

EFFECT OF STEAM INHALATION ON RESPIRATORY PARAMETERS AMONG ASTHMATIC PATIENTS IN SELECTED HOSPITALS AND AREAS OF NAVI MUMBAI

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ABSTRACT

Background: At most, just 10% of adults and 35% of children in any given region of the world suffer from asthma. A phenomenon known as the "cohort effect" may be to blame for the fact that asthma is more prevalent in children than in adults. Research conducted recently that is based on populations shows that the increase in asthma prevalence that has been seen all across the world over the course of the last thirty years has begun to drop in industrialized nations. The number of people who take medication for asthma has expanded in tandem with this problem. **Methodology:** Quantitative Research Approach was conducted in the study. Quasi-experimental 1 Group pre-test post-test research design was used in study. The study has conducted at selected hospital OPD, Clinics of Navi Mumbai. The required sample size for the present study was 15. Non probability purposive sampling technique was utilized. The population for the proposed study will be the adults suffering from asthma. **Result:** The effectiveness of steam inhalation therapy on control of asthma were findings pre-test shows mean 9.53 and SD 2.35, Whereas post-test 4 shows mean 7.4 and SD was 2.47 respectively. The 't' test value was 2.41897 with df was 15 and P-value was 0.011156. The results show significant Effectiveness ($p < 0.05$). **Conclusion:** According to the findings, the researcher is able come to the conclusion that the Steam Inhalation therapy demonstrates effectiveness on asthmatic parameters in asthmatic patients based on comparisons made before and after the treatment was carried out.

Key Words: Effectiveness, Steam inhalation, Respiratory Parameters, Asthmatic Patients

INTRODUCTION

Asthma is a fairly common problem all over the world. Studies show that the number of people with asthma has gone up by almost 7% overall in the last 30 years. The number of people with asthma is growing quickly. Unlike rural places, a city or town. Rising air pollution and upper respiratory tract infections may be the two things that are most important for the rise in asthma in India. Asthma can happen at any age, but about half of cases happen before the age of ten, and about a quarter of cases happen before the age of forty. ¹

Asthma causes mucosal edema, hypersensitivity, and mucous. Inflammation causes asthma symptoms as wheezing, dyspnoea, chest tightness, and recurring coughing. When symptom-free, asthmatics may have significant deteriorations that linger for hours or days. ²



As of the year 1998, the prevalence of asthma was very different in different parts of the world, with a general trend toward higher rates of asthma in more developed and westernized nations. Mortality however is most widespread in low- to middle-income nations, while symptoms were most prominent in the Republic of Ireland, the United Kingdom, Australia, and New Zealand; Eastern Europe, Indonesia, Greece, Uzbekistan, India, and Ethiopia had the lowest prevalence³

According to the World Health Organization, 4.3% of the population across the globe suffers from asthma. Patients suffering from asthma are benefiting from complementary and alternative medicine treatments. Complimentary treatment, such as steam inhalation is example of treatment whose effects on asthma have not been subjected to substantial research. According to this idea, the patient will experience fewer symptoms of respiratory distress and less secretions from their respiratory passages if humidified air is administered to them, regardless of whether it is in the form of steam inhalation.⁴

The Maharashtra State Health Management Information System (HMIS) alone documented 6,886 instances of childhood asthma. between April 2018 and March 2019, a precipitous increase of over 39% compared to the same time period in 2017–18, when 4,185 cases were reported.⁵

The results of the National Family Health Survey (NFHS-5) from 2019 to 2021 indicate that, Asthma affects 1,547 women and 1,523 men per 100,000 persons in Maharashtra. Men and women are more likely to have asthma if they are elderly, have less education, and reside in rural areas.⁶

Inhaling steam, which helps to clean and open nasal passages, is one of the most common natural therapies for cold and sinus symptoms. It is also one of the most effective treatments. Inhalation of water vapour is a component of this treatment modality, which is also known as "steam therapy." Mucus is intended to be expelled from the lungs, throat, and nasal passages when exposed to air that is warm and humid. It's possible that this will help with the symptoms of nasal passage blood vessel irritation and edema.¹¹

