



# “A STUDY TO ASSESS THE EFFECT OF SALT WATER VERSUS PLAIN WATER STEAM INHALATION THERAPY ON SYMPTOMS OF ACUTE UPPER RESPIRATORY TRACT INFECTION AMONG UNDER FIVE CHILDREN IN SELECTED AREAS.”

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**Abstract :** Acute upper respiratory tract infections (AURTI) are a leading cause of morbidity and mortality in under-five children worldwide. About 6.6 million children less than 5 years of age die every year in the world; 95% of them in low-income countries and one third of the total deaths is due to Acute Upper Respiratory Tract Infection. , a quantitative research approach was used. In this study quasi experimental pre-test and post-test design was used. The research finding recorded In saltwater steam inhalation group, average reduction in infection score was 3.1 which was 2.1 plain water steam inhalation group. T-value for this test was 2.5 with 58 degrees of freedom. Corresponding p-value was small (less than 0.05), the null hypothesis is rejected. It is evident that the saltwater steam inhalation was highly significantly effective in improving the acute upper respiratory tract infection among children as compared to plain water steam inhalation conclusion was this therapy is most effective and can be diminishes the symptoms of acute upper respiratory tract infection as comparatively with the plain water steam inhalation therapy among under five children.

**Keywords:** Asses, Effect, Salt water Steam inhalation, Plain water Steam inhalation Acute Upper Respiratory Tract Infection .

**Introduction :**Acute upper respiratory tract infections (AURTI) are a leading cause of morbidity and

mortality in under-five children worldwide. About 6.6 million children less than 5 years of age die every year in the world; 95% of them in low-income countries and one third of the total deaths is due to Acute Upper Respiratory Tract Infection.

Many risk factors for upper respiratory tract infections have been identified which include not only the climatic conditions but also the poverty, poor nutrition, poor housing conditions, indoor air pollution such as parental smoking, absence of ventilation, overcrowding, industrialization, social cultural values, overuse and misuse of antibiotics, lack of basic health services and lack of awareness. Infections of the Upper respiratory tract infection are the most common human ailment while they are a source of discomfort, disability and loss of time for most Under five children's they are a considerable cause of morbidity & in children and the elderly. Many of these infections run their natural course in under five Children and adults without specific treatment and without obstacle. However, in young infants, small children and in the elderly, It increases the morbidity & mortality rates. Every year Acute Respiratory Tract Infections in young children is responsible for an approximate 4.1 million deaths worldwide. The incident of Acute Respiratory Tract Infections is similar in developed and developing countries.

**Need of the study :** Acute respiratory infection (ARI) is a leading cause of morbidity and mortality in under- five children Worldwide. On an average, children below 5 years of age suffer about 5 episodes of Acute Respiratory Infection per child per year, thus accounting for about 238 million attacks and about 13 million deaths every year in the world. Identification of modifiable risk factors of Acute Respiratory Infection may help in reducing the burden of disease. Acute respiratory infection is the major cause of mortality among children aged less than 5 years, especially in developing countries such as India. Lower respiratory tract infections are leading cause of under-five morbidity globally.<sup>9</sup>

Acute Respiratory tract infection causes a major challenge to the health system in developing countries because of high morbidity and mortality. It is evaluated that Bangladesh, India, Indonesia, and Nepal together account for 40% of the global Acute Respiratory Infection mortality. Among infants living in overcrowded surroundings and sub optimally breast-fed are more likely to suffer Acute Respiratory Infection-related illnesses.

**Research approach :** In this study, a quantitative research approach was used.

**Research designed:** In this study quasi experimental pre-test and post-test design was used.

**Sample:** Sample refers to the representative unit of population under study. In this study sample were under five children.

**Sample size:60**

**Sampling Technique:** Samples were selected based on the following criteria.

**Inclusion criteria:**

The children with the manifestation of acute upper respiratory tract infection including, cough, sore

throat and nasal obstruction.

