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**Original Research Article**

# Effectiveness of holy basil leaves and turmeric powder in steam inhalation to relieve symptoms of acute upper respiratory tract infection among school going children

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## ABSTRACT

**Background:** Acute upper respiratory tract infection is the most common infection in children worldwide, causing significant morbidity and sometimes leading to mortality in children. Steam inhalation with herbal additives is a widely practiced traditional remedy, yet evidence-based data on its effectiveness in children is limited. This study aimed to assess the effectiveness of steam inhalation with holy basil leaves and turmeric powder in relieving symptoms of acute upper respiratory tract infection among school-going children.
**Methods:** The study utilized a quantitative approach, employing a quasi-experimental non-equivalent control group design. A total of 40 samples were selected from the Kachigam community area in Daman, based on specific selection criteria, with convenience sampling being the chosen technique. Data collection involved using a structured questionnaire schedule for demographic variables and an observational checklist assessment conducted before and after the intervention of steam inhalation with holy basil leaves and turmeric powder.
**Results:** The post-test mean score in experimental group 3.95 (SD=1.95) was less than control group post-test mean score in control group 5.55 (SD=1.73) and 't' value of post-test was 2.737 which shows the significant effect of the steam inhalation with holy basil leaves and turmeric powder ($p<0.05$) and there is significant mean difference between experimental and control group post-test was 1.6.
**Conclusion:** Statistical significance was calculated by using paired and unpaired "t" test and Chi-square. After steam inhalation with holy basil leaves and turmeric powder the relieved the symptoms of acute upper respiratory tract infection among the school going children.

**Keywords:** Acute upper respiratory tract infection, Steam inhalation, Holy basil leaves, Turmeric powder

## INTRODUCTION

Children's health is a reflection of the prosperity and health of the country. Children with respiratory diseases are frequently diagnosed, particularly those who attend school. It is one of the main causes of early childhood morbidity and mortality.[1] One of the most prevalent viral infections, acute upper respiratory infections typically attached the nose and throat. They can go on for three weeks. Millions of people are affected with acute upper respiratory infections every year. Although bacteria can also cause them, viruses are typically the culprits. Most patients with acute upper respiratory infections get better in a few weeks, but others may experience problems that need to be treated by a doctor.[2]

Most acute upper respiratory tract infections are caused by viruses, which include influenza, respiratory syncytial, and rhinoviruses. Acute upper respiratory tract infections are short-term infections of the nose and throat. Symptom

relief is the main goal of treatment, which is frequently administered at home.[3]

Acute upper respiratory infection affects the nasal passages and throat. It can cause cough, excess mucus, and other symptoms. Treatment will depend on the cause, but home remedies include using a dehumidifier and taking pain relief medication. Upper respiratory infection occurs when a virus or bacteria enter the body, usually through the mouth or nose.

The infection may pass to another person through touch or a sneeze or cough. The treatment is usually simple unless a person also has a chronic respiratory condition, such as asthma. Children, especially young children, may have more of these infections, because their immune system are still developing.

Children who spend lots of time around other kids may be more prone to these infections, because children are less likely than adults to wash their hands after sneezing or wipe their nose. Enclosed spaces where people gather, such as classrooms, offices, and homes, can be high risk areas for the spread of upper respiratory infection. Typically, an upper respiratory infection lasts 7-10 trusted source days, and sometimes up to 3 weeks. In some cases, these infections develop into more serious issues, such as sinus infections or pneumonia.[4]

Steam therapy is an Ayurvedic remedy beneficial in treating respiratory tract infections. It involves steam inhalation by adding several natural herbs. According to research, traditional antibacterial herbs like eucalyptus enhance the benefits of steam therapy. Other herbs like mint, neem, Tulsi, basil, and rosemary can also be used.[5]

### *Need of the study*

Globally, acute respiratory infections account for approximately 4.3 million deaths annually in children under five years, representing 21.3% of all child mortality. In India, an estimated 300 million cases of acute respiratory tract infections occur yearly, with 30–60 million classified as moderate to severe.[9]

National Family Health Survey-5 (2019–2021) data indicate that 11.9% of urban and 13.7% of rural children suffered from URTI.[10] Despite the high disease burden, evidence-based evaluation of accessible non-pharmacological interventions remains limited.