A Cochrane review of steam for the "common cold" found equivocal evidence, and a recent primary care trial found no benefit and some harm (mild thermal injury) for the pragmatic advice to inhale steam twice daily for a range of respiratory tract infections. However, steam inhalation is widely advocated in the treatment of rhinosinusitis.⁷

Inhaling steam is a frequent form of self-treatment for the common cold that is suggested by primary care physicians all around the world. Case studies and patient series have already attempted to bring attention to the risk of burns that are associated with steam inhalation therapy, but Cochrane reviews have shown that there is no evidence that it is beneficial. The results of this nationwide investigation provide the strongest evidence to date that steam inhalation therapy should be avoided.⁸

Patients may experience a sense of relief when they take deep breaths of warm air while inhaling steam. It does a great job of reducing nasal congestion and relaxing the cough. When the airways are allowed to relax, mucus can more easily be expelled, which results in easier breathing. When you breathe out through your mouth with your lips pursed together, you create a back pressure that helps to open your airways, which in turn facilitates the process of expiration and helps to empty your lungs. This restriction is very slight.¹²

Objectives of the Study

1. To assess the respiratory parameters among asthmatic patients before and after steam inhalation
2. To determine the effectiveness of steam inhalation on respiratory parameters among asthmatic patients
3. To determine the association of pre interventional scores of respiratory parameters with selected demographic variables

Methodology

Quantitative Research Approach was used with a Quasi-experimental 1 Group pre-test post-test research Design. The study has conducted at selected hospital OPD, Clinics of Navi Mumbai

The population for the proposed study was the adults suffering from asthma and accessible population was asthmatic patients visiting hospital of Navi Mumbai.

OPD Patients between 18 to 55 years of age suffering from asthma and who are using repulses/ inhalers/ nebulization's whenever required and who knows Marathi/ Hindi/ English were selected for as samples for the study.

Adults those who are on oral/injectable corticosteroids/bronchodilators and with severe major illness were excluded from the study.¹³

For the present study sample size was 15 and non probability purposive sampling technique was used to select the samples.

Result:

Table No 1: Socioeconomic Characteristics of Asthmatic Patients

n=15

| Sr.No | Demographic Variables | Frequency | Percentage |
|------------|--|-----------|------------|
| 1.1 | Age in Years | | |
| a | 18-25 years | 2 | 13% |
| b | 26-35 years | 4 | 27% |
| c | 36-45 years | 6 | 40% |
| d | 46-55 years | 3 | 20% |
| 1.2 | Gender | | |
| a | Male | 9 | 60% |
| b | Female | 6 | 40% |
| 1.3 | Educational status | | |
| a | Profession or Honours | 1 | 7% |
| b | Graduate or post graduate | 2 | 13% |
| c | Intermediate or post high school diploma | 4 | 27% |
| d | High school certificate | 3 | 20% |
| e | Middle school certificate | 2 | 13% |
| f | Primary school certificate | 1 | 7% |
| g | Illiterate | 2 | 13% |
| 1.4 | Occupational status | | |
| a | Sedentary worker | 6 | 40% |
| b | Moderate worker | 4 | 27% |
| c | Heavy worker | 3 | 20% |
| d | Unemployed | 2 | 13% |
| 1.5 | Residence | | |
| a | Urban | 6 | 40% |
| b | Urban Slums | 9 | 60% |
| 1.6 | Monthly family income (In rupees) | | |

| | | | |
|-----|--|---|-----|
| a | ≥32050 | 1 | 7% |
| b | 16020 – 32049 | 2 | 13% |
| c | 12020 – 16019 | 4 | 27% |
| d | 8010– 12019 | 5 | 33% |
| e | 4810– 8009 | 2 | 13% |
| f | 1601– 4809 | 1 | 7% |
| g | ≤ 1600 | 0 | 0% |
| 1.7 | Size of Residence | | |
| a | 200 Square feet | 3 | 20% |
| b | 201 - 400 Square feet | 6 | 40% |
| c | 401 – 600 square feet | 5 | 33% |
| d | More than 601 square feet | 1 | 7% |
| 1.8 | No. of Family Member residing in the house | | |
| a | Upto 2 | 3 | 20% |
| b | 3-5 | 9 | 60% |
| c | 6-8 | 2 | 13% |
| d | More than 8 | 1 | 7% |

The data represented in **Table No-1.** indicates that, the overall analysis of the demographic characteristics was conducted to find the frequency and percentage of 15 participants in each category of the demographic variables.

