Effects of Early Mobilisation on Post Operative Pulmonary Complication in Patients with Open Abdominal Surgery

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Abstract

Background: Patients undergoing open abdominal surgery are the focus of this research, namely the effect of early mobilisation on postoperative pulmonary problems. Early mobilization is proposed as a potential intervention to enhance respiratory function and reduce the risk of PPCs.

Purpose: The purpose of this study is to evaluate the impact of pre-operative mobilisation on the incidence of pulmonary complications in patients undergoing open abdominal surgery.

Materials and Methods: This quasi-experimental study included 50 subjects who underwent open abdominal surgery at Saveetha Medical Hospital, SIMTS. Convenient sampling was used to select the participants. Measures of oxygen saturation (SPO2) and pulmonary function (FEV1) from a spirometer were employed as functional outcome indicators. After two weeks, participants were given a post-test to record their progress.

Results: Data collected before and after early mobilisation exercise were analysed using a paired t-test. The experimental group showed significant improvements in SPO2, FIM, and FEV1 (P<0.0001), indicating higher values post-intervention. Post-test demonstrated higher statistical significance compared to pre-test.

Conclusion: As a result, it was shown that early mobilisation Exercise is beneficial for reducing pulmonary complications after surgery.

Key Word: Functional Independence Measure Scale (FIM), Spirometer (FEV1), Early Mobilisation Exercise (EMT), SPO2, and Open Abdominal Surgery.

Introduction

Post-operative pulmonary complications (PPCs) following open abdominal surgery are a possibility. The most frequent type of surgery is abdominal surgery, which can involve a wide range of important internal bodily organs and tissues, such as the gallbladder, oesophagus, kidneys, and liver.\textsuperscript{1}

A cut above or reaching out over the umbilicus is referred to as upper abdominal surgery (UAS). An incision below the umbilicus is referred to as lower abdominal surgery (LAS). Open abdominal surgery is an option if the incision is longer than 5 cm. Laparoscopic procedures were first often used for several reduced risk abdominal surgeries. Compared to open abdominal procedures, these were typically

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associated with less discomfort, quicker healing times, shorter hospital stays, and lower complication rates. Notwithstanding, and whether they adhere to the most recent best evidence recommendations are currently unknown. It is appropriate to examine whether and how the advancements in surgical methods have affected the use of physiotherapy in this populace. Accordingly, the motivation behind this study was to decide how patients having various types of abdominal surgery and surgical techniques are now managed during their preoperative and postoperative physical therapy sessions in New Zealand’s public hospital surgical units.

As surgical practices and after care have advanced, so too have patient outcomes following open abdominal surgery. Pulmonary complications after surgery (PPCs) continue to be a key cause for concern. The wide variety of respiratory illnesses that are classified as PPCs includes atelectasis, pneumonia, and respiratory failure. These illnesses may lead to more serious outcomes, longer hospital stays, and greater medical costs. There has been growing interest in early mobilisation as a preventative strategy for reducing PPCs and speeding up recoveries in recent years.

In this introductory section, we will discuss how early mobilisation affects pulmonary difficulties for patients. The significance of early assembly, alongside the physiological advantages and supporting proof, will be emphasized. It will also be obvious what challenges and barriers medical practitioners face while using early mobilization techniques.

Pulmonary complications after abdominal surgery are a major concern since they affect as many as half of all patients. In the first thirty days after surgery, any pathological changes or abnormalities in the respiratory system are classified as postoperative complications. It is important not to downplay the impact of PPCs on patient outcomes, which may vary from relatively minor respiratory difficulties to life-threatening infections.

Consequences and difficulties caused by PPCs: PPCs have a major effect on postoperative mortality and morbidity. They may cause patients to need more medical treatment, including admission to the intensive care unit (ICU) and readmission to the hospital. Due to the high costs of Hospitalization, diagnostic testing, and subsequent treatments, PPCs may put a substantial burden on healthcare budgets.

The benefits of early mobilisation in avoiding the complications of prolonged bed rest and immobility provide compelling justification for the practice. weaker respiratory muscles, lower lung capacity, poor gas exchange, and decreased cough efficiency are only some of the physiological changes that may occur after surgery and prolonged periods of inactivity. By beginning early mobilisation, lung function, pulmonary secretion clearance, and respiratory outcomes may all be improved, mitigating some of the unfavourable effects.

The Physiological Advantages of an Early Deployment

Better Airflow and Gas Transfer in the Lungs

Inhibiting the progression of atelectasis with early mobilisation has been shown to increase lung ventilation. By encouraging a more upright posture, this device helps increase oxygen intake. Deeper breathing, facilitated by mobilisation, aids in secretion clearance and improves gas exchange. Movement, particularly walking and upper-limb movements, performed early on may strengthen respiratory muscles and improve the effectiveness of a cough, so facilitating the early clearance of respiratory secretions.