- Under five children whose mothers are at home.
- Under five children who are not taking any other treatment.

#### Exclusion criteria:

- The children suffering from acute upper respiratory tract infection with fever, vomiting, restlessness, and ear ache and irritable cry.

#### Result:

#### Section I: Description of samples (under five children) based on their personal characteristics.

**Table 1: Description of samples (under five children) based on their personal characteristics in terms of frequency and percentages. N=30, 30**

Demographic variable	Salt water		Plain water	
	Freq	%	Freq	%
<b>Age</b>				
1 to 3 years	12	40.0%	14	46.7%
3 to 5 years	18	60.0%	16	53.3%
<b>Gender</b>				
Male	12	40.0%	16	53.3%
Female	18	60.0%	14	46.7%
<b>Mother's occupation</b>				
Homemaker	7	23.3%	12	40.0%
Daily wage	16	53.3%	14	46.7%
Private employee	7	23.3%	4	13.3%
<b>Monthly family income</b>				
Rs. 10000 – 15000/-	2	6.7%	7	23.3%
Rs. 15001 to 20000/-	12	40.0%	12	40.0%
Rs. 20001 to 25000/-	11	36.7%	7	23.3%
Above 25000 /-	5	16.7%	4	13.3%

**Table No 1:** In saltwater group, 40% of the children had age 1 to 3 years and 60% of them had age 3 to 5 years. In plain water group, 46.7% of the children had age 1 to 3 years and 53.3% of them had age 3 to 5 years.

In saltwater group, 40% of them were males and 60% of them were females. In plain water group, 53.3% of them were males and 46.7% of them were females.

In saltwater group, 23.3% of them were homemakers, 53.3% of them were daily wagers and 23.3% of them were private employees. In plain water group, 40% of them were homemakers, 46.7% of them were daily wagers and 13.3% of them were private employees.

In saltwater group, 6.7% of them had monthly family income Rs.10000-15000, 40% of them had monthly family income Rs.15000-20000, 36.7% of them had income Rs.20001-25000 and 16.7% of them had income above 25000. In plain water group, 23.3% of them had monthly family income Rs.10000-15000, 40% of them had monthly family income Rs.15000-20000, 23.3% of them had

income Rs.20001-25000 and 13.3% of them had income above 25000.

## Section II: Analysis of data related to the of acute upper respiratory tract infection among under five children before steam inhalation therapy.

**Table 2: Acute upper respiratory tract infection among under five children before steam inhalation therapy**

N=30, 30

Infection	Saltwater group		Plain water group	
	O1		O1	
	Freq	%	Freq	%
No infection (Score 0)	0	0.0%	0	0.0%
Mild (Score 1-4)	0	0.0%	0	0.0%
Moderate (Score 5-8)	6	20.0%	15	50.0%
Severe (Score 9-13)	24	80.0%	15	50.0%

Table No 2: In saltwater group, 20% of the under five children had moderate infection (score 5-8) and 80% of them had severe infection (score 9-13) in acute upper respiratory tract. In plain water group, 50% of the under five children had moderate infection (score 5-8) and 50% of them had severe infection (score 9-13) in acute upper respiratory tract.

## Section III: Analysis of data related to the effect of steam inhalation on symptoms of acute upper respiratory tract infection among mother under five children after steam inhalation therapy.

**Table 3: Effect of steam inhalation on symptoms of acute upper respiratory tract infection among mother under five children after steam inhalation therapy**

N=30, 30

Infection	Saltwater group				Plain water group			
	O1		O2		O1		O2	
	Freq	%	Freq	%	Freq	%	Freq	%
No infection (Score 0)	0	0.0%	0	0.0%	0	0.0%	0	0.0%
Mild (Score 1-4)	0	0.0%	0	0.0%	0	0.0%	1	3.3%
Moderate (Score 5-8)	6	20.0%	27	90.0%	15	50.0%	29	96.7%
Severe (Score 9-13)	24	80.0%	3	10.0%	15	50.0%	0	0.0%

TableNo 3: In saltwater group in pre-test, 20% of the under five children had moderate infection (score 5-8) and 80% of them had severe infection (score 9-13) in acute upper respiratory tract. In post-test, 90% of the under five children had moderate infection (score 5-8) and 10% of them had severe infection (score 9-13) in acute upper respiratory tract.