### *Statement of the problem*

"A study to assess the effectiveness of holy basil leaves and turmeric powder in steam inhalation to relieve symptoms of acute upper respiratory tract infection among school going children at selected area of Daman."

### *Objectives*

Objectives of the study were to assess the pretest level of symptoms of acute upper respiratory tract infection among school going children at selected area of Daman in experimental group and control group, to assess the effectiveness of holy basil leaves and turmeric powder in steam inhalation to relieve the symptoms of acute upper respiratory tract infection among school going children in experimental group, to compare the post-test level of symptom score among school going children in experimental group and control group and to find out the association between pre-test score with selected demographic variables in experimental group and control group.

### *Research hypothesis*

The following hypothesis are tested at <0.05 level of significance.

$H_1$

There will be a significant mean difference between pretest and post-test score of school going children in experimental group at selected area of Daman.

$H_2$

There will be significant mean difference in pretest and post-test between experimental group and control group of school going children at selected area of Daman.

$H_3$

There will be a significant association between pretest score with selected demographic variables in experimental group and control group.

### *Delimitation*

The data collection period is delimited to 4 weeks. Children who are available at the time of data collection. The parents/guardian who are willing to participate during data collection. The study was delimited among the school going children between 6 to 10 years of age.

### *Conceptual framework*

The present study aims to evaluate the effectiveness of steam inhalation in reducing the sign and symptoms of acute upper respiratory tract infection among school going children. Conceptual frame work for this present study is on the basis of Ernestine Wiedenbach's clinical nursing practice theory. As a prescriptive theory of nursing. Prescriptive theory directs action toward an explicit goal. It consists of 3 factors, which includes central purpose, prescription and realities (Figure 1).

## METHODS

### *Study design and setting*

A quantitative quasi-experimental non-equivalent control group design was adopted. The study was conducted in the community area of Kachigam, Daman, located 9.1 km from the Government College of Nursing, Daman.

### *Population*

The population of this study was school going children whose age between 6 years to 10 years at community area.

### *Inclusion criteria*

School-going children aged 6–10 years with symptoms of acute URTI; guardian present at home; not on any concurrent treatment; and available during the data collection period.

### *Sample size*

In this study sample size is 40, 20 samples in experimental group and 20 in control group.

### *Sampling techniques*

In this study, investigator had used non-probability convenience sampling technique followed by assignment of obtained samples to experimental and control group.

### *Exclusion criteria*

Children or guardians unwilling to participate; children with systemic or communicable illness; children already on medication; and those whose guardians were unwell during data collection.

### *Ethical considerations*

The study adhered to ethical principles of voluntary participation, informed consent, anonymity, confidentiality, and minimization of harm. Written informed consent was obtained from the guardian of each participating child prior to enrolment.

