RESEARCH ARTICLE

A Study to Assess the Effectiveness of Structured Teaching Programme on Knowledge Regarding Use of Incentive Spirometry Among Post Operative Patients Undergoing Cardiac Surgery in Parul Sevashram Hospital

Dr. Ravindra HN[1] and Mr. Nirav Patel[2]

[1]Dr. Ravindra HN, Principal of Parul Institute of Nursing, Parul University, Vadodara, Gujarat,

[2]Mr. Nirav Patel, MSc Final Year Nursing, , Parul Institute of Nursing, Parul University, Vadodara Gujarat. Email: 2309252040006@paruluniversity.ac.in

*Corresponding Author
Mrs. Arpita Pancholi

Abstract: *Introduction:* Incentive spirometry is a common post-operative intervention aimed at promoting optimal lung function and preventing respiratory complications (atelectasis, pneumonia, pulmonary oedema, pleural effusion, ARDS, pulmonary embolism) in post-operative patients undergoing cardiac surgery. This study aims to assess the effectiveness of a structured teaching program on knowledge regarding use of incentive spirometry among post-operative patients undergoing cardiac surgery in Parul Sevashram Hospital. *Objectives of the study:* 1. To assess the knowledge regarding use of incentive spirometry among the patients undergoing cardiac surgery in selected hospital. 2. To determine the effectiveness of structured teaching programme on knowledge regarding use of incentive spirometry among the patients undergoing cardiac surgery in selected hospital. 3. To find association between post-test knowledge and demographics variable regarding use of incentive spirometry among the patients undergoing cardiac surgery in selected hospital. *Material And Method:* The selection of research approach is basic procedure for the conduct of research enquiry. A research approach tells the researcher to know what data to collect and how to analyze the data. In the view of the problem selected and the objectives to be achieved, quantitative approach was considered appropriate for the study. A research design selected was one group pre-test and post -test design which belongs to the pre-experimental design. The samples of the study were the post operative patients undergoing cardiac surgery in PSH, Limda, Vadodara who meet the inclusive criteria. The sample size consisted of 30 samples were selected in PSH, Limda, Vadodara. They were selected based on inclusion criteria and their interest for the participation. The sampling techniques adopted for the study was non probability convenient sampling technique. The convenient sampling is a specific type of non-probability sampling method that relies on data collection from population subject who are conveniently available to participate in this study. The structured knowledge questionnaire was validated by total five experts out of four of medical surgical nursing, and one from doctor of critical care medicine. Result: This study reveals that, data collected from 30 samples, on effectiveness of structured teaching programmed on knowledge regarding use of incentive spirometry among post- operative patients undergoing cardiac surgery. Finding revealed that the mean post-test was higher than the mean pre- test score in research group. Pair t-test was used to analyze the effectiveness of knowledge regarding use of incentive spirometry. in research finding shows a knowledge regarding use of incentive spirometry is increase which was statistically significance at 0.05 level.

Kyewords: Effectiveness Incentive spirometry, post-operative care, Respiratory complications, Atelectasis. Pneumonia, Pulmonary edema, Pleural effusion.

INTRODUCTION

Incentive spirometry is a common post-operative intervention aimed at promoting optimal lung function and preventing respiratory complications (atelectasis, pneumonia, pulmonary oedema, pleural effusion, ARDS, pulmonary embolism) in post-operative patients undergoing cardiac surgery. This study aims to assess the effectiveness of a structured teaching program on knowledge regarding use of incentive spirometry among post-operative patients undergoing cardiac surgery in Parul Sevashram Hospital.

Objectives of the study:

1. To assess the knowledge regarding use of incentive spirometry among the patients undergoing cardiac surgery in selected hospital.

2. To determine the effectiveness of structured teaching programme on knowledge regarding use of incentive spirometry among the patients undergoing cardiac surgery in selected hospital.

3. To find association between post-test knowledge and demographics variable regarding use of incentive spirometry among the patients undergoing cardiac surgery in selected hospital.

MATERIAL AND METHOD

The selection of research approach is basic procedure for the conduct of research enquiry. A research approach tells the researcher to know what data to collect and how to analyze the data. In the view of the problem selected and the objectives to be achieved, quantitative approach was considered appropriate for the study.

