

The Effect of Lotus Position on Dyspnoea Management in Intensive Care Unit

Vildan Kocatepe¹, Dilek Yildirim², Gulbeyaz Can³, Esra Bahceci⁴

Abstract

Objective: To determine the effect of lotus position on dyspnoea management.

Methods: The case-control study was conducted from June to November 2016 at a training and research hospital in Istanbul, Turkey, and comprised patients with lung disease in an intensive care unit. The patients were divided into an experimental group who were exposed to lotus position for dyspnoea management, while the control group was subjected to Orthopnoeic position. Data was collected using a patient description form, and the Medical Research Council Scale. Respiratory rate, oxygen saturation, heart rate and blood pressure for all subjects were noted. SPSS 22 was used for data analysis.

Results: Of the 35 subjects, 17(48.5%) were cases and 18(51.4%) were controls. The overall mean age was 61.48±15.51 years. There was a significant improvement in the intra-group respiratory rate, oxygen saturation, heart rate and systolic blood pressure in both groups ($p<0.05$). Patients in both groups were similar in their vital signs both before and after the intervention ($p>0.05$).

Conclusions: Both lotus and Orthopnoeic positions significantly improved dyspnoea-related variables, and lotus position was as effective as Orthopnoeic position.

Keywords: Dyspnoea, Dyspnoea management, Position, Lotus position, Orthopnoeic position.

(JPMA 70: 820; 2020). <https://doi.org/10.5455/JPMA.302643210>

Introduction

Dyspnoea refers to recognising the act of respiration, normally unrecognised, and/or making an attempt for respiration.¹ It is described by patients as "end of the world", "crash", "fish's becoming thirsty" and "feeling of dying".² Most of the intensive care units (ICUs) offer support and treatment services for respiratory diseases.³ Dyspnoea management in ICUs are important in terms of patient comfort and improvement of the quality of life. As well as pharmacological methods, like bronchodilators, opioids and anxiolytics, non-pharmacological methods, such as bed-rest, appropriate positioning, acupuncture, relaxation exercises, hand fan, respiration exercises and oxygen support, are used.^{4,5}

A non-pharmacological method, positioning increases oxygenation by enhancing ventilation-perfusion mismatch. Putting a patient in an appropriate position

can decrease the rate of using expensive treatment alternatives and invasive interventions, and can increase oxygenation without causing trauma.⁶ There have been several studies on the effects of positions on oxygenation and some variables likely to be used for evaluation of some factors causing respiratory distress.⁷⁻¹¹ While some studies showed that giving a position was effective in oxygen saturation and respiratory function tests,¹² other studies reported otherwise.¹³ It has been reported that patients with dyspnoea present to healthcare centres and most frequently have very low oxygen saturation on peripheral tissue oxygenation measurements, and prefer Orthopnoeic position.¹⁴

Although there have been studies about positions for dyspnoea management, there is insufficient evidence about which patients and how long they shall be given a certain position and which position offers better oxygenation.⁴ To clarify these issues, new randomised controlled trials (RCTs) are needed. The current study was conducted to determine the effect of lotus position on dyspnoea management compared to Orthopnoeic position.

¹ Department of Nursing, Acibadem Mehmet Ali Aydinlar University, Istanbul, Turkey; ²Department of Nursing, Istanbul Sabahattin Zaim University, Istanbul, Turkey; ³Florence Nightingale Nursing, Istanbul University, Istanbul, Turkey; ⁴Respiratory Intensive Care Unit, Sureyyapasa Chest Diseases and Thoracic Surgery Training and Research Hospital, Istanbul, Turkey.