In plain water group in pre-test, 50% of the under five children had moderate infection (score 5-8) and 50% of them had severe infection (score 9-13) in acute upper respiratory tract. In post-test, 3.3% of

the under five children had mild infection (Score 1-4) and 96.7% of them had moderate infection (score 5-8) in acute upper respiratory tract.

This indicates that the acute upper respiratory tract infection among mother under five children improved remarkably after salt water as well as plain water inhalation therapy.

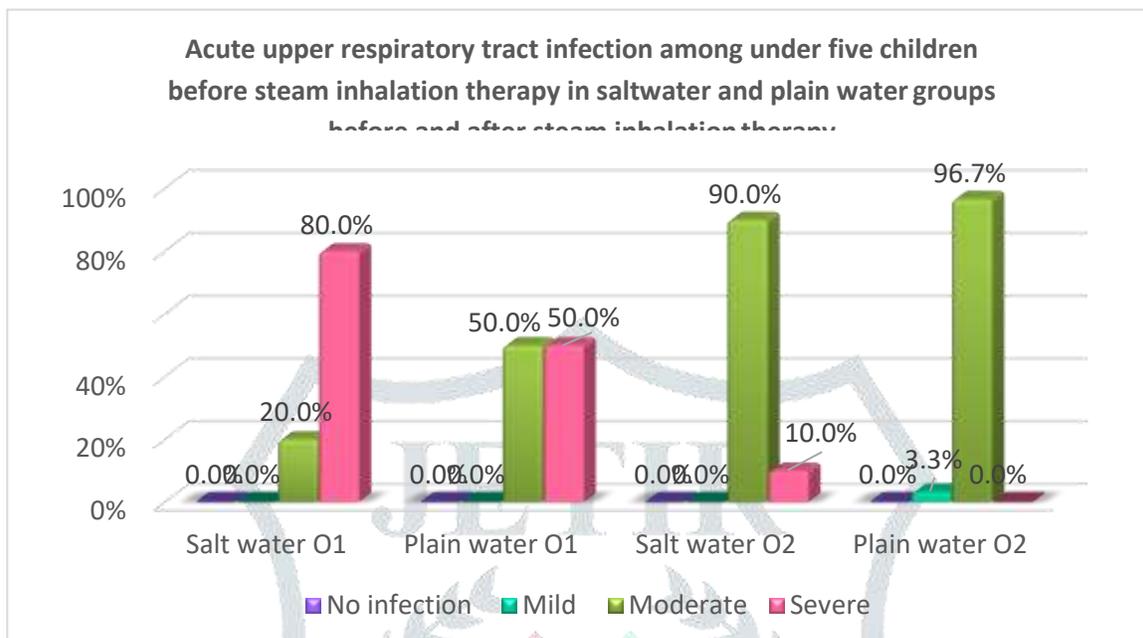


Figure01 Description of samples (under five children) based on their acute upper respiratory tract infection among under five children before steam inhalation therapy

**Table 5: Two sample t-test for the comparison of the effect of steam inhalation on symptoms of acute upper respiratory tract infection among mother under five children after steam inhalation therapy**

N=30, 30

Group	Mean	SD	T	df	p-value
Salt water	3.1	1.6	2.5	58	0.008
Plain water	2.1	1.6			

Table no 5: Researcher applied two sample t-test to assess the effect of salt water and plain water steam inhalation on acute upper respiratory tract infection among children.