A research design selected was one group pre-test and post-test design which belongs to the pre-experimental design. The samples of the study were the post operative patients undergoing cardiac surgery in PSH, Limda, Vadodara who meet the inclusive criteria. The sample size consisted of 30 samples were selected in PSH, Limda, Vadodara. They were selected based on inclusion criteria and their interest for the participation. The sampling techniques adopted for the study was non probability convenient sampling technique. The convenient sampling is a specific type of non-probability sampling method that relies on data collection from population subject who are conveniently available to participate in this study. The structured knowledge questionnaire was validated by total five experts out of four of medical surgical nursing, and one from doctor of critical care medicine.

RESULT

This study reveals that, data collected from 30 samples, on effectiveness of structured teaching programmed on knowledge regarding use of incentive spirometry among post- operative patients undergoing cardiac surgery. Finding revealed that the mean post-test was higher than the mean pre- test score in research group. Pair t-test was used to analyze the effectiveness of knowledge regarding use of incentive spirometry. in research finding shows a knowledge regarding use of incentive spirometry is increase which was statistically significance at 0.05 level.

TABLE 4.1: This section deals with description of socio-demographic variables of the post operative patients undergoing cardiac surgery.

SOCIO-DEMOGRAPHIC DATA OF POST OPERATIVE PATIENT UNDERGOING CARDIAC SURGERY OF HOSPITAL	FREQUENCY	PERCENTAGE
1) AGE		
A. 30 TO 40 years	0	00%
B. 41 to 50 years	5	16.66%
C. 51 to 60 years	10	33.33%
D. Above 61 years	15	50%
2) Gender		
A. Male	18	60%
B. Female	12	40%
3) Marital status		
A. Married	30	100%
B. Unmarried	0	00%
4) Monthly income		
A. Less than 5000	12	40%
B. 5001 to 10000	5	16.66%
C. 10001 to 15000	3	10%
D. More than 15000	10	33.33%
5) Post operative day		
A. 0 to 2nd	12	40%
B. 3rd to 4th	5	16.66%
C. 5th to 6th	4	13.33%
D. Above 7th	9	30%

6)Education		
A. Primary school	5	16.66%
B. Higher secondary school	5	16.66%
C. Undergraduate and post graduate	8	26.66%
D. No formal education	12	40%

Table 4.2.1: Analysis of data related to frequency and percentage distribution of pre-test and post-test knowledge scores of post operative patients undergoing cardiac surgery.

QUESTIONS	PRE-TEST		POST-TEST	
	F	%	F	%
1) In which position you should do incentive spirometry?	5	16.66	25	83
2) How do you inhale while incentive spirometry?	7	23.33	23	76
3) What is the therapeutic effect of using this device?	12	40	20	66
4) What type of complication may be avoided with the proper use of this device?	8	26.66	22	73
5) What is the recommended duration of incentive spirometry sessions?	4	13.33	26	86
6) Do you hold your breath when using an incentive spirometry?	12	40	18	60
7) What is the name of the device used to measure lung function in incentive spirometry?	10	33.33	18	60
8) How often should the incentive spirometer be cleaned and disinfected?	8	26.66	28	93
9) How many times you should do an incentive spirometry?	6	20	20	66
10) What should you do if you experience dizziness or discomfort while using the incentive spirometer?	8	26.66	22	73
11) How often should a patient use an incentive spirometer after cardiac surgery?	5	26.66	22	73
12) What is the primary purpose of using incentive spirometry?	7	23.33	28	93
13) How often should you typically use an incentive spirometer following your healthcare provider's instruction?	7	23.33	29	96
14) Which of the following is a common reason for prescribing an incentive spirometer?	6	20	29	96
15) Which part of the incentive spirometer indicates how well you are performing the exercise?	6	20	28	93
16) Before starting to use the incentive spirometer, you should:	4	13.33	25	83
17) What is a key benefit of using an incentive spirometer regularly?	4	13.33	23	76
18) What should a patient avoid before undergoing spirometry?	6	20	28	93
19) Which of the following surgeries is most likely to require post-operative spirometry?	8	26.66	28	93
20) Why is it important to use a spirometer regularly after surgery?	6	20	28	93

Table 4.2.2: Analysis of data related to frequency and percentage distribution of pre-test and post-test knowledge scores of post operative patients undergoing cardiac surgery. N=30

KNOWLEDGE	PRE-TEST		POST-TEST	
	F	%	F	%
POOR KNOWLEDGE	25	83.33	0	0

AVERAGE KNOWLEDGE	5	16.66	4	13.33
GOOD KNOWLEDGE	0	0	26	86.66

Table 4.3: Mean, Median, Mode, SD and range of knowledge score.