Correspondence: Vildan Kocatepe. e-mail: vildan.kocatepe@acibadem.edu.tr

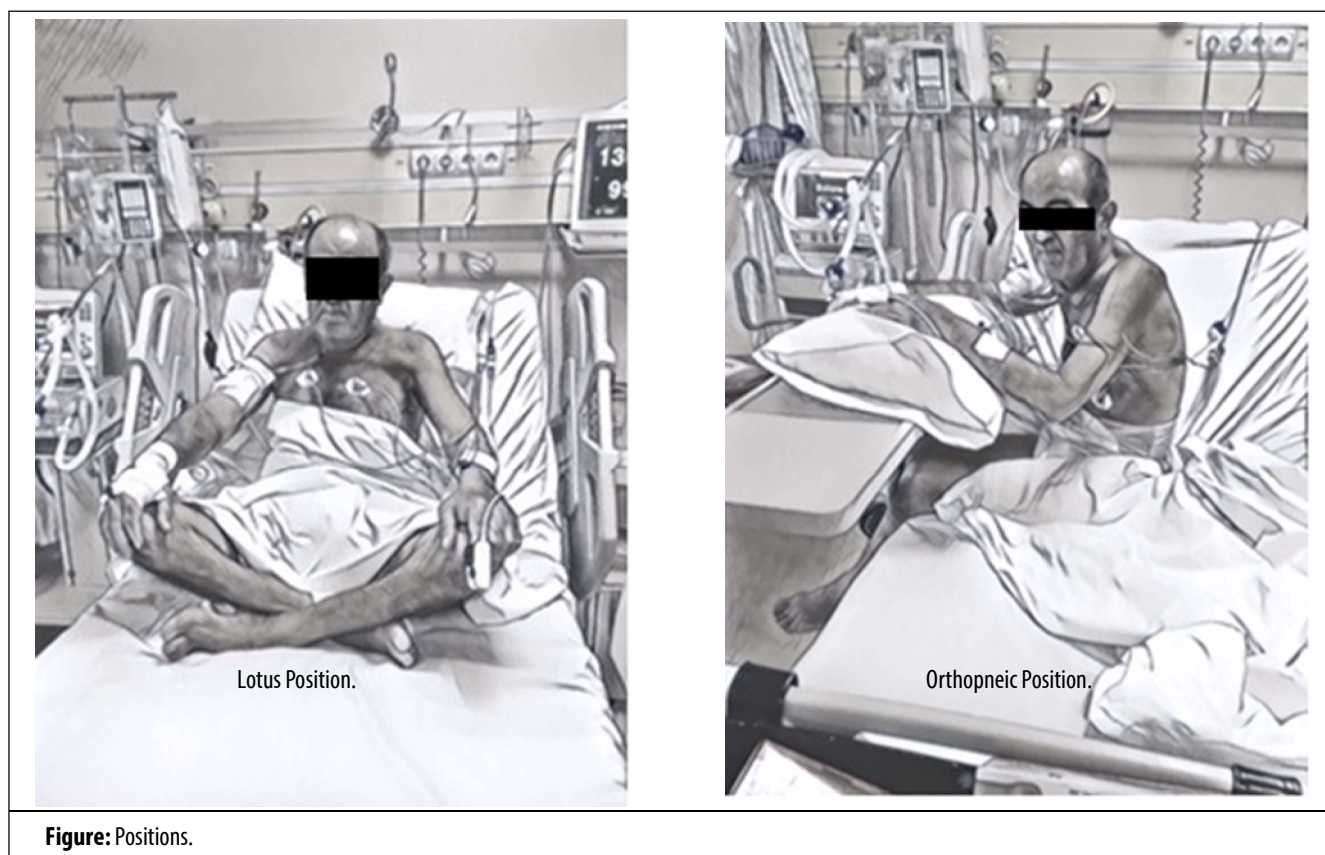


Figure: Positions.

Patients and Methods

The case-control study was conducted from June to November 2016 at a training and research hospital in Istanbul, Turkey, and comprised patients of either gender aged >18 years with lung disease in second- and third-degree ICUs. Approval was obtained from the Medical Research Evaluation Committee of Acibadem Mehmet Ali Aydinlar University, Istanbul (2016-11/13) and a written permission was obtained from the General Directorate of the hospital where the study was conducted. Those included were volunteers receiving standard medical treatment with ongoing oxygen support, had no uncontrolled heart disease, neuromuscular disease or neurological disease. Those excluded were patients having physical obstacles that prevented the execution of Orthopnoic and lotus positions, and those having any chronic illness that might have prevented the execution of any of the two positions. Using a randomisation checklist, the patients included were assigned either to the experimental group which was exposed to lotus position, or to the control group which was exposed to Orthopnoic position.

After getting written informed consent from the subjects, general characteristics of the patients were recorded and vital signs, like respiratory rate (RR), heart rate (HR), blood pressure (BP) and oxygen saturation (O_2 Sat) was recorded on the study proforma. When a dyspnoea attack developed, the patients in the experimental group were instructed to lotus (put their feet on the opposing thighs and their hands on their knees) until their vital signs returned to normal. The patients in the control group were instructed to adopt the Orthopnoic position (sit down by leaning forward) (Figure). In the fifth minute after the patients were put in the above positions, vital signs and duration of dyspnoea were recorded. Dyspnoea severity was determined using the Medical Research Council Scale (MRCs).¹⁵ It is based on various physical activities causing dyspnoea, and has five items. Patients mark the best degree of their dyspnoea on a 0-5 scale in which 0 corresponds to dyspnoea due to exercise, and 5 corresponds to dyspnoea even when getting dressed and taking off clothes.¹⁶

The patient description form (PIF), generated in light of literature, comprised 14 questions about socio-

demographic features, of which eight were open-ended.^{1,2,8,16}

Data was analysed using SPSS 22. In order to express the differences between the intervention and the control groups, frequency and percentage distribution, mean and standard deviation as well as median and interquartile ranges (IQRs) were used.