In saltwater steam inhalation group, average reduction in infection score was 3.1 which was 2.1 plain water steam inhalation group. T-value for this test was 2.5 with 58 degrees of freedom. Corresponding p-value was small (less than 0.05), the null hypothesis is rejected. It is evident that the saltwater steam inhalation was highly significantly effective in improving the acute upper respiratory tract infection among children as compared to plain water steam inhalation.

**Section IV:** Analysis of data related to the association between the symptoms of acute upper respiratory tract infection among mother under five children after steam inhalation therapy with their selected

demographic variables.

Table 6: Fisher's exact test for the association between the symptoms of acute upper respiratory tract infection among under five children after steam inhalation therapy with their selected demographic variables.

N=60

Demographic variable		Infection		p-value
		Moderate	Severe	
Age	1 to 3 years	12	14	0.172
	3 to 5 years	9	25	
Gender	Male	8	20	0.419
	Female	13	19	
Mother's occupation	Homemaker	9	10	0.327
	Daily wage	8	22	
	Private employee	4	7	
Monthly family income	Rs. 10000 – 15000/-	4	5	0.958
	Rs. 15001 to 20000/-	8	16	
	Rs. 20001 to 25000/-	6	12	
	Above 25000 /-	3	6	

Table no 6: Since all the p-values were large (greater than 0.05), none of the demographic variables was found to have significant association with the symptoms of acute upper respiratory tract infection among mother under five children.

### Discussion:

In this study approach with quasi-experimental non-equivalent groups design was used. Sample comprised of 60 patients who were having common cold for not more than 2 days selected through purposive sampling. Study subjects in the experimental group were given steam inhalation with salt while in the control group with plain water twice a day for three days. Common cold was assessed before and after the intervention through a checklist and the scores were recorded. Study was conducted in a community setting in Delhi. Data were examined using expressive and inferential statistics. In the present study, there was a difference between the pre-test and post-test scores of common cold in control as well as experimental groups. When the post-intervention scores of control and experimental group were compared, the t value was 4.14 at df (58) at 0.05 level of significance, which was found to be significant. This shows that steam inhalation with plain versus salt water is more effective than steam inhalation with plain water in relieving symptoms of common cold. In present study was done on 30 samples of under five children those who are having cough, cold, sore throat, nasal congestion more than 3 days selected through purposive sampling. Plain water steam inhalation having effect on symptoms of upper respiratory tract infection in under five children in selected area.

This study was aimed to assess the effectiveness of home based steam inhalation therapy on reducing the symptoms of acute upper respiratory tract infections among under five children in Nanchiyampalayam at Dharapuram. The conceptual framework of the study was based on the Modified Wiedenbach's Helping Art Of Clinical Nursing Theory. The study made use of one group pre-test pre experimental design. Purposive sampling technique was used to select 30 samples for the study. The tool used for the study was observation checklist and rating scale. The pre-test was conducted and the steam inhalation was 13 given in the morning and evening for five days. The post test was done on the 6th day using the same observational checklist and rating scale.

The data gathered was analyzed by using descriptive and inferential statistics. There is a significant difference between pre-test and post test score ( $t$ 'value =23.20). Statistical analysis showed that the steam inhalation in post-test was highly significant  $p < 0.05$  level. It is strongly supported that the steam inhalation was effective in reducing the symptoms of acute upper respiratory tract infection. The study findings revealed that there was a significant reduction in symptoms level followed by steam inhalation therapy among under five children with acute upper respiratory tract infection. In recent study, done on 30 samples of under five children those who are having upper respiratory tract infection more than 3 days selected through purposive sampling. In that second experimental group were given steam inhalation with plain water once in a day for three days. The tool used for the study was cough analogue scale rating scale. The study findings revealed that there was a plain water steam inhalation was significantly effective in improving the acute upper respiratory tract infection among children. Salt Therapy has a lots of Health Benefits including children from 6 months upwards, adults with respiratory/skin ailments, as well as those in good health who want to strengthen their immunity and enjoy a relaxing treatment with proven positive effects on well-being.

