# EFFECT OF INCENTIVE SPIROMETRY FOR PREVENTION OF PULMONARY COMPLICATIONS IN PATIENTS HAVING CHEST TUBE DRAINAGE IN SELECTED HOSPITAL, GUWAHATI, ASSAM

**Nursing**

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## ABSTRACT

**Introduction:** Incentive spirometry is a method of deep breathing that provides visual feedback to encourage the patient to inhale slowly and deeply to maximize lung inflation and prevent unwanted complications.

**Aim:** The study was attempted to evaluate the effect of incentive spirometry in patients having chest tube drainage for prevention of pulmonary complications.

**Methods And Materials:** The study was conducted in Guwahati Medical College and Hospital and Quasi-experimental research design (pretest-posttest nonequivalent groups) was used.The study was undertaken among patients with chest tube drainage.Sixty samples were assigned, the experimental group (n=30) received incentive spirometry therapy whereas the control group (n=30) received no intervention.

**Results:** The mean in control group score (19.43) was higher than the mean in experimental group score (12.83) in 3rd day and the mean in control group score (14.06) is higher than the mean in experimental group score (5.06) 7th day respectively.The calculated independent "t" value (t= 5.46 & t=6.45 at 0.05 level of significance) was more than tabulated value (t= 2.0017 at 0.05 level of significance) in 3rd day and 7th day respectively. There was significant association with pulmonary complications with demographic variables viz. age, sex, lung disorder.

**Conclusion:** This study revealed that incentive spirometry was effective in reducing pulmonary complications among patients with chest tube drainage.

## KEYWORDS

Incentive Spirometry, Pulmonary complications, Chest tube drainage

## INTRODUCTION

Over the last decades, the number of risks associated with surgical procedures has been increased.Moreover recent studies estimates that million of surgical procedures have been performed worldwide each year.[1] The reported incidence of postoperative pulmonary complications ranges from 5 to 80 percent, depending upon the patient population and the criteria used to define a complication.[2] So it is important for the nursing students to know the proper technique of incentive spirometry which they can teach the patients to reduce the incidence of postoperative pulmonary complications.[3]

## MATERIALS AND METHODS

An ethical clearance has been obtained from the Ethical Committee, Assam downtown University, Guwahati to conduct the study. Permission was obtained from the concerned authority to conduct the study in Guwahati Medical College and Hospital, Guwahati.The design adopted was quasi-experimental research design (pretest-posttest non equivalent groups).60 samples were assigned to control group (n=30) received no intervention for prevention of pulmonary complications and experimental group (n=30) received incentive spirometry therapy.The sampling technique was non-probability purposive sampling technique.The samples in the experimental group were given administration of incentive spirometry 4 times for 15 minutes in a day was done for 3rd day and 7th day respectively. Preassessment was done by assessing the level of pulmonary complication by using observational checklist before use of incentive spirometer.Post assessment was done by assessing the level of pulmonary complications by using observational checklist after use of incentive spirometry whereas the control group was not provided any treatment.

## RESULTS AND DISCUSSION

The data gathered were analysed by using descriptive and inferential statistics**.**The significant difference between experimental and control group regarding the development of pulmonary complications to be computed by Paired t-test and unpaired t-test.Chi-square test was computed to determine the association between pulmonary complications and demographic variables among the control group.

**Frequency and percentage distribution of patients according to the selected demographic characteristics.**

Findings of the study showed that,out of 60 samples most of the patient with pulmonary complications fall in the age group of 21-30 years and 31-40 years, the percentage being 62 % followed by 38 % in the age group of above 40 years and majority of the samples in the study are males accounting 71 % with regards of history of smoking 68%.The duration of effect of anaesthesia administer are less than 2 hours with the percentage of 77% .During surgery 77% does not have any complications and 23% have complications.All (100%) have got preantibiotic administration and have taken oxygen post-operatively. All 100 % does not have any previous history of other surgery and 100% does not have respiratory complication in previous surgery.

**Frequency and percentage distribution of pulmonary complications among experimental and control group**
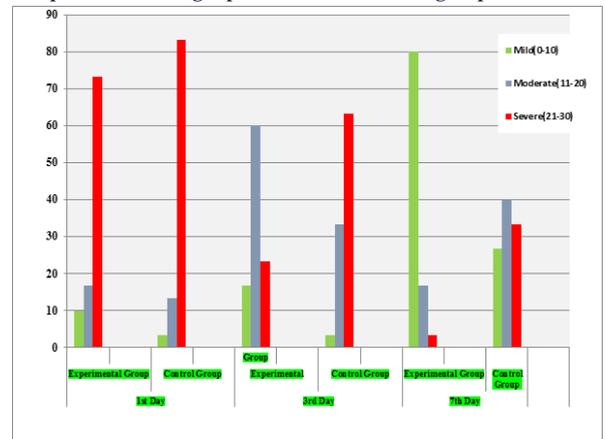


**Figure 1:**Bar diagram showing frequency and percentage distribution of pulmonary complications among experimental and control group N=60

The data presented in the fig 1 showed that in the control group 83.34% experienced severe pulmonary complications whereas in the experimental group 73.33% experienced severe pulmonary complications in 1st Day.In 3rd day, the control group 63.34% experienced severe pulmonary complications whereas in the experimental group 60% experienced moderate pulmonary complications. In 7th day, the control group 40% experienced moderate pulmonary complications whereas in the experimental group 80% experienced mild pulmonary complications.