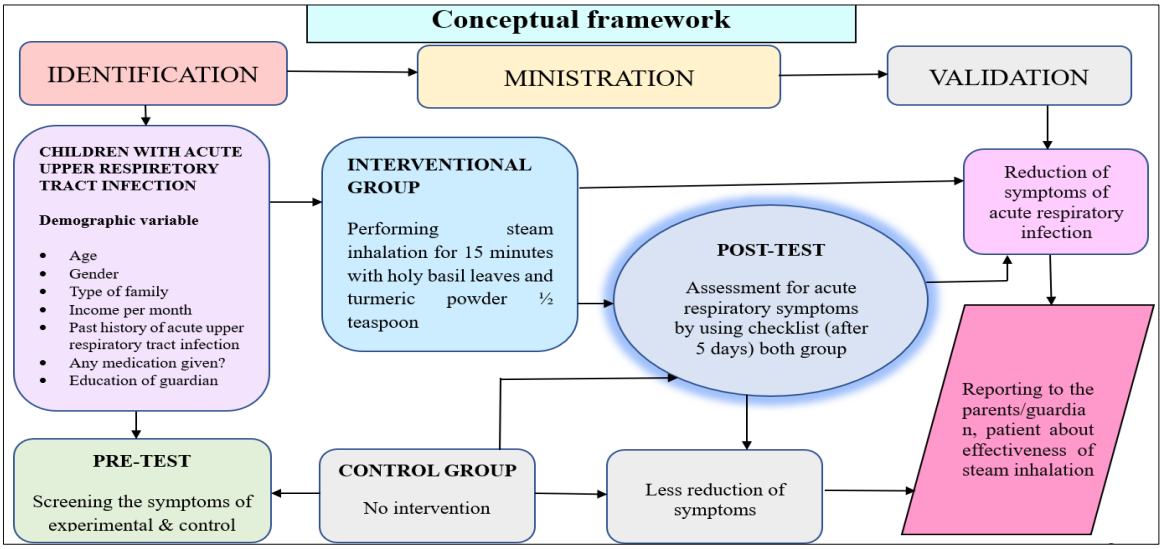


**Figure 1: Conceptual framework.**

### *Intervention*

The experimental group received steam inhalation with 15 holy basil (Tulsi) leaves and half teaspoon of turmeric powder, twice daily, for five consecutive days. On the 6th day, investigator (post-test) assessed symptoms by using same checklist. The control group received no intervention during this period.

### *Instruments*

A structured questionnaire schedule was used to collect demographic information (age, gender, family type, income, past history of URTI, medication use, and guardian's education). In this study consists of observation check list which contain 20 items mainly the signs and symptoms of acute upper respiratory tract infection. The observational checklist consists of 20 signs and symptoms. Each symptom if present was given score "1" and for absent "0". The total score was 20 involving mild=0–6, moderate=7–13, and severe=14–20.

### *Data collection procedure*

Baseline data (pre-test) were collected using the demographic questionnaire and observational checklist before administration of the intervention. Investigator provided steam inhalation with 15 holy basil leaves and half teaspoon of turmeric powder to the school going children for 5 consecutive days from first day on wards for 15 minutes, in morning and evening. On the 6th day, investigator (post-test) assessed symptoms by using same checklist. Totally 5-6 children were intervened per day.

### *Duration of data collection*

Data collection period is one moth. For this study data was collected from 10 October 2023 to 10 November 2023 and it completed in 27 December 2023.

### *Statistical analysis*

Data were analyzed using descriptive statistics (frequency, percentage, mean, standard deviation) and inferential statistics (paired t-test, unpaired t-test, Chi-square test). The level of significance was set at $p<0.05$.

## RESULTS

### *Demographic profile*

In the experimental group, the majority of children (35%) were in the age group of 8.1–9 years; 65% were male; 55% belonged to nuclear families; 45% had a monthly family income of Rs. 5,001–10,000; 75% had an occasional past history of URTI; none had received any medication; and 35% of guardians had completed primary schooling. In the control group, 45% were in the age group of 6.1–7 years; 70% were female; 75% belonged to nuclear families; 35% reported an income of Rs. 10,001–15,000; 80% had an occasional URTI history; none had received medication; and 35% of guardians were illiterate.

### *Pre-test symptom levels*

In both groups, the majority of children 13 (65%) presented with moderate-level acute upper respiratory tract infection symptoms at pre-test, and 7 (35%) had mild symptoms. No child had severe symptoms. The baseline severity was comparable across groups (Table 1).

### *Post-test symptom levels*

At post-test, 16 (80%) of children in the experimental group had mild symptoms and 4 (20%) had moderate symptoms. In the control group, 12 (60%) had mild and 8 (40%) had moderate symptoms. The shift from moderate to mild severity was more pronounced in the experimental group (Table 1).