1.1 Age-Majority of the participants 6(40%) in the steam inhalation group (Group-1) of were belonged to 36-45 years and 2(13%) belonged to 18-25 years.

1.2 Gender- Majority of the participants 9(60%) in the steam inhalation group (Group-1) were males and 6(40%) were females.

1.3 Educational status- Majority of the participants in Group-1were observed that 4(27%) were intermediate or post high school diploma, and 1(7%) were Profession or Honours and primary school certificate.

1.4 Occupational status- Majority of the participants in a Group-1 of 6 (40%) were sedentary worker and 2(13%) were unemployed.

1.5 Residence- Majority of the participants in Group-1 of 9(60%) from urban slums area and 6(40%) from urban area.

1.6 Monthly family income (In rupees)- Majority of the participants in Group-1 of majority of 5(33%) had income between Rs. 8010-12019, 1(7%) between Rs. 1601-4809 and ≥32050 respectively,

1.7 Size of the residence- Majority of participant in Group-1 6(40%) having between 201-400 square feet and 1(7%) having more than 601 square feet of residence.

1.8 No. Of Family members residing in the house- Majority of participant in Group-1 of 9(60%) had 3-5 members, and 1(7%) had more than 8 family members.

Table No 2: Clinical Characteristics of Asthmatic Patients

n=15

| Sr. No | Clinical characteristics | Group-1 | |
|--|-------------------------------|-----------|------------|
| | | Frequency | Percentage |
| Suffering from asthma since ___ yrs. | | | |
| a | < 5 | 5 | 33% |
| b | 6-10 | 2 | 13% |
| c | 11-15 | 1 | 7% |
| d | More than 15 | 7 | 47% |
| No. of hospital admissions due to asthmatic attack in previous year | | | |
| a | No admission | 3 | 20% |
| b | 1-3 | 4 | 27% |
| c | 4-6 | 2 | 13% |
| d | 7-9 | 5 | 33% |
| e | More than 10 | 1 | 7% |
| Do you take any medicine for asthma | | | |
| a | No medicines | 2 | 13% |
| b | Use of nebulisation(repulse) | 6 | 40% |
| c | Use of revolizer (dry powder) | 4 | 27% |
| d | Use of spray pump | 3 | 20% |

The data represented in **Table No.2.** indicates that, the overall analysis of the clinical characteristics was carried out to find the frequency and percentage of 15 participants for the clinical characteristics.

Majority of the participants 7 (47%) were suffering from asthma for more than 15 years, Majority of the participants 5(33%) had 7-9 time due to asthmatic attack in previous year, while majority of the participants 6(40%) uses nebulisation (respules).¹⁶

Table No 3: Item Wise Analysis of Respiratory Parameters among Asthmatic Patients before and after Steam Inhalation.

n=15

| Respiratory Parameters | Preintervention | | Post intervention 1 | | Post intervention 2 | | Post intervention3 | | Post intervention 4 | |
|----------------------------------|-----------------|----|---------------------|----|---------------------|----|--------------------|----|---------------------|----|
| | Freq | % | Freq | % | Freq | % | Freq | % | Freq | % |
| Respiratory rate | | | | | | | | | | |
| 16-22/min | 3 | 20 | 4 | 27 | 4 | 27 | 5 | 33 | 6 | 40 |
| 12-15/ min | 2 | 13 | 3 | 20 | 5 | 33 | 6 | 40 | 7 | 46 |
| 23-28/min | 6 | 40 | 4 | 27 | 3 | 20 | 3 | 20 | 1 | 7 |
| >28 /min | 4 | 27 | 4 | 27 | 3 | 20 | 1 | 7 | 1 | 7 |
| Respiratory rhythm | | | | | | | | | | |
| Regular | 6 | 40 | 7 | 47 | 8 | 53 | 8 | 53 | 9 | 60 |
| Irregular | 9 | 60 | 8 | 53 | 7 | 47 | 7 | 47 | 6 | 40 |
| Respiratory depth | | | | | | | | | | |
| Normal | 4 | 27 | 4 | 27 | 5 | 33 | 7 | 47 | 8 | 53 |
| Deep | 5 | 33 | 6 | 40 | 4 | 27 | 3 | 20 | 3 | 20 |
| Shallow | 6 | 40 | 5 | 33 | 6 | 40 | 5 | 33 | 4 | 27 |
| Respiratory breath sounds | | | | | | | | | | |
| Normal | 3 | 20 | 4 | 27 | 4 | 27 | 5 | 33 | 6 | 40 |
| Rales/ronchi | 2 | 13 | 3 | 20 | 5 | 33 | 6 | 40 | 7 | 46 |
| Wheezing | 6 | 40 | 4 | 27 | 3 | 20 | 3 | 20 | 1 | 7 |
| High pitched wheezing | 4 | 27 | 4 | 27 | 3 | 20 | 1 | 7 | 1 | 7 |