In this study airway Clearance Halotherapy safely and effectively promotes clearance the airways. It works as a "gentle brush" to clean your airways and lungs of mucus, allergens, pollutants and other impurities. When finely ground salt particles get into your airways, they gently stimulate cilia movement, which improves the expectoration of mucus, bacteria and any other irritants. Sodium chloride delivered via Halotherapy also changes the consistency of mucus, making it thinner, less sticky and more slippery, and greatly eases expectoration. Combined with its potential to stimulate cilia movement, sodium chloride is an important contributor to airway clearance. Inhibiting the bacteria. Salt water steam inhalation Aerosol inhibits the growth of bacteria, which can cause you respiratory tract infections. Improving immunity Dry salt aerosol strengthens local immunity of your respiratory tract and reduces its sensitization to common allergens. In recent study was done on 60 samples of under five children those who are having upper respiratory tract infection, more than 3 days selected through purposive sampling in that experimental group were given steam inhalation

with salt while in the second group with plain water once in a day for three days. Symptoms of acute respiratory tract infection was assessed before and after the intervention through modified cough analogue scale and the scores were recorded. In the present study, shown that the salt water steam inhalation more effective than the plain water steam inhalation. Pearson's correlation coefficient was computed which was 0.81 Hence the tool is reliable. In this study salt water steam inhalation conclude highly significant than plain water steam inhalation in reducing upper respiratory tract infection among under five children.

In present study was done on 60 samples of under five children those who are having cough cold sore throat, nasal congestion more than 3 days selected through purposive sampling in that experimental group were given steam inhalation with salt while in the second group with plain water once in a day for three days. Symptoms of acute respiratory tract infection was assessed before and after the intervention through modified cough analogue scale and the scores were recorded. Study was conducted in a community setting in Alandi, Pune Data were examine using inferential statistics. In the present study, there was difference between the pre-test and post-test scores of in acute respiratory tract infection of both the experimental groups. Reliability was assessed using test-retest method. Pearson's correlation coefficient was computed which was 0.81 Hence the tool is reliable. Data related to description of samples (under five children) based on their personal characteristics showed that, in saltwater group, 60% of them had age 3 to 5 years, 60% of them were females, 53.3% of them were daily wagers, 40% of them had monthly family income Rs. 15000-20000. In plain water group, 53.3% of them had age 3 to 5 years, 53.3% of them were males. Analysis of data related to the of acute upper respiratory tract infection among under five children before steam inhalation therapy indicated that, in saltwater group, 80% of them had analysis. In this study salt water steam inhalation conclude highly significant than plain water steam inhalation in reducing upper respiratory tract infection among under five children.

### Summary:

The aim of the study was to assess the effect of A study to assess the effect of salt water verses plain water steam inhalation therapy on symptoms of acute upper respiratory tract infection among under five children in selected rural area of Alandi, Pune Research method adopted to the present study was two group pre-test posttest only design. Setting for this study was rural area Alandi. Pune Sample selected for this study was symptoms of acute upper respiratory tract infection among under five children, Alandi, Pune. Content validity done by 16 experts in different fields. A pilot study was conduct on 10 samples in urban area of Phule nagar, Pimpri, Pune. Reliability was assessed using test-retest method. Pearson's correlation coefficient was computed which was 0.81 .Hence the tool is reliable, and the investigator can proceed to pilot study.

Non probability Purposive Sampling Technique was used for selecting 60 under five children, 30 children for first group who received salt water steam inhalation therapy and 30 children who receives plain water steam inhalation therapy for second group. The actual data was collected from January (20/01/2021 to 25/01/2021) for a period of 6 days.

