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## **An experimental study to assess the effectiveness of deep breathing exercise on pulmonary parameters of patients undergoing abdominal surgery in selected hospitals of Pune city**

**Pradeep Kumar Yadav and Geeta Vikas Shiroor**

### **Abstract**

**Introduction:** Breathing is the bridge between mind and body, the connection between consciousness and unconsciousness, the movement of spirit in matter. Breath is the key to health and wellness, a function, we can learn to regulate and develop in order to improve our physical, mental and spiritual well-being Breathing is special in several respects:

**Title:** "Effectiveness of Deep Breathing Exercise on pulmonary parameters of patients undergoing abdominal surgery in selected hospitals of Pune City"

**Purpose:** The purpose of the study is to assess the effectiveness of deep breathing exercise on pulmonary parameters among patients undergoing abdominal surgery.

**Material and Method:** Quantitative Approach, Quasi-Experimental Pretest Posttest Control Group Research Design was adopted for the present study. Total 60 samples were included in the study based on inclusion and exclusion criteria: 30 in experimental and 30 in control group. The data collection tool includes demographic profile and pulmonary parameters. Deep Breathing Exercise (DBE) was taught and practiced by the patients in the experimental group and the control group patients continued with routine treatment.

**Result:** In the Experimental Group majority of patient were male within the age group of 41 – 55 years, having a primary level of education. Majority of were vegetarians and doing household work. Majority of them have the habit of chewing tobacco. In the Control Group also majority of patients were male with the age group of 41 – 55 years. Majority were vegetarians and self-employed. Pulmonary parameter of patient was observed before 12 hours and after 24, 36, 48, and 72 hours of surgery and effect of deep breathing exercise was assessed and compare with 36 hours and 72 hours. In the experimental group after the intervention of deep breathing exercise 26 (86.67%) patients were falling under a satisfactory status of pulmonary parameters and 4 (13.33%) had good status of pulmonary parameters and in the control group none patients had good status of pulmonary parameters. The p – value after 36 hours was 0.0001 and after 72 hours 0.028 (Less than 0.05). This data proved that deep breathing exercise was significantly effective in abdominal surgery patients. As the p value of all the demographic variables were greater than 0.05 it is found there is no significant association with pulmonary parameters.

**Conclusion:** Deep Breathing Exercise was found to be significantly effective in improving the pulmonary parameter status among patients with abdominal surgery.

**Keywords:** deep breathing exercise, abdominal surgery, postoperative pulmonary complications

### **Introduction**

Breathing is the relationship between cognizance and insentience; a way to personify health and directing our vitality to enhance holistic development [1]. Surgery is a unique experience for the individual. It is means of treating ailments, wounds and malformations by certain maneuver's and instrumentation; evolving around the patient and health care team members. The surgery may be major or minor and elective or emergency, but it is a stressful event to the patients. The more complex the surgery, the more likely the patient has to undergo changes in the body systems [1]. Postoperative respiratory complications, such as pneumonia, shortness of breath, atelectasis, sputum retention, respiratory failure is of major difficulties after abdominal surgery. In some countries, deep breathing exercises are recommended to patients who are unable to take deep breaths after abdominal surgery. Postoperative

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Postoperative respiratory difficulties are related with substantial morbidity and mortality. [3] Postoperative maladies are primary reason for the morbidity and mortality related with surgery. Pneumonia is the most unpretentious postoperative intricacy and positions as the third most usual postoperative disease, after urinary tract and wound contamination. National Nosocomial Infection Surveillance framework states that, pneumonia came occurs in about 20% of patients after surgery [3]. Postoperative pneumonia happens is common in 10% to 40% of patients, and the related death rate is 35% to 45%, contingent upon the sort of surgery [4]. Surgery is usually a rare incident in human life and act as a stressor to patients and causes many physiological changes, right from tissue injury, flow mobility status and vital impacts to stress and decreased value of life. After abdominal Surgery, 35% of the patients encounter postoperative intricacies. The larger parts of these respiratory distresses leading to failure, which happen in 10% of all patients after abdominal surgery [5]. Deep breathing and coughing practices in the postoperative period help eradicate inhalation anesthetics counteract alveolar collapse expel respiratory discharges to larger airway passages for expectoration.