### *Effectiveness of holy basil leaves and turmeric powder steam inhalation*

In the experimental group pretest mean score of symptoms among school going children was 8.55 and 3.95 in post-test with mean deference of 4.60, whereas in control group pretest 8.65 and 5.55 in the post-test with mean difference 3.10. however, both the group were statistically significant. There is a mean difference between experimental and control group that clearly showed the successfulness of the steam inhalation therapy (Figure 2 and Table 2).

**Table 1: Distribution of levels of acute upper respiratory tract infection symptoms in pre-test and post-test across experimental and control groups (n=20+20).**

| Level of URTI | Exp. pre-test, N (%) | Exp. post-test, N (%) | Ctrl. pre-test, N (%) | Ctrl. post-test, N (%) |
|---|---|---|---|---|
| **Mild** | 7 (35) | 16 (80) | 7 (35) | 12 (60) |
| **Moderate** | 13 (65) | 4 (20) | 13 (65) | 8 (40) |
| **Severe** | 0 (0) | 0 (0) | 0 (0) | 0 (0) |

Values are presented as frequency (percentage). Exp.=experimental group; ctrl. =control group

**Table 2: Assess the effectiveness of steam inhalation using holy basil leaves and turmeric powder in alleviating symptoms.**

| Group | | Mean | Mean difference | SD | SE | Paired "t" test | df | Table value | Level of S* |
|---|---|---|---|---|---|---|---|---|---|
| **Experimental** | Pre-test | 8.55 | 4.600 | 2.48 | 0.56 | 11.14 | 19 | 1.729 | S* |
| | Post-test | 3.95 | | 1.96 | 0.44 | | | | |
| **Control** | Pre-test | 8.65 | 3.100 | 2.35 | 0.53 | 12.94 | 19 | 1.729 | |
| | Post-test | 5.55 | | 1.73 | 0.39 | | | | |

S* significant at the <0.05 level of significance

**Table 3: Compare the post-test mean scores between the experimental and control group regarding the level of symptom.**

| Group | | Mean | Mean difference | SD | SE | Unpaired "t" test | df | Table value | Level of S* |
|---|---|---|---|---|---|---|---|---|---|
| **Post test** | Experimental | 3.95 | 1.6 | 1.96 | 0.44 | 2.74 | 38 | 1.69 | S* |
| | Control | 5.55 | | 1.73 | 0.39 | | | | |

S* significant at the <0.05 level of significance

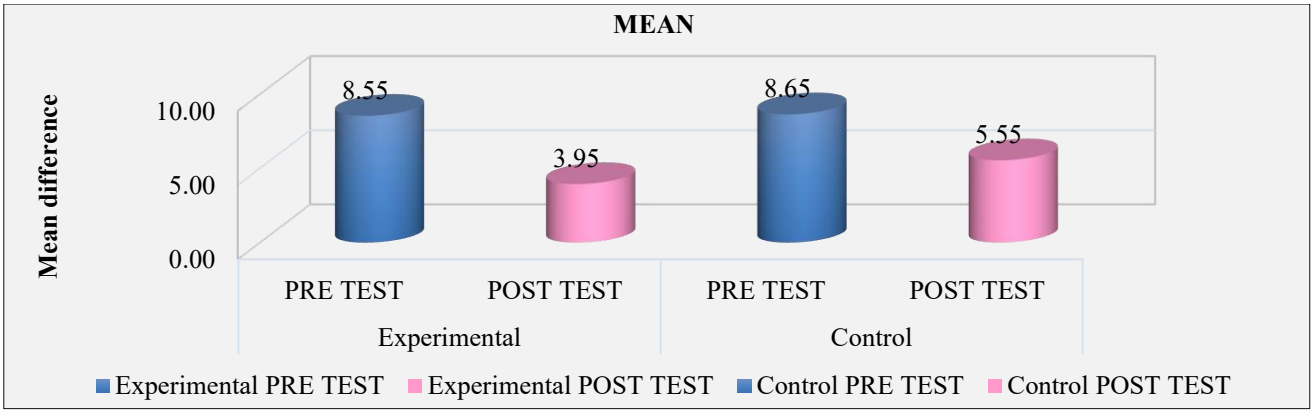


**Figure 2: Compare mean difference to assess the effectiveness of holy basil leaves and turmeric powder steam inhalation in relieving the symptoms.**