Data were analysed by using Descriptive and Inferential statistics. Effect of salt water verses plain water steam inhalation therapy on symptoms of acute upper respiratory tract infection among under five children in that the saltwater steam inhalation was highly significantly effective in improving the acute upper respiratory tract infection among children as compared to plain water steam inhalation.

### **Conclusion:**

From the results of study it is evident that salt water steam inhalation therapy & plain water steam inhalation therapy, both are effective in reducing upper respiratory tract infection. However salt water steam inhalation therapy was more effective & convenient for the mother of the children of under-five years of ages. This therapy is most effective and can be diminishes the symptoms of acute upper respiratory tract infection as comparatively with the plain water steam inhalation therapy among under five children.

### **Recommendation:**

Following study can be undertaken in relation to present study

- A similar study may be replicated in the large samples there by findings can be generalized.
- The study can be undertaken in different settings and different target population such as under five children following Asthma, COPD.
- A comparative can be done to assess the effect of Plain water steam inhalation versus turmeric powder steam inhalation.
- A comparative study can be done to assess the effect of Tulsi leaf steam inhalation versus salt water steam inhalation reduction of acute upper respiratory tract infection among the children.
- A comparative study can be done to assess the effect of Orange peel versus honey steam inhalation versus salt water steam inhalation reduction of acute upper respiratory tract infection among the children.
- A study can be done to assess the importance of steam inhalation among children.

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## REFERENCES

1. FWDenny, FALoda Jan <https://pubmed.ncbi.nlm.nih.gov/3946732/>
2. Prajapati B, Talsania N, Somalia KN A Study On Prevalence of Acute Respiratory Tract Infections (ARI) In: Urban And Rural Communities Of Ahmadabad District, Gujarat. National Journal of Community Medicine 2: 255-259.
3. ClinicalTrials.gov March 5, 2010
4. Nilanjan MK. A longitudinal study on ARI among rural under fives. Indian Journal of Community Medicine. 2001;26:8–11.
5. Nilanjan MK. A longitudinal study on ARI among rural under-fives. Indian Journal of Community Medicine. 2001; 26:8–11.
6. Purushothama V. Dasaraju and Chien Liu. · 1996 · Cited by 104
7. S Alemayehu Published: 25 October
8. Cherian T., Simoes E. A., Steinhoff M. C., Chitra K., John M., Raghupathy P. et al. Bronchiolitis in Tropical South India. American Journal of Diseases of Children. 1990;144(9): 1026–30. [[PubMed](#)]
9. J Nat Sci Biol Med. 2014 Jan-Jun
10. "Common Cold: Treatments and Drugs". Mayo Clinic. on 12 February 2010. Retrieved 9 January 2010.
11. T.J.John, T. Cherian, me Steinhoff, etiology of Acute Respiratory Infection in children in tropical south India, review of infection.
12. Prajapati B, Talsania N, Sonaliya KN (2011) A Study On Prevalence Of Acute Respiratory Tract Infections (ARI)
13. Johnson A. Acute respiratory infections. In: Azubuike JC, Nkanginieme KE, editors. Paediatrics and Child Health in Tropical Region. 2nd ed. Owerri African Educational Services. 2007;396-425.
14. Roth GA, Abate D, Abate KH, Abay SM, Abbafati C, Abbasi N, et al. Global, regional, and national age-sex-specific mortality for 282 causes of death in 195 countries and territories, 1980–2017: a systematic analysis for the global burden of disease study 2017. Lancet. 2018;392(10159):1736–88
15. von Bertalanffy, L. (1968). General System Theory: Foundations, Development, Applications. New York: George Braziller.
16. Gupta N, Jain SK, Ratnesh, Chawla V, Venkatesh S, an evaluation of diarrheal diseases and acute respiratory infections control programmes in Delhi Slum, division of reproductive health and