**Objectives of the Study**

1. To assess pre-operative pulmonary parameters in experimental group and control group.

2. To assess post-operative pulmonary parameters in experimental group and control group.
3. To determine the effectiveness of deep breathing exercise on pulmonary parameter in Experimental group.
4. To find out the association between the pre-test pulmonary parameters with selected demographic Variables.

**Hypothesis**

**Hypothesis for Effectiveness**

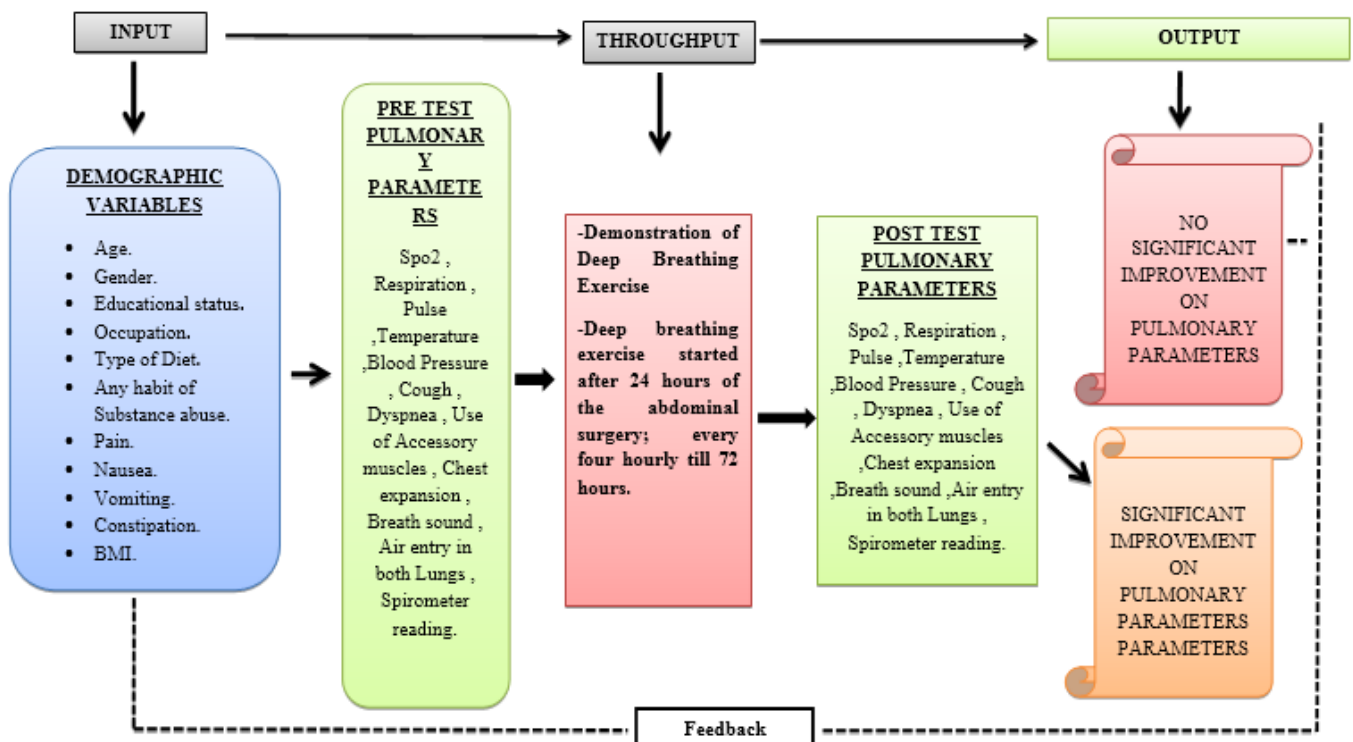
**H0<sub>1</sub>:** There is no statistically significant difference in pulmonary parameters before and after the deep breathing exercise among the patients undergoing abdominal surgery at 0.05 level of significance.

**H0<sub>2</sub>:** There is no statistically significant difference in pulmonary parameters between control group and experimental group of patients undergoing abdominal surgery at 0.05 level of significance.