KNOWLEDGE SCORE	MEAN	MEDIAN	MODE	SD	RANGE
PRE-TEST	4.63	4	3	1.70	8
POST-TEST	16.28	17	18	2.28	11
DIFFERENCE	11.66	13	15	3.32	3

Above table deals with mean, median, mode, SD and range of pre-test and post-test knowledge score of primary school teachers.

The pre-test mean knowledge score was 4.63, median was 4, mode was 3, SD was 1.70 and range was 8. Whereas in post-test mean knowledge score was 16.28, median was 17, mode was 18, SD was 2.25 and range was 11. Therefore, overall difference in mean knowledge score was 11.66, median difference was 13, mode difference was 15, standard deviation difference was 3.32 and range difference was 3.

Table 4.4: Significance of mean difference between pre-test and post-test knowledge of adolescent girls regarding menstrual hygiene.

Knowledge score				Mean difference	SDD	SED	t-value		S
Pre-test		Post-test					Tabulated value	Calculated value	
Mean	SD	Mean	SD						
4.62	1.76	16.28	2.34	11.66	3.32	0.62	3.67	18.91	S

DF=28, P=0.001

Table no. 4.4 represents that pre-test knowledge mean score was 4.62, standard deviation was 1.76 and post-test knowledge mean score was 16.28 and standard deviation was 2.34. The mean difference of pre-test and post-test knowledge was 11.66, standard deviation difference was 3.32 and standard error was 0.62, as the calculated paired 't test value found to 18.91 which was higher than the tabulated value at 0.001 level of significance. Hence, it can be inferred that the STP was effective and there was significant improvement in knowledge regarding use of incentive spirometry among post-operative patients undergoing cardiac surgery of selected hospital. Therefore, research hypothesis H1 is accepted and null hypothesis H01 is rejected.

Table 4.5: Association between post-test knowledge score with selected demographic variables.

Socio-demographic variables	Post-test knowledge score of patients						Total	Chi square test
	Poor		Average		Good			
	F	%	F	%	F	%		
1)Age								
A. 30 to 40 years	0	0%	0	0%	0	0%	0	X2=1.29
B. 41 to 50 years	0	0%	1	3.33%	4	13.33%	5	Df=4
C. 51 to 61 years	0	0%	2	6.66%	8	26.66%	10	P=0.257
D. Above 61 years	0	0%	1	3.33%	14	46.66%	15	
2)Gender								
A. Male	0	0%	2	6.66%	16	53.33%	18	X2=0.02
B. Female	0	0%	2	6.66%	10	33.33%	12	Df=1
								P=0.882
3) Marital status								
A. Married	0	0%	4	13.33%	26	86.66%	30	X2=0.01
B. Unmarried	0	0%	0	0%	0	0%	0	Df=1
								P=0.00

4) Monthly income								
A. Less than 5000 INR	0	0%	0	0%	12	40%	12	X2=1.52
	0	0%	1	3.33%	4	13.33	5	Df=1
B. 5001 to 10000 INR	0	0%	1	3.33%	2	6.66%	3	P=0.218
	0	0%	2	6.66%	8	26.66%	10	
C. 10001 to 15000 INR								
D. More than 15001 INR								
5) Post operative day								
A. 0 to 2	0	0%	0	0%	12	40%	12	X2=1.76
B. 3 to 4	0	0%	1	3.33%	4	13.33%	5	Df=6
C. 5 to 6	0	0%	2	6.66%	2	6.66%	4	P=0.184
D. above 7	0	0%	1	3.33%	8	26.44%	9	
6) Education: A. Primary school B. Higher secondary school C. Undergraduate & Postgraduate D. No formal education	0	0%	3	10%	2	6.66%	5	X2=1.98
	0	0%	1	3.33%	4	13.33%	5	Df=1
								P=0.159
	0	0%	0	0%	8	26.66%	8	
	0	0%	0	0%	12	40%	12	

Table 4.5, represents the association between post-test knowledge score with selected demographic variables.

Age: The chi- square value 1.29 at $p < 0.05$ showed significant association of age with post- test knowledge score of patients.

Gender: The chi- square value 0.02 at $p < 0.05$ showed no significant association of gender with post-test knowledge score of the patients.