***Comparison the post-test level of symptom score***

Symptom among school going children in experimental group was 3.95 with SD 1.95 and the post-test mean score among children in the control group was 5.55 with SD 1.73 the calculated "t" value of t=2.737 was found to be statistically significant at p<0.05 level. This clearly indicated that after the administration of steam inhalation therapy with holy basil leaves and turmeric powder among school going children in the experimental group there was significant reduction in the level of symptoms than in the control group (Table 3).

***Association with demographic variables***

Chi-square analysis revealed significant associations between pre-test symptom scores and past history of acute upper respiratory tract infection and guardian's education level in the experimental group. In the control group, significant associations were found with age, monthly income, and guardian's education level.

## DISCUSSION

Therapeutic benefit of this intervention can be attributed to the known. The pharmacological properties of its components. Holy basil exhibits antibacterial, antiviral, and anti-inflammatory activity.

Steam inhalation requires only basic equipment and widely available natural ingredients, making it a feasible, cost-effective, and culturally accepted addition to home-based care. Nurses and community health workers can play a pivotal role in educating families about this intervention and promoting evidence-based home remedies for childhood respiratory infections.

The follow-up period was limited to six days. Future studies should employ larger, randomly selected samples across diverse settings and include longer follow-up periods to assess durability of symptom relief.

In this study Table 1 shows that in experimental group pretest, majority 13 (65%) of children had moderate level of symptoms and 7 (35%) of children had mild level of symptoms and no child with 0 (0.00%) symptoms of acute upper respiratory tract infection. In control group pretest 7 (35%) sample were found to have mild level symptom, 13 (65%) sample were found to have moderate level symptom and 0 (0%) samples were found severe symptom.

The similar study was conducted in 2019 by Sindhu in this study. In the pretest 17 (57%) samples were found to have mild common cold, 11 (37%) samples were found to have moderate level and 2 (6%) samples were found to have severe infection.

Table 3 shows that in post-test of experimental group 16 (80%) of children had mild level symptom, 4 (20%) of children had moderate level symptom and 0 (0) children had severe symptom. In control group post-test 12 (60%) of children had mild level symptom, 8 (40%) of children had moderate level symptom and 0 (0) of children had severe symptom.[6]

Table 3 showed that the post-test mean score of acute upper respiratory tract infection symptom among school going children in experimental group was 3.95 with SD 1.96 and the post-test mean score of symptoms among children in the control group was 5.55 with SD 1.73 with mean deference 1.6. The calculated "t" value 2.737 was found to be statistically significant at p<0.05 level. This clearly indicates that after the administration of steam inhalation therapy with holy basil leaves and turmeric powder among school going children in the experimental group there was significant reduction in the level of symptoms than in the control group.

The similar study was conducted in 2019 by Sindhu, the mean score on level of common cold in pretest was 6.8 and in post-test was 1.16. The calculated 't' value was 12.99 at 29 degrees of freedom and significant at 0.05 level. It reveals that an important difference between pretest and post test score.[6]

***Limitations***

The non-probability convenience sampling technique was use to select the samples, which limits the generalization of the study findings. The study was conducted only in Kachigam community area, Daman. The study period only 4 weeks. The total sample was 40, 20 in experimental group and 20 in control group.

## CONCLUSION

The study's findings lead to the conclusion that, in comparing the mean difference of symptom levels among school-going children, the experimental group exhibited a mean score of 3.95, while the control group had a mean score of 5.55. Although both groups showed statistical significance, the notable mean difference between the experimental and control groups underscores the effectiveness of steam inhalation with holy basil leaves and turmeric powder in reducing symptoms of acute upper respiratory tract infection among school-going children.

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*Ethical approval: The study was approved by the Institutional Ethics Committee*

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