Comparative nonparametric Mann-Whitney U test was used for comparison of continuous variables across groups if data did not fit normal distribution. Nonparametric Wilcoxon rank test was used to determine the difference between the related group mean values, with $p < 0.05$ being significant.

Results

Of the 35 subjects, 17(48.5%) were cases and 18(51.4%) were controls. The overall mean age was 61.48 ± 15.51 years. It was 62.05 ± 16.13 years in the experimental group and 60.94 ± 15.34 years in the control group ($p = 0.754$). In the experimental group, 11(64.7%) patients were male, while there were 16(88.9%) males in the control group. Besides, 14(82.4%) patients in the experimental group and 15(83.3%) in the control group were married. Also, 10(58.8%) patients in the experimental group and 7(49.9%) in the control group were secondary school graduates.

The duration of ICU stay was 4.35 ± 2.99 days in the experimental group and 6.76 ± 7.24 days in the control group. The frequency of presenting to the emergency

unit with dyspnoea in the preceding year was 2.31 ± 1.66 in the experimental group and 3.00 ± 2.76 in the control group. Seven (41.2%) patients in the experimental group were smokers and 5(29.4%) were ex-smokers. Ten (55.6%) patients in the control group were smokers and 5 (28.8%) were ex-smokers. Time since having given up smoking was 20.8 ± 9.52 years in the experimental group and 16.75 ± 15.35 years in the control group. Also, 8(47.1%) patients in the experimental group and 10 (55.6%) in the control group had chronic obstructive lung disease (COLD). Seven (41.2%) patients in the experimental group and 7 (38.9%) in the control group felt most comfortable in semi-Fowler's position in general; 15(88.2%) and 15(83.3%) patients were administered oxygen in the two groups respectively, with the amount of oxygen administered being $.8 \pm 2.91$ litre/min in the experimental group and 5.2 ± 2.14 liter/min in the control group.

The mean MRCS score was 2.76 ± 0.91 in the experimental group and 2.89 ± 0.90 in the control group ($p = 0.664$). General characteristics and treatment features were similar in both the groups ($p > 0.05$).

There was no significant difference in RR, O₂ Sat, HR and systolic BP between the groups ($p \geq 0.05$), but diastolic BP was higher in the control group ($p = 0.036$).

There was a significant improvement in RR, O₂ Sat, HR and systolic BP in both groups after positioning (Table).

Table: The IVF center websites evaluated according to AMA, ACOG, and ASRM ethics committee guidelines..

	Lotus Position		Orthopneic Position		Vital signs after positioning	
	Before Position Mean ± SD	After Position Mean ± SD	Before Position Mean ± SD	After Position Mean ± SD	U-test	p-value
Respiratory Rate	29.65±5.16	22.64±3.52	31.67±4.74	23.00±1.10	143.5	0.752
W	-3.521	-3.736				
p-value	0.001*	0.001*				
Oxygen Saturation	83.94±2.30	93.52±2.03	84.67±2.95	93.55±2.28	148.5	0.880
W	-3.626	-3.737				
p-value	0.001*	0.001*				
Heart Rate	111.41±17.90	99.76±17.83	108.33±18.08	96.56±14.94	138.5	0.632
W	-3.364	-3.426				
p-value	0.001*	0.001*				
Systolic BP	131.17±35.46	126.47±16.31	143.00±21.44	126.47±16.30	126.5	0.381
W	-2.368	-3.203				
p-value	0.018*	0.001*				
Diastolic BP	69.29±8.96	66.17±10.24	77.61±12.30	72.50±13.28	103.0	0.098
W	-1.566	-2.359				
p-value	0.117	0.018*				
Duration of Dyspnoea		61.53±23.08		64.33±35.66	143.0	0.741

W= Wilcoxon W test was used. Statistically significant outcome values are in bold., U= Mann Whitney U test was used. SD: Standard deviation; BP Blood pressure.

Discussion

It has been reported in literature that smoking status of patients has an effect on their perception of dyspnoea, and that smokers have a higher degree of dyspnoea.¹⁷ In the present study, the rate of smokers was similar in the experimental and control groups. This masqueraded the effect of smoking on the degree of dyspnoea.

The disease in which the positive effect of the body position on respiratory functions can be best observed is COLD in which patients suffer from dyspnoea due to increased mechanical load of inspiratory muscles, weakened inspiratory muscles, increased ventilatory drive, gas exchange disorders, dynamic airway compression and cardiovascular problems.¹⁸ In the current study, more than half the patients in both the experimental and control groups had COLD. This might have hindered revealing differences due to diagnoses of the patients.