**Hypothesisr Association**

**H0:** There is no statistically significant association between the pulmonary parameters and the selected demographic variables in the control group and experimental group of patients undergoing abdominal surgery at 0.05 level of significance.

**Conceptual framework of the study**



**Fig 1:** Conceptual framework based on Ludwig Von Bertalanffy General System Theory

**Materials and Methods**

A Quantitative research approach and quasi experimental pre test-posttest control group design had been adopted for the present study. The dependent and independent variables in the study were pulmonary parameters of patients and Deep breathing exercise. Pilot study was conducted at Rao Nursing Home Pune. Total 8 patients, 4 patients in experimental and 4 in control group were selected by using non-probability purposive sampling technique according to

the inclusion criteria of the sample i.e. Patients who are undergoing Major abdominal surgery during the day of data collection, Patients with stable vital parameters, Patients who are conscious and oriented, Patients who are willing to participate in the study. The data collection tool includes demographic variables and pulmonary parameters. Each parameter is graded as 1, 2, 3 that is 1 is good, 2 is satisfactory and 3 was considered as poor. Total there were 13 parameters. Based on the scores attained, the participants

were categorized into Good, Satisfactory, and Poor. Deep Breathing was taught and practiced by the patients in the

experimental group, and control group patients continued with routine treatment.

**Results**

**Table 1:** Frequency and percentage distribution of selected demographic characteristics of patients undergoing abdominal surgery A- Personal characteristics N = 60

| Sr. No.            | Personal Characteristics | Experimental Group n <sub>1</sub> =30 |        | Control Group n <sub>2</sub> =30 |        |
|--------------------|--------------------------|---------------------------------------|--------|----------------------------------|--------|
|                    |                          | (f)                                   | (%)    | (f)                              | (%)    |
| AGE                |                          |                                       |        |                                  |        |
| 1                  | a) 25-40 Yr.             | 5                                     | 16.70% | 3                                | 10%    |
|                    | b) 41 - 55 Yr.           | 16                                    | 53.33% | 20                               | 66.67% |
|                    | c) 56 and above          | 9                                     | 30%    | 7                                | 23.33% |
| GENDER             |                          |                                       |        |                                  |        |
| 2                  | a) Male                  | 21                                    | 70%    | 18                               | 60%    |
|                    | b) Female                | 9                                     | 30%    | 12                               | 40%    |
| Educational Status |                          |                                       |        |                                  |        |
| 3                  | a) Graduate and above    | 6                                     | 20%    | 5                                | 16.67% |
|                    | b) Secondary             | 7                                     | 23.33% | 12                               | 40%    |
|                    | c) Primary               | 13                                    | 43.33% | 11                               | 36.67% |
|                    | d) Illiterate            | 4                                     | 13.33% | 2                                | 6.67%  |

| Sr. No.                                      | Personal Characteristics     | Experimental Group n <sub>1</sub> =30 |        | Control Group N <sub>2</sub> =30 |        |
|--|------------------------------|---------------------------------------|--------|----------------------------------|--------|
|  |                              | (f)                                   | (%)    | (f)                              | (%)    |
| Occupation                                   |                              |                                       |        |                                  |        |
| 4  | a) Government employee       | 6                                     | 20%    | 5                                | 16.67% |
|  | b) Private employee          | 7                                     | 23.33% | 6                                | 20%    |
|  | c) Self Employee             | 7                                     | 23.33% | 12                               | 40%    |
|  | d) House hold                | 10                                    | 33.33% | 7                                | 23.33% |
| Type Of Diet                                 |                              |                                       |        |                                  |        |
| 5  | a) Vegetarian                | 13                                    | 43.33% | 9                                | 30%    |
|  | b) Non vegetarian            | 12                                    | 40%    | 17                               | 56.67% |
|  | c) Eggetarian                | 5                                     | 16.67% | 4                                | 13.33% |
| Any Habit Of Substance Abuse If Yes Specific |                              |                                       |        |                                  |        |
| 6  | a) Alcohol                   | 3                                     | 10%    | 5                                | 16.67% |
|  | b) Smoking                   | 10                                    | 33.33% | 13                               | 43.33% |
|  | c) Tobacco                   | 11                                    | 36.67% | 7                                | 23.33% |
|  | No Habit of Substance Abuse. | 6                                     | 20%    | 1                                | 3.33%  |