This finding is supported by a true experimental study conducted by

**Susila C, Dhanlakshmi G, Revathy R(2017)** on effectiveness of Incentive Spirometry on respiratory status among post operative patients subjected to major abdominal surgery.60 samples were selected by simple random technique at Billroth Hospitals.The result shows that pretest level of respiratory status was maximum of 73.33% had average score and 26.67% had poor in experimental group and in control group maximum of 60% had average score and 4% had poor score.In the post test level of respiratory status maximum of 73.33% had good score and 26.67% had excellent score in experimental group and in control group maximum of 53.33% had average score and 46.67% had good score.[5]

**Effect of incentive spirometry in term of pulmonary complications among the experimental and control group.**

**Table2: Effect Of Incentive Spirometry In Term Of Pulmonary Complications Among The Experimental And Control Group   N=60**

| Days | Group | Mean | SD | Mean difference | t value | df | Tabulated t-value | Inference |
|------|-------|------|-----|-----------------|---------|-----|-------------------|-----------|
| 3rd day | Experimental group | 12.83 | 5.1966 | 6.6 | 5.46 | 58 | 2.0017 | S* |
| | Control group | 19.43 | 5.3271 | | | | | |
| 7th day | Experimental group | 5.06 | 4.589 | 9 | 6.45 | 58 | 2.0017 | S* |
| | Control group | 14.06 | 6.9614 | | | | | |

S=Significant *,NS= Not Significant at p<0.05 level

Table 2 shows that the mean in control group (19.43) was higher than the mean in experimental group (12.83) in 3rd day and the mean in control group (14.06) is higher than the mean in experimental group (5.06) 7th day respectively.The calculated independent "t" value (t= 5.46 & t=6.45 at 0.05 level of significance) was  more than tabulated value (t= 2.0017 at 0.05 level of significance) in 3rd day and 7th day respectively.Hence,research  hypothesis was accepted which shows that there was significant difference in the effect of incentive spirometry in term of pulmonary complication among the experimental and control group.

The finding is consistent with a pre-experimental study conducted by **Sharma K, Kaur A (2020)** on effectiveness of Incentive Spirometry on respiratory parameters among patients with Chest Tube drainage.One group pre-test and post-test design was carried out by using purposive sampling technique among 30 patients with chest tube drainage in ICUs of a tertiary care hospital, Ludhiana, Punjab.Data was collected by self-report for demographic variables,clinical profile sheet and assessed the respiratory parameters by using Respiratory Distress Observation Scale (DOS). The Mean±SD of heart rate in pre-test (O1) was 1.43±0.50 which got decreased to 0.36±0.49 in post- test (O4) with statistically significant at p = 0.000. In pre-test,Mean±SD of respiratory rate was 1.30±0.46 and got decreased to 0.30 ± 0.46 during post- test.The Mean±SD of restlessness was 1.23±0.81 in pre-test whereas in post-test it was decreased to 0.23±0.43.The study conclude that almost all subjects were having respiratory distress during pre-test but after using incentive spirometry in chest tube drainage patients, the parameters were improved daily gradually and during post-test only 26.6% patients were having respiratory distress.The incentive spirometry was effective for improving respiratory parameters among chest tube drainage patients.[6]

**Association between pulmonary complications and demographic variables among the control group**

**Table 3: Association Between Pulmonary Complications And Demographic Variables Among The Control Group N=30**

S=Significant *, NS= Not Significant at p<0.05 level

| Variables | Pulmonary complication score | | | $\chi^2$ | df | Tabulated t value | Inference |
|-----------|------|----------|--------|----------|-----|-------------------|-----------|
| | Mild | Moderate | Severe | | | | |
| Age in years a) < 40 b) > 40 | 2 1 | 8 5 | 7 7 | 7.5029 | 2 | 5.99 | S |
| Sex a)Male b)Female | 13 - | 6 4 | 1 6 | 15.455 | 2 | 5.99 | S |
| History of smoking a)Yes b) No | 6 3 | 7 3 | 5 4 | 0.8619 | 2 | 5.99 | NS |
| Any complication during/ after surgery a) Yes b) No | 2 7 | 3 9 | 3 6 | 0.6875 | 2 | 5.99 | NS |
| Number of days with oxygen administration a)>5 days | 6 | 3 | 4 | 1.1005 | 2 | 5.99 | NS |
| b) <5 days | 7 | 2 | 8 | 1.1005 | 2 | 5.99 | NS |
| Episode of vomiting-postoperative period a)Yes b)No | 1 9 | 0 8 | 01 13 | 0.3804 | 2 | 5.99 | NS |
| Previous history of any other surgery a)Yes b)No | 0 15 | 0 9 | 0 6 | 0.0 | 2 | 5.99 | NS |
| Any associated lung disorder a) Yes b) No | 2 7 | 3 6 | 5 7 | 9.8749 | 2 | 5.99 | S |

The result of chi-square analysis in the table 3 showed that there was a significant association between the pulmonary complications and demographic variables among the control group with the demographic variables viz. age, sex and associated lung disorder. Thus, the chi square (2) value is significant at 0.05 level of significance. Hence, we accept our research   hypothesis saying that there was significant association between pulmonary complications and demographic variables among the control group with the demographic variables viz. age, sex and associated lung disorder.

Present study supported by **Kaur A, Kalyani C, Kusum K (2020)** who published a pre experimental study on effect of incentive spirometry on recovery of postoperative patients and found that there was association between performance level on incentive spirometry  with selected demographic variables viz. sex and diagnosis of postoperative patients.[6]

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**CONCLUSION**
The present study was examined to assess the effect of incentive spirometry for prevention of pulmonary complications in patients having chest tube drainage.Based on statistical findings, the study was revealed that Incentive Spirometry was effective in reducing pulmonary complications in patients with chest tube drainage.The study further revealed that significant association with the demographic variables viz. age, sex and any lung disorder.Except the variables viz.  history of smoking, complication during/after  surgery, number of days with oxygen administration, episodes of vomiting, previous history of any other surgery shows no association pulmonary complications.

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