Venous thromboembolism Prevention

Early mobility is related with a diminished risk of creating venous thromboembolism (VTE), a potentially fatal complication of surgery. Increasing blood flow early on decreases the likelihood of developing pulmonary embolisms and deep vein thrombosis.

Early mobilisation after open abdominal surgery has been studied extensively for its potential benefits in reducing postoperative pulmonary complications. The results of these investigations have been uniformly good, with fewer cases of PPC, shorter hospital stays, and faster recoveries. Standardised early mobilisation tactics are still difficult to implement due to a variety of barriers, such as patient-specific limits, attitudes among healthcare practitioners, and resource constraints.
As a result, patients having open abdominal surgery might greatly benefit from early mobilisation, which has been shown to enhance outcomes and decrease the incidence of postoperative pulmonary problems. The physiological benefits of early activation, for example, expanded hack viability, higher lung capability, and VTE counteraction, highlight the need of including it into perioperative remedial regimens. To overcome these barriers and make the most of early mobilisation approaches in clinical practise, more study and effort are required. Patients undergoing open stomach a medical procedure might recuperate all the more rapidly, with less issues, and have better resides in the event that medical services suppliers put an accentuation on right on time mobilisation.7

AIM

The purpose of this research was to determine whether early mobilisation reduced the risk of pulmonary complications in patients who had gone through open stomach a medical procedure. The motivation behind this examination was to decide the impacts of early postoperative mobilisation on oxygen saturation (SPO2), pulmonary function (FEV1), and functional outcome assessments in individuals who had undergone abdominal surgery.

Material and Methods

This quasi-experimental study concentrates on 50 subjects who went through open abdominal surgery at Saveetha Medical Hospital, SIMTS. Convenient sampling was used to select the participants. SPO2 levels, spirometer (FEV1) readings, and functional outcome measures were utilised to determine success. The post-test findings were obtained and analysed following the 2-week intervention.

Materials required: pulse, oximetry, chair, Dumbbell, ball, walker, incentive spirometry.

Selection criteria

Inclusion criteria:

• Patients only taken from the Saveetha Medical college and Hospitals

Exclusion criteria:

• Individuals who have Recurrent abdominal surgeries.
• Medical conditions that would limit their participation in the training program.
• Those in the past who left too early for the Mobilis efforts.
• Able to walk alone following surgery

Outcome measure:

• SPO2 level - Pulse oximeter readings
• Functional Independence Measure Scale (FIM) - As a means of evaluating practical competence
• Pulmonary function - Measured using Spirometer (FEV1)

Procedure

Fifty people who have had open abdominal surgery will be selected at random from those who meet the inclusion and exclusion criteria. Participants will be briefed and supervised by the treatment teacher before the trial begins.

Each person who took part in the study was picked using a systematic, random, and efficient method. The patient was instructed to take a seat and given some background information before the therapy session began, and then shown how to do the necessary movements by the therapist.

Measurements of SPO2, the Practical Freedom Measure Scale, and pneumonic capability utilizing a spirometer (FEV1) will be taken before and after the subject receives treatment for 5 weeks, with the same protocol being used for both sets of measurements.

Early Mobilisation Protocol

1. Ankle toe Pumps 10 reps per hour

Ask the individuals to sit and make their ankle going up on toe and down on toe.

2. Active/assisted Mobility exercises: make the individual sit on bed or chair move the upper limb backward
3. Deep Breathing Exercise:

make the individual inhale through nose while abdomen should comes out while aling through mouth abdomen should goes in

4. Airway clearance technique (ACT):

• Therapist should give percussion, vibration and shaking to the individual.
• Sit up straight take a deep breath to fill lungs three quarters full hold two or three seconds exhale forcefully, in a continues exhalation to move mucus form the smaller to the larger airway
• Train the individual ACBT and Autogenic drainage

5. Incentive Spirometry:

using incentive spirometry make the individual

6. Upper limb and lower limb Strengthening Exercise

using 0.5 kg and 1 kg dumbbell wrist curl and biceps curl on chair or bed.

7. Walking:

make the individual walk slowly with or without walker

Data analysis

Descriptive and inferential statistics were used to tabulate and analyse the gathered data. The mean and standard deviation (SD) were applied to all boundaries. The massive contrasts between the pre-and post-test scores were dissected utilizing a paired t-test. Statistical significance was found at the (p<0.05) level.