- Marital status: The chi- square value 0.01 at $p < 0.05$ showed no significant association of marital status with post-test knowledge score of the patients.
- Monthly income: The chi- square value 1.52 at $p < 0.05$ showed significant association of Monthly income with post-test knowledge score of the patients.
- Post operative day: The chi- square value 1.76 at $p < 0.05$ showed significant association of post operative day with post-test knowledge score of the patients.
- Education: The chi- square value 1.98 at $p < 0.05$ showed significant association of education with post-test knowledge score of the patients.

DISCUSSION

5.1.1. To assess the knowledge regarding use of incentive spirometry among the post operative patients undergoing cardiac surgery of hospital before and after structured teaching programmed.

In the present study, majority 25(83%) of patients were having poor knowledge score, whereas 5(16%) of them had moderate level of knowledge score and no one had adequate level of knowledge regarding use of incentive spirometry in the pre-test. After the administration of STP, in the post-test none of them were having poor knowledge score 4(13%) of them had moderate level of knowledge score and majority 26(86%) of them had adequate level of knowledge score.

Similar cross-sectional study was carried out in hospital. In that study aimed to test the hypothesis that the use of incentive spirometry in conjunction with postoperative pulmonary rehabilitation care has a notable impact on arterial blood gas, oxygen saturation (SpO2) and vital signs. In the experimental group, on post-op day 3, the

arterial partial pressure of oxygen (PaO2) (p = 0.01), arterial oxygen saturation (SaO2) (p = 0.002) and oxygen saturation (SpO2) (p < 0.001) values were statistically significantly higher. Additionally, on post-op day 3 the experimental group had significantly lower systolic blood pressure (p = 0.03), diastolic blood pressure (p = 0.004) and respiratory rate (p < 0.001).

5.1.2. To compare the pre-test and post-test knowledge score of post operative patients undergoing cardiac surgery regarding use of incentive spirometry.

In comparison to mean and standard deviation between pre-test and post-test knowledge score regarding use of incentive spirometry among post operative patients undergoing cardiac surgery of hospital, analysis of the result reveals that pre-test knowledge mean score was 4.63 with the standard deviation of 1.70 and post-test knowledge mean score was 16.28 and standard deviation was 2.28. The Mean difference between pre-test and post-rest knowledge score was 11.66 and it was statistically very high significant. Paired 't' test value was 18.91 which were highly significant at 0.001 level of significance. So, the STP was effective and there was significant improvement in knowledge regarding use of incentive spirometry among post operative patients undergoing cardiac surgery in hospital.

Currently, consensus on the effectiveness of incentive spirometry (IS) following cardiac, thoracic, and upper abdominal surgery has been based on randomized controlled trials (RCTs) and systematic reviews of lower methodological quality. To improve the quality of the research and to account for the effects of IS following thoracic surgery, in addition to cardiac and upper abdominal surgery, we performed a meta-analysis with thorough application of the Grading of Recommendations Assessment, Development and Evaluation scoring system and extensive reference to the Cochrane Handbook for Systematic Reviews of Interventions.

Thirty-one RCTs involving 3,776 adults undergoing cardiac, thoracic, or upper abdominal surgery were included. By comparing the use of IS to other chest rehabilitation strategies, we found that IS alone did not significantly reduce 30-day PPCs (RR = 1.00, 95% CI: 0.88-1.13) or 30-day mortality (RR = 0.73, 95% CI: 0.42-1.25). Likewise, there was no difference in LHS (mean difference = -0.17, 95% CI: -0.65 to 0.30) between IS and the other rehabilitation strategies. None of the included trials significantly impacted the sensitivity analysis and publication bias was not detected.

5.1.3. To association between post-test score with selected socio-demographic variables of post operative patients undergoing cardiac surgery of selected school such as age, gender, monthly income, post-operative day etc.

The statistical results of 'chi' square analysis reveals that there was no significant association between post-test knowledge scores and their selected demographic variables gender and marital status. The chi-square value are less than p-value showed there is significant association between age, monthly income, post-operative day, education with post test knowledge score of patients.