- nutrition, Indian council medical research, New Delhi, Indian journal pediatrics, 2018 May P.471- 476.
17. K.Park, Text Book of Preventive and social medicine, Jaypee publications. 8<sup>th</sup> edition, 2009, India page no 133-136.
18. Sarini.N.K., Gaur.D.R., Saini.V., Lal.S. Acute respiratory infections in the children, a study of knowledge and practices mothers, department of SPM, Medical college, Medical college, Rohtak, Haryana, Journal communicable diseases, 2018. Jun, P.75-77.
19. Frese.T, Klauss S, Herrmann K, Sandholzer H. Children and adolescents as patients in general practice-The reasons for encounter. J.Clin Med Res 2018;3:177-82.
20. H Dagne Published: 28 February Article number: 93 (2020)
21. Eric A Disease Control Priorities in Developing Countries. 2nd edition.
22. J Family Med Prim Care. 2019 Sep
23. J Clin Diagn Res. 2016 May Published online LC08–LC13.
24. 2016 <https://pubmed.ncbi.nlm.nih.gov/27437249/>
25. Mishra.V. Indoor air pollution from biomass combustion and acute respiratory illness in preschool age children in Zimbabwe. Int J Epidemiology 2003;32:847-53.
26. CMAJ. 2016 Sep 20; 188(13): 940–949. Published online 2016 Jul 18. doi: [10.1503/cmaj.160362](https://doi.org/10.1503/cmaj.160362)
27. Shen Daniel Vol. 6 No. 2&3 (2019): International Journal of Nursing & Midwifery Research. Lisa Burkhart on Sep 20, 2017
28. Zhang L, Mendoza-Sassi RA, Wainwright C, Klassen TP **Published:** 21 December 2017
29. New England Journal of Medicine study in 2006 <https://himalayancrystalsalt.com/pages/lung-sinus-health>
30. Beatrice dupuymarch 25, 2020 <https://apnews.com/article/8683380135>
31. Posted by Lisa Burkhart on Sep 20 <https://www.1stclassmed.com/blog/can-salt-therapy-benefit-respiratory-patients>.
32. Vathanophas.K, Sangchai.R, Raktham.S, Pariyanonda.A, Thangsuwan.J, Bunyaratabhandu, et al. A community-based study of acute respiratory tract infection in Thai children. Rev Infect. Dis 2011 ; 12:S957-65.
33. Weber.MW, Milligan.P, Hilton.S, Lahai.G, Whittle.H, Mulholland.Greenwood.BM: Risk factors respiratory syncytial virus infection leading to hospital admission in children in Western Region of The Gambia. Int J Epidemiol 2017;28:157-62.
34. Posted by erisnutriverse September 30, 2020 <https://erisnutriverse.in/2020/09/30/steam-therapy-for-lungs-benefits-uses-precaution/>
35. Acharya.D, Prasanna KS, Nair.S, Rao RS. Acute respiratory infections in children: A community based longitudinal study in south India. Indian J Public Health 2018;47:7-13.

36. M Singh · 2017 · Cited by 196 <https://www.babycenter.in/x1050640/will-steam-inhalation- help>
37. Stacy Sampson, D.O. — Written by Jacquelyn Cafasso — Updated on March 7, 2019 <https://www.healthline.com/health/steam-inhalation#benefits>
38. Evidence-Based Complementary and Alternative Medicine, vol. 2019, Article 7 pages, 2019. <https://doi.org/10.1155/2019/2453483> <https://www.healthline.com/health/can-you-sweat-out-a-cold#exercise>
39. Cochrane Database Syst Rev. 2004; <https://pubmed.ncbi.nlm.nih.gov/15106160>
40. Polit F. Denise and Hungler p. Bernadette, "essential of nursing research" 2<sup>nd</sup> edition Lippincott publication 1989.
41. ICA Chiang Cited by 3 · 2015 · <https://opentextbc.ca/researchmethods/chapter/>
42. A Lydia Jasmine · 01 Feb 2018 <http://repository-tnmgrmu.ac.in/>
43. <https://kilkennysalttherapy.ie/health-benefits/>