| S. No.       | Clinical Profile           | Experimental Group n <sub>1</sub> =30 |        | Control Group n <sub>2</sub> =30 |        |
|--------------|----------------------------|---------------------------------------|--------|----------------------------------|--------|
|              |                            | (f)                                   | (%)    | (f)                              | (%)    |
| Pain         |                            |                                       |        |                                  |        |
| 1            | Yes                        | 28                                    | 93.33% | 28                               | 93.33% |
|              | No                         | 2                                     | 6.67%  | 2                                | 6.67%  |
| Nausea       |                            |                                       |        |                                  |        |
| 2            | Yes                        | 25                                    | 83.33% | 21                               | 70%    |
|              | No                         | 5                                     | 16.67% | 9                                | 30%    |
| Vomiting     |                            |                                       |        |                                  |        |
| 3            | Yes                        | 14                                    | 46.67% | 19                               | 63.33% |
|              | No                         | 16                                    | 53.33% | 11                               | 36.67% |
| Constipation |                            |                                       |        |                                  |        |
| 4            | Yes                        | 15                                    | 50%    | 12                               | 40%    |
|              | No                         | 15                                    | 50%    | 18                               | 60%    |
| BMI          |                            |                                       |        |                                  |        |
| 5            | < 18                       | 18                                    | 60%    | 11                               | 36.67% |
|              | 18.5 – 25                  | 9                                     | 30%    | 18                               | 60%    |
|              | > 25                       | 3                                     | 10%    | 1                                | 3.33%  |
| 6            | Type of surgical procedure | 30 (LAP)                              | 100%   | 30(LAP)                          | 100%   |

B - Clinical Profile n = 60

**Table 2:** Description of the observation of pulmonary parameters before intervention among patients undergoing abdominal surgery in both groups. n = 30, 30

| Pulmonary parameters | Experimental N 1 = 30 |     | Control group n 2 = 30 |      |
|----------------------|-----------------------|-----|------------------------|------|
|                      | Freq.                 | %   | Freq.                  | %    |
| Good                 | 0                     | 0%  | 0                      | 0%   |
| Satisfactory         | 27                    | 90% | 30                     | 100% |
| Poor                 | 3                     | 10% | 0                      | 0%   |

**Table 3:** Description of the observation of pulmonary parameters after intervention among patients underwent abdominal surgery in both groups n = 60

| Hours | Pulmonary parameters | Experimental group n 1= 30 |        | Control group n 2 = 30 |        |
|-------|----------------------|----------------------------|--------|------------------------|--------|
|       |                      | Freq.                      | %      | Freq.                  | %      |
| 36    | Good                 | 0                          | 0%     | 0                      | 0      |
|       | Satisfactory         | 30                         | 100%   | 26                     | 86.67% |
|       | Poor                 | 0                          | 0%     | 4                      | 13.33% |
| 48    | Good                 | 2                          | 6.67%  | 0                      | 0%     |
|       | Satisfactory         | 28                         | 93.33% | 29                     | 96.67% |
|       | Poor                 | 0                          | 0%     | 1                      | 13.33% |
| 72    | Good                 | 4                          | 13.33% | 0                      | 0%     |
|       | Satisfactory         | 26                         | 93.33% | 30                     | 100%   |
|       | Poor                 | 0                          | 0%     | 0                      | 0%     |

**Table 4:** Effectiveness of intervention on pulmonary parameters of patients undergoing abdominal surgery in the experimental group. n=n130, n2 30

| Hours | Group        | Mean  | SD    | t    | df | p-value   |
|-------|--------------|-------|-------|------|----|-----------|
| 36    | Experimental | 18    | 2.42  | 5.97 | 58 | 0.00001** |
|       | Control      | 22.5  | 3.34  |      |    |           |
| 72    | Experimental | 17.13 | 3.85  | 2.35 | 58 | 0.028*    |
|       | Control      | 18.87 | 3.002 |      |    |           |