The same study conducted in that, The STP focused on adverse health effects of tobacco chewing, myths and facts, and tobacco cessation. It was administered in regional language to female hospital housekeeping personnel (N=35) over three days. Post-assessments were conducted at 4 weeks following the last session of the STP. Current tobacco use was reported by 26% of the sample. Tobacco chewers (vs. non-chewers) were more likely to be significantly older, have elementary education, belong to nuclear family, have lesser knowledge regarding harmful effects, and have a more favorable attitude toward the practice of tobacco chewing. At the end of 4 weeks following the STP, participants significantly improved their knowledge regarding the harmful health impact of tobacco chewing and how to quit (p=0.001), and showed a significantly less favorable attitude toward tobacco chewing (p=0.001). Change in participants' knowledge scores was found to be negatively correlated with change in attitude scores, implying that increase in knowledge was associated with less favorable attitude toward tobacco chewing (r=-0.427, p=0.011).

CONCLUSION

In pre-test there was lack of adequate knowledge regarding use of incentive spirometry among the post operative patients undergoing cardiac surgery of hospital but after the administration of STP there was significant improvement in knowledge of use of incentive spirometry in patients, it can be concluded that structured teaching programme is found to be an effective and feasible method of teaching strategy to improve knowledge of post operative patients undergoing cardiac surgery of Hospital.

REFERENCES

1. World Health Organization. *The Top 10 Causes of Death*. Fact Sheets, 2018.
2. Hillis, L. D., et al. "2011 ACCF/AHA Guideline for Coronary Artery Bypass Graft Surgery: Executive Summary." *Journal of the American College of Cardiology*, vol. 58, no. 24, 2011, pp. 2584–2614. doi:10.1016/j.jacc.2011.08.008.
3. Branson, R. D. "The Scientific Basis for Postoperative Respiratory Care." *Respiratory Care*, vol. 58, no. 11, 2013, pp. 1974–84. doi:10.4187/respcare.02832.
4. Mullen-Fortino, M., N. O'Brien, and M. Jones. "Critical Care of a Patient After CABG

Surgery." *Nursing2020 Critical Care*, vol. 4, no. 4, 2009, pp. 46–53.

5. Miskovic, A., and A. B. Lumb. "Postoperative Pulmonary Complications." *British Journal of Anaesthesia*, vol. 118, no. 3, 2017, pp. 317–34. doi:10.1093/bja/aex002.

6. Hulzebos, E. H., et al. "Preoperative Intensive Inspiratory Muscle Training to Prevent Postoperative Pulmonary Complications in High-Risk Patients Undergoing CABG Surgery: A Randomized Clinical Trial." *JAMA*, vol. 296, no. 15, 2006, pp. 1851–57. doi:10.1001/jama.296.15.1851.

7. Ferreira, G. M., et al. "Espirometria de Incentivo com Pressão Positiva Expiratória É Benéfica Após Revascularização Miocárdia." *Arquivos Brasileiros de Cardiologia*, vol. 94, 2010, pp. 246–51. doi:10.1590/S0066-782X2010000200017.

8. Massard, G., and J. M. Wihlm. "Postoperative Atelectasis." *Chest Surgery Clinics of North America*, vol. 8, no. 3, 1998, pp. 503–28.

9. Renault, J. A., et al. "Comparação entre Exercícios de Respiração Profunda e Espirometria de Incentivo no Pós-Operatório de Cirurgia de Revascularização do Miocárdio." *Brazilian Journal of Cardiovascular Surgery*, vol. 24, 2009, pp. 165–72. doi:10.1590/S0102-76382009000200012.

10. Shaban, M., et al. "Assessment of the Effects of Respiratory Exercise Education on Acute Respiratory Complications and Length of Hospitalization after CABG Surgery." *Hayat*, vol. 8, no. 2, 2002, pp. 12–20.

11. Oshvandi, K., et al. "Effect of Respiratory Exercises on the Prevalence of Atelectasis in Patients Undergoing Coronary Artery Bypass Surgery." *Avicenna Journal of Nursing and Midwifery Care*, vol. 27, no. 6, 2020, pp. 432–40. doi:10.30699/ajnmc.27.6.432.

12. Yánez-Brage, I., et al. "Respiratory Physiotherapy and Incidence of Pulmonary Complications in Off-Pump CABG Surgery: An Observational Follow-Up Study." *BMC Pulmonary Medicine*, vol. 9, no. 1, 2009, p. 36. doi:10.1186/1471-2466-9-36.

13. Freitas, E., et al. "Incentive Spirometry for Preventing Pulmonary Complications After Coronary Artery Bypass Graft." *Cochrane Database of Systematic Reviews*, vol. 3, no. 9, 2012, CD004466.