<table>
<thead>
<tr>
<th>outcome</th>
<th>Early Mobilization</th>
<th>Std. err</th>
<th>t' test</th>
<th>P Value</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Pre-Test</td>
<td>Post-Test</td>
<td></td>
<td></td>
</tr>
<tr>
<td>SPO2</td>
<td>84.2% SD 2.3</td>
<td>96.4% SD 1.8</td>
<td>0.39</td>
<td>30.6</td>
</tr>
<tr>
<td>FIM Score</td>
<td>43.82 SD .56</td>
<td>93.36 SD 3.02</td>
<td>0.55</td>
<td>89.99</td>
</tr>
<tr>
<td>(FEV1)</td>
<td>71.44% SD 1.83</td>
<td>90.34% SD 4.87</td>
<td>0.72</td>
<td>26.16</td>
</tr>
</tbody>
</table>

Results

This study examined the effectiveness of early mobilization exercise in reducing post-operative pulmonary complications, improving pulmonary volume, and functional independence in patients who have undergone open abdominal surgery. The study involved an unknown number of participants who received early mobilization exercise for two weeks. Data was collected before and after the program and analyzed using descriptive and inferential statistics. The results showed a statistically significant improvement in SPO2, FIM, and FEV1 after the early mobilization exercise. These findings suggest that early mobilization exercise may improve lung function and overall recovery for patients who have undergone open abdominal surgery. However, the study’s limitations and individual differences among participants should be considered when interpreting the results.

Discussion

This research set out to see whether post-op patients benefited from early mobilisation exercises after undergoing open abdominal surgery. The reason for this study was to inspect the impacts of early mobilisation on lung volume and functional activities in patients who had just had thoracic surgery, with the hope of determining whether or not this strategy may lower the risk of pulmonary problems.\(^{1,6}\)

The research included 50 people who had just recovered from open abdominal surgery. The researchers have predetermined inclusion and exclusion criteria in place to keep the sample representative. Prior to the start of the trial, all participants received the same pre-defined instructions for the early mobilisation exercise therapy.\(^{13}\)

Subjects participated in a two-week, supervised exercise programme as part of the early mobilisation
intervention. Researchers followed study subjects very carefully and gathered data to assess the effect of the intervention during this time.

The researchers observed that patients who participated in early mobilisation exercise had fewer pulmonary problems after surgery. As a result of this discovery, it seems that the intervention may have a beneficial impact on the respiratory system, which might result in fewer breathing-related issues after surgery.8

Measurements were also taken to assess the individuals’ lung volume and the functional activities they engaged in. Results from a test measuring lung capacity, called the Forced Expiratory Volume in 1 Second (FEV1), were significantly higher after treatment than they had been before. It seems that individuals who have had open abdominal surgery benefit from early mobilisation because of improved lung function.2

The Functional Independence Measure Scale (FIM) was used to evaluate functional activities, and it, too, revealed a considerable uptick after the early mobilisation intervention lasting only two weeks. It’s possible that the exercise programme may help these individuals become more independent in their daily lives and boost their physical abilities as a whole.

A thorough examination of the data showed no statistically significant relationships between the investigated factors. It appears to be that the enhancements in post-useable aspiratory issues, lung volume, and practical exercises were inferable straightforwardly to the early preparation mediation, since both the bias and independent factors were shown to be negligible.11,15

Patient care after open abdominal surgery may benefit from early mobilisation exercise, according to the study’s results. Early mobilisation may improve recovery results and patient well-being by lowering the risk of post-operative pulmonary problems, increasing lung volume, and fostering functional independence.

However, it is critical to note that the research includes several caveats. For example, the sample size was on the smaller side, and the intervention period was just two weeks long. The findings may not be applicable to a wider population or longer time frame if these limitations are taken into account. In order to confirm and broaden these results, further study is required, ideally with bigger samples and longer follow-up periods.5,14

In sum, the findings provide light on the potential advantages of early mobilisation exercise for patients recovering from open abdominal surgery.7 More examination is expected to affirm these discoveries and investigate different parts of the mediation’s effect on post-useable recuperation, yet the outcomes propose positive results concerning decreased post-employable pneumonic inconveniences, worked on aspiratory volume, and improved utilitarian exercises. The data presented here may help medical practitioners evaluate the feasibility of introducing early mobilisation exercise into the treatment regimens of patients after open abdominal surgery, with any necessary modifications made to account for the specific characteristics of each patient.4,9

**Conclusion**

The goal of this study was to determine whether patients who had open abdominal surgery benefited from early mobilisation as a post-operative intervention to reduce their risk of pulmonary complications. The research found that early mobilisation helped patients recover more quickly because it increased lung volume and enhanced functional activities.

The term “early mobilisation” is used here to describe the practise of beginning exercise and other forms of physical activity soon after surgery.

**Ethical clearance:** The Institutional Review Board (IRB) of a private hospital and institution in Chennai has given its approval for human research to be conducted in accordance with all relevant local, state, and federal laws and regulations. (Application Number 03/029/2022/ISRB/SR/SCPT).

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References


