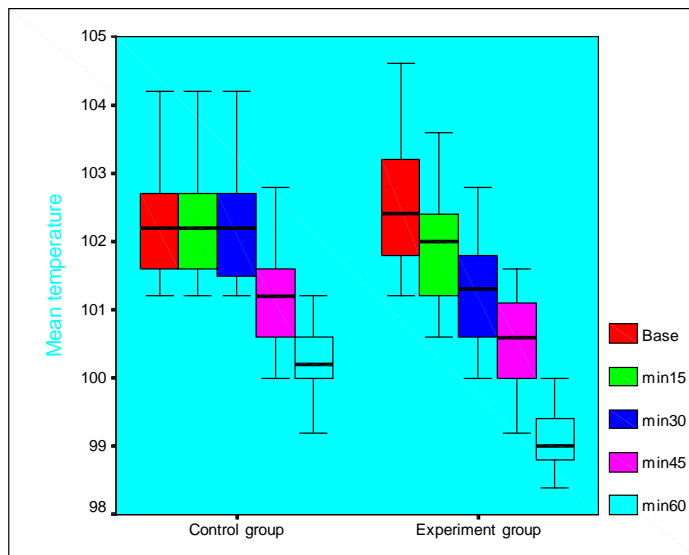


Figure 1 Box plot compares the control group and experiment group temperature

Table 4: Repeated measure Analysis of variance

Source of variation	Sum of Squares	df	Mean Square	F	Sig.
Within each group (Experiment & Control group)	379.425	4	94.856	599.107	0.001
Between group (Experiment & Control group)	35.218	1	35.218	16.094	0.001

Table - 4 shows that temperature reduction with in groups, the reduction within experiment group form baseline to 1 hour is statistically significant, The reduction within control group form baseline to 1 hour is also statistically significant

Temperature reduction between groups, both groups are having reduction but pattern of difference between experiment and control group is statistically significant.

Table – 5: Effectiveness of tepid sponging in experimental group

Source of variation	Temperature		Difference	Effectiveness of tepid sponging
	Baseline	After 60 min		
Experiment group	102.52±0.86	99.09±0.41	3.43±0.86	3.43- 1.96 = 1.47
Control group	102.24±0.84	100.28±0.53	1.96±0.69	

Table-5 show the difference in experimental group is 3.44 and in control it is 1.96. The effectiveness of tepid sponging was 1.47<sup>0</sup>F

Table 6: Association between Age of children and reduction in temperature

group	Child age	N	Mean reduction in temperature	Std. Deviation	One-way ANOVA F-test
Experiment group	6months - 1 year	6	3.07	0.63	F=6.69 P=0.001 Significant
	1 - 3 years	15	3.10	0.68	
	3 - 5 years	10	3.25	0.77	
	5 - 6 years	9	4.36	0.81	
	Total	40	3.43	0.85	
Control group	6months - 1 year	7	1.94	1.09	F=1.11 P=0.36 Not Significant
	1 - 3 years	18	2.06	0.55	
	3 - 5 years	8	1.58	0.60	
	5 - 6 years	7	2.14	0.56	
	Total	40	1.96	0.68	

When assessing the Experimental group association between the children age and their reduction in temperature it shows there is a statistically significant association between them after administering tepid sponging. When age increases their reduction in temperature also increases. When assessing the control association between the children age and their reduction in temperature it shows there is no statistically significant association between them without administering tepid sponging.

Irrespective of their age they are having reduction in temperature.

Table – 7: Association between Associated features and groups

		group		Chi square test
		Control group	Experiment group	
Features	No	40(100%)	36(90%)	$\chi^2=4.21$ P=0.04 Significant
	Yes	0	4(10%)	
Total		40	40	

Table 7 depicts that in experiment group 10% developed associated features

There is statistically significant difference between experiment and control group.

### Discussion

The findings showed that majority 15% of the children are between 6months to 1 year in experimental group whereas it is 17.5% in control group, 52.5% of the children are males in experimental group whereas it is 45% in control group, 70% of the children are belongs to Hindu community in experimental group whereas it is 62.5% in control group, 7.5% of the fathers of the children were illiterates in experimental group whereas it was 5% in control group, 12.5% of the mothers of the children were illiterates in experimental group whereas it was 10% in control group, 57.5% of the children parents are daily wagers in experimental group whereas it is 70% in control group, 30% of the children family income is <2000 in experimental group whereas it is 50% in control group, and 67.5% of the children are from nuclear family system in experimental group whereas it was 55% in control group.

In experimental group mean temperature was 102.52'SD .86, maximum temperature 104.60F, Minimum temperature 101.20F and Range of temperature was 3.4, In control group mean temperature was 102.24'SD .84,

maximum temperature 104.20F, Minimum temperature 101.20F and Range of temperature was 3.

A study was conducted on “Management of feverish children at home”. The sample consisted of 52 children aged from 3 months to 5 years. The study results revealed that warm sponging caused the fastest reduction in temperature. Another study on “Efficacy of tepid sponging versus paracetamol in reducing temperature in febrile children” compared the efficacy of tepid sponging with paracetamol. 80 children aged 6 to 54 months are selected for the study. The study revealed that a significantly greater and more rapid reduction of fever was demonstrated with tepid sponging than paracetamol. The findings of the present study as well as previous studies showed that tepid sponging was effective in reducing the body temperature among children.

The reduction within experiment group from baseline to 1 hour is statistically significant, The reduction within control group from baseline to 1 hour is also statistically significant.

### **Conclusion**

Thus, to conclude, the findings of the present study as well as previous studies showed that tepid sponging was effective in reducing the body temperature among children. So to conclude, the investigator has achieved the objective of assessing the effectiveness of tepid sponging among children between 6 months to 6 years.

### **References**

1. Nadine Mudkar. Child health and challenges in the next century, Is India ready? *Pediatrics today*.2000 Jan; 3(1): 32-33.
2. Michael S. Karmer. Technical paper on the WHO programme for control of acute respiratory infections, 2003.
3. TNAI. Fundamentals of nursing, procedure manual. 1<sup>st</sup>edn, and mosby.2005: 310-11.
4. Barbara Kosier fundamentals of nursing. 10<sup>th</sup>edn, 2006: 512-514.
5. Potter Perry. basic nursing theory and practice. 5<sup>th</sup>edn, Mosby; 2003: 650-654.
6. Wally and Wong. Essentials of pediatric nursing. 5<sup>th</sup>edn, mosby; 2001: 243-238.
7. Brunawald et al. Principles of internal medicine. 15<sup>th</sup>edn. R.R Donnelly and sons; 2002: 741-44.
8. Y.K Amdekar. Rational use of antipyretics, *Journal of Indian Academy of Pediatrics*, 2003 June; 40(6): 541-4.
9. Mahar AF et al. Tepid sponging to reduce temperature in febrile children in tropical climate. *Clinical Pediatrics*, Apr 1994; 33(4): 227-31.
10. Dorathy R. Marlow, Barbara A. Redding. Text book of pediatric nursing. 6<sup>th</sup>edn. Harcourt India; 2002: 840-1.
11. Jane Ball, Ruth Blinder. *Pediatric Nursing*. 2<sup>nd</sup>edn congress cataloging; 1999:403.
12. Chandra J. Bhatnagar SK. antipyretics in children. *Indian Journal of Pediatrics*. Jan 2002; 69(1): 69-74.
13. Sharbar J. The efficacy of tepid sponge bath to reduce fever in young children. *American Journal of Emergency Medicine*. 1997; 15:188-192.