Table no. 3. The Pre-intervention status shows that majority of 6(40%) had 23-28/ min respiratory rate and majority of 9(60%) respondents having irregular rhythm. In Respiratory depth majority of respondents 6(40%) had shallow depth and majority of 6(40%) had wheezing sounds.¹⁴

In the post intervention 4th week 6 (40%) had improved rate of 16-22 breaths per/min and majority of 7(46%) had respiratory rate between 12-15/min. Majority 9(60%) had regular rhythm and 8(53%) had normal depth of respiration. Majority had 7(46%) had rales/ronchi breathing sounds and 6 (40%) had normal breathing sounds.

Table No 4: Overall Respiratory Status among Asthmatic Patients before and After Steam Inhalation

N=15

| Respiratory Parameters | Pre-Intervention | | Post Intervention 1 | | Post Intervention 2 | | Post Intervention 3 | | Post Intervention 4 | |
|------------------------|------------------|----|---------------------|----|---------------------|----|---------------------|----|---------------------|----|
| | N | % | N | % | N | % | N | % | N | % |
| Mildly compromised | 2 | 13 | 2 | 13 | 3 | 20 | 5 | 34 | 8 | 53 |
| Moderately compromised | 8 | 53 | 9 | 60 | 10 | 67 | 8 | 53 | 5 | 34 |
| Severely compromised | 5 | 34 | 4 | 27 | 2 | 13 | 2 | 13 | 2 | 13 |

The above **Table no. 4** Above findings suggest that mildly compromised status is improved from 2(13%) to 8 (53%), 8 (53%) moderately compromised status is reduced to 5(34%) and 5 (34%) participants severely compromised status is lowered to 2 (13%) in post intervention 4.

Table No 5: Item Wise Analysis of Respiratory Status by PEFR among Asthmatic Patients before and After Steam Inhalation

N=15

| PEFR Parameters | Pre-Intervention | | Post intervention 1 | | Post intervention 2 | | Post intervention 3 | | Post intervention 4 | |
|----------------------------------|------------------|----|---------------------|----|---------------------|----|---------------------|----|---------------------|----|
| | Freq | % | Freq | % | Freq | % | Freq | % | Freq | % |
| Green zone >250 L/min | 3 | 20 | 3 | 20 | 4 | 27 | 4 | 27 | 6 | 40 |
| High yellow zone 200-250 L/min | 2 | 14 | 4 | 27 | 4 | 27 | 5 | 33 | 7 | 46 |
| Low yellow zone 80 and 200 L/min | 5 | 33 | 5 | 33 | 5 | 33 | 4 | 27 | 1 | 7 |
| Red zone | 5 | 33 | 3 | 20 | 2 | 13 | 2 | 13 | 1 | 7 |

| | | | | | | | | | | |
|------------|--|--|--|--|--|--|--|--|--|--|
| ≤ 80 L/min | | | | | | | | | | |
|------------|--|--|--|--|--|--|--|--|--|--|

The **Table no. 5** Above findings suggest that Green zone >250 L/min is improved from 3 (20%) to 4 (27%), and 6 (40%) High yellow zone 200-250 L/min is improved to 2(14%) and 7 (46%) Low yellow zone 80 and 200 L/min and Red zone ≤ 80 L/min lowered to 5 (33%) to 1 (7%) in post intervention 4.