Researcher applied unpaired t – test for effectiveness of intervention in the experimental group. The data presented in above table signifies that after 36 hours of the abdominal surgery, mean score in the experimental group was 18 which increase to 22.5 in control group. SD in experimental group was 2.42 and SD in the control group was 3.34. t – 5.97 Value for significance of correlation was 5.97 at 58 degrees of freedom. Since p-value was 0.00001 (Less than 0.05) and after 72 hours of the abdominal surgery mean score in the experimental group was 17.13 which increase to 18.87 in the control group. SD in the experimental group was 3.85 and SD in the control group was 3.002 t – 2.35 Value for significance of correlation was 2.35 at 58 degrees of freedom. Since p-value was 0.028 (Less than 0.05), this proved that deep breathing exercise was found to be significantly effective in improving the pulmonary parameters among patients with abdominal surgery

**Table 5:** Association of pulmonary parameters with selected demographic variables n =60

| S. No | Demographic variables                        | p-value    |
|-------|--|------------|
| 1     | Age  | 0.408 (NS) |
| 2     | Gender                                       | 0.377 (NS) |
| 3     | Education status                             | 0.418 (NS) |
| 4     | Occupation                                   | 0.289 (NS) |
| 5     | Type of Diet                                 | 0.558 (NS) |
| 6     | Any habit of Substance abuse if yes Specific | 0.207( NS) |
| 7     | BMI  | 0.489 (NS) |

The above table shows, the association of pulmonary parameters with selected demographic variables using Fisher’s exact test. Since as all p-values are greater than 0.05 we accept H<sub>0</sub>. There is no significant association between the pulmonary parameters among patients with undergoing abdominal surgery and selected demographic variables at 0.05 Level Of Significance.

**Discussion**

In the present study it was observed that among experimental group and control group 16 (53.33%) and 20 (66.67%) were between 41 -55 years of age because as the age increases there are more chances of getting sick for various reasons and may need a surgical procedure. In the experimental group majority of the samples 21 (70%) were

male. In the control group 18 (60%) of abdominal surgery patients were females because as male compared to females drink alcohol, smokes and doesn’t maintain the dietary pattern and in my research setting. In the experimental group majority 13 (43.33%) were Education up to primary level and control group, majority 12 (40%) of them were at the secondary level may be because the study setting always have the patients with low socioeconomic group who are mainly doing farming as their major occupation, they usually stop studying after primary education. ng more patients admitted were rural area. In the present study it was observed that among the experimental group majority 10 (33.33%) of them were employed as household. In control group, majority 12 (44 %) of them were self-employed because they belong to low socio-economic status and farmer background. In the experimental group majority 13 (43.33%) of them were vegetarian and in the control group, majority 17 (56.67%) of them were non-vegetarian because non vegetarian food products are non-fibrous which may lead to abdominal problems as these bad habits may disrupt the intestinal mucosa and may lead to cancer and other problems. In the experimental group majority experimental group, majority 11 (36.67%) of them used tobacco and 6 (20%) have no habit of substance abuse. In control group, majority 13 (43.33%) of them were use smoking and 1 (3.33%) have no habit of substance abuse because these bad habits may disrupt the intestinal mucosa and may lead to cancer and other problems. In the experimental group of majority 18 (60%) of them were BMI < 18. In control group of majority 18 (60%) of them were BMI between 18.5 – 25. In the present study after 36 hours of intervention it was observed Since p-value was 0.00001 (Less than 0.05), and after 72 hours of intervention p - value was 0.028 ( Less than 0.05) this proved that deep breathing exercise was found to be significantly effective in improving the pulmonary parameters among patients with abdominal surgery. It was observed since the p - value was greater than 0.05 this proved there is no association between the pulmonary parameters among patients with undergoing demographic variable at the 0.05 level of significance.

**Conclusion**

After undergoing for abdominal surgery post-operative pulmonary complication is most common. So that patients

stay in hospital for a long time and patient spend his/her extra money for treatment of post-operative pulmonary complication and on the surgical treatment. At the present time in most of country patient died after the abdominal surgery due to the post-operative pulmonary complication. The study was undertaken to assess the effectiveness of deep breathing exercise on pulmonary parameters among patient undergoing abdominal surgery patient. The results of data analysis proved that deep breathing exercise was found to be significantly effective in improving the pulmonary parameters among patients with abdominal surgery patients in the experimental group.

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