14. Grooms, D. A. "Postoperative Pulmonary Complications." *Clinical Foundations*, vol. 13, 2012, pp. 1–11.

15. Wynne, R., and M. Botti. "Postoperative Pulmonary Dysfunction in Adults after Cardiac Surgery with Cardiopulmonary Bypass." *American Journal of Critical Care*, vol. 13, 2004, pp. 384–93. doi:10.4037/ajcc2004.13.5.384.

16. Zarbock, A., et al. "Prophylactic Nasal Continuous Positive Airway Pressure Following Cardiac Surgery." *Chest*, vol. 135, no. 5, 2009, pp. 1252–59. doi:10.1378/chest.08-1602.

17. Westwood, K., et al. "Incentive Spirometry Decreases Respiratory Complications Following Major Abdominal Surgery." *The Surgeon*, vol. 5, no. 6, 2008, pp. 339–42.

18. Anandhi, D., and P. Divya. "Influence of Various Factors on Incentive Spirometry Values in Patients Undergoing Thoracotomy." *Annals of Physiotherapy and Clinical*, vol. 1, no. 1, 2018, pp. 1–5.

19. Nardi, P., et al. "Effect of Preoperative Respiratory Physiotherapy and Motor Exercise in Patients Undergoing Elective Cardiac Surgery: Short-Term Results." *Polish Journal of Cardio-Thoracic Surgery*, vol. 16, no. 2, 2019, pp. 81–87. doi:10.5114/kitp.2019.86360.

20. Carvalho, C. R. F., et al. "Incentive Spirometry in Major Surgeries: A Systematic Review." *Brazilian Journal of Physical Therapy*, vol. 15, 2011, pp. 343–50. doi:10.1590/S1413-35552011005000025.

21. Overend, T. J., et al. "Effect of Incentive Spirometry on Postoperative Pulmonary Complications: A Systematic Review." *Chest*, vol. 120, no. 3, 2001, pp. 971–78. doi:10.1378/chest.120.3.971.

22. Restrepo, R. D., et al. "Incentive Spirometry: 2011." *Respiratory Care*, vol. 56, no. 10, 2011, pp. 1600–04. doi:10.4187/respcare.01471.

23. Ünver, S., G. Kıvanç, and H. M. Alptekin. "Deep Breathing Exercise Education Receiving and Performing Status of Patients Undergoing Abdominal Surgery." *International Journal of Health Sciences*, vol. 12, no. 4, 2018, pp. 35–38.

24. Afrasiabi, A., K. H. Ansarin, and S. Salmasi. "Comparison of the Effect of Incentive Spirometry on Pulmonary Volumes and Arterial Blood Gases After CABG Surgery." *Armaghane Danesh*, vol. 11, no. 3, 2006, pp. 1–9.

25. Eltorai, A. E. M., et al. "Perspectives on Incentive Spirometry Utility and Patient Protocols." *Respiratory Care*, vol. 63, no. 5, 2018, pp. 519–31. doi:10.4187/respcare.05872.

26. Agostini, P., and S. Singh. "Incentive Spirometry Following Thoracic Surgery: What Should We Be Doing?" *Physiotherapy*, vol. 95, no. 2, 2009, pp. 76–82. doi:10.1016/j.physio.2008.11.003.

27. Gürlek, Ö., and M. Yavuz. "Cerrahi Kliniklerde Çalışan Hemşirelerin Ameliyat Öncesi Hasta Eğitimi Uygulama Durumları." *Anadolu Hemşirelik ve Sağlık Bilimleri Dergisi*, vol. 16, no. 1, 2013, pp. 8–15.

28. Fayyaz, F., and A. Ammar. "Preoperative Incentive Spirometry: Effectiveness to Improve Postoperative Oxygenation in Patients Undergoing CABG Surgery." *Professional Medical Journal*, vol. 23, 2016, pp. 1368–72.

29. Yazdannik, A., et al. "Effect of Incentive Spirometry on Arterial Blood Gases After CABG Surgery." *Iranian Journal of Nursing and Midwifery Research*, vol. 21, no. 1, 2016, p. 89. doi:10.4103/1735-9066.174761.

30. Moradyan, T., et al. "Effect of Planned Breathing Exercises on Oxygenation in Patients After Coronary Artery Bypass Surgery." *Iranian Journal of Cardiovascular Nursing*, vol. 1, no. 1, 2012, pp. 8–14.