Table No 6: Overall Respiratory Status by PEFr among Asthmatic Patients before and After Steam Inhalation

N=120

| PEFR Parameters | Pre-Intervention | | Post intervention 1 | | Post intervention 2 | | Post intervention3 | | Post intervention 4 | |
|-----------------|------------------|----|---------------------|----|---------------------|----|--------------------|----|---------------------|----|
| | Freq | % | Freq | % | Freq | % | Freq | % | Freq | % |
| Normal | 3 | 20 | 3 | 20 | 4 | 27 | 4 | 27 | 6 | 40 |
| Mild | 2 | 14 | 4 | 27 | 4 | 27 | 5 | 33 | 7 | 46 |
| Moderate | 5 | 33 | 5 | 33 | 5 | 33 | 4 | 27 | 1 | 7 |
| Severe | 5 | 33 | 3 | 20 | 2 | 13 | 2 | 13 | 1 | 7 |

The **Table no. 6.** Depicts the findings of assessment of respiratory parameters by PEFr measurement using peak flow meter among asthmatic patients before steam inhalation. Above findings suggest that normal PEFr parameter is improved from 3(20%) to 6 (40%),MildPEFr parameter is improved from 2 (14%) to 7 (46%). Moderate PEFr parameter is lowered from 5 (33%) to 1 (%). Participants severely compromised status is lowered from 5 (33%) to 1 (7%) in post intervention 4.

Table No 7: Pre -Post Comparison in Steam Inhalation Group

n==15

| Test | Mean | SD | T Test | DF | P-value | Result |
|-------------|------|------|---------|----|----------|--------------|
| Pre test | 9.53 | 2.35 | 2.41897 | 14 | 0.011156 | p < .05 S |
| Post-test 4 | 7.4 | 2.47 | | | | |

NS (Non-Significant)-P is ≥ to 0.05

S (Significant)- p < .05

The **Table no. 7** depicts the effectiveness of steam inhalation therapy on control of asthma were findings pre-test shows mean 9.53 and SD 2.35, Whereas post-test 4 shows mean 7.4 and SD was 2.47 respectively. The 't' test value was 2.41897 with df was 15 and P-value was 0.011156. **The results show significant Effectiveness (p<0.05).**

DISCUSSION

The results of the study that was conducted on the effects of steam inhalation on nasal mucociliary clearance in healthy individuals and nasal disease states show that the patients' average nasal mucociliary clearance¹⁵ time before breathing steam was 10.9 minutes on average, with a 4.4 standard deviation (SD). After 24 hours, there were 8.7 minutes with an SD of 4.1 and 9.3 minutes with an SD of 4.2 for the hour following inhaling steam. Similar nasal mucociliary clearance times of 8.2 minutes with a standard deviation of 3.8 were seen in the controls before inhaling steam. One hour after

inhaling steam, it was 7.1 minutes with an SD of 3.2; 24 hours later, it was 7.1 minutes; and, finally, it was 6.7 minutes with an SD of 3.2. Steam inhalation Definitely Improves Nasal Mucociliary Clearance as a result, and our patients' problems were greatly reduced.⁹

In Nanchiyampalayam, Dharapuram, an investigation into the efficacy of steam inhalation therapy at home for treating acute upper respiratory tract infections in children under the age of five was conducted. In the investigation, one group per experimental design with post-test and instrumental assessment was utilized. The 30 samples for the research were selected using the technique of purposeful sampling. After completing the preliminary test, thirteen individuals received morning and evening steam inhalations for five days. On the sixth day, the Post-Interventional Assessment was conducted using the same observational checklist and rating scale. According to a statistical analysis, the post-test vapor inhalation was highly significant.¹⁰

CONCLUSIONS

As per the results the researcher can concluded that the steam inhalation therapy shows effectiveness on asthmatic parameters in asthmatic patients as per the of pre and post comparisons.

Funding: Nil

Conflict of Interest: Nil

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