During dyspnoea, most patients have Orthopnoeic, lateral or supine positions without realising it. These positions allow abdominal breathing, which helps patients feel more comfortable. Since they facilitate the use of respiratory muscles, regulate hydrostatic pressure in thorax, reduce cardiac preload and allow the most effective use of oxygen, they relax patients. In a case study, effects of lotus position used by a patient with cystic fibrosis on respiratory functions were examined. In the report, effects of this position were compared with those of standing and sitting. Lotus position increased O₂ Sat, diastolic BP and forced vital capacity (FCV), and decreased HR, RR, systolic BP compared to the other two positions. However, in the present study, there was no significant difference between lotus and Orthopnoeic positions, and both the positions reduced RR, HR, systolic and diastolic BP, and increased O₂ Sat. This suggested that the lotus position, utilised in psychological relaxation methods like yoga, could decrease the perception of dyspnoea since dyspnoea is a subjective condition.

It is known that Orthopnoeic position decreases dyspnoea by allowing the diaphragm to slide forward and upward further by increasing the movements of accessory muscles like sternocleidomastoid and scalene muscles.¹⁹ In a study on 40 patients with lung cancer and 140 healthy individuals, effects of six positions (standing, supine, sitting upright, Orthopnoeic, lying on the right side and lying on the left side) were compared.

The Orthopnoeic position did not create a difference in the healthy individuals, but it was most frequently preferred by patients with moderate and severe dyspnoea, and caused the highest increase in inspiration and expiration pressures.²⁰

In an experimental study on 17 patients with COLD, the patients were put in supine, standing, sitting upright and Orthopnoeic positions and their respiratory functions were evaluated. It reported that the Orthopnoeic position was effective in the reduction of dyspnoea and enhancement of respiratory functions in 7 patients.¹⁸ The Orthopnoeic position has been shown to relax accessory muscles, change ventilation per minute, increase oxygenation and reduce transdiaphragmatic pressure by allowing the elevation of the thoracic chest.^{18,20} In the present study, vital signs and O₂ Sat also improved in the patients who were put in the Orthopnoeic position.

An RCT comprising 24 stroke patients investigated the effects of four positions. It measured arterial O₂ Sat when the patients lay on the hemiplegic side at an angle of 45 degrees, lay on the non-hemiplegic side at an angle of 45 degrees, sat on a bed raised at its head-end at an angle of 70 degrees, and sat in an armchair. The RCT reported that these positions had no effects on arterial O₂ Sat, which was >90% in all the positions.¹³ The reason why the results differed from those of the present study is that the earlier sample did not include patients with lung diseases.

In a case report, the COLD patient felt comfortable in prone position. This position was reported to relax the patient by increasing the movement of the diaphragm and by mobilisation of secretions.²¹ However, there have been no other studies on patients with COLD showing that prone position is effective. This position is rather used in patients with acute respiratory distress syndrome (ARDS). In other studies on patients with ARDS, prone position was found to improve oxygenation.^{22,23} While patients change from supine position to prone position, secretions are mobilised thanks to the effect of gravity. In addition, the alveoli closed in supine position tend to open and this causes the heterogeneous structure of the lungs in ARDS to change and to acquire a more homogenous structure. Since there have not been sufficient studies on the effect of prone position in lung diseases, the position is not recommended for all the patients.

In a study including 60 patients, peripheral O₂ Sat was found to be higher in sitting and supine positions than in lateral lumbar puncture position.²⁴ In a study on COLD patients, supine and sitting positions were compared and inspiration and expiration pressures were found to be higher in the sitting position. Some non-mechanical variables, including body mass index (BMI), FEV1 and arterial blood gas (ABG) values, and some mechanical variables, like lung volumes and positions, were shown to affect inspiratory muscles.²⁵ In the present study, the lotus position, a type of sitting position, was found to have a positive influence.

In the present study, lotus position was found to have effects similar to the orthopnoeic position. Therefore, it can be suggested that positions appropriate for patients' conditions should be selected during dyspnoea, and that patients' preferences should be taken into consideration.

The current study has its limitations. The sample size was small, and related to a single hospital. Besides, all patients meeting the inclusion criteria within the study period were targetted when using a scientific and systematic way based on proper statistical formulation to raise the sample would have been better.

Conclusion

The orthopnoeic position enhanced physiological parameters of the patients, but the lotus position had similar effects as well.

Disclaimer: None.

Conflict of Interest: None.

Source of Funding: None.

References

- Mirici A. Approach to respiratory system symptoms. In: Erol C, ed. *Respiratory System Diseases*. Ankara: Nobel Tip Press; 2011, p1-11.
- Kocatepe V, Karadakovan A, Kav S, Aydiner A, Can G, Meron T, et al. Dyspnoea. In: Can G, ed. *Evidence-Based Palliative Care In A Cancer Patient*. Istanbul: Nobel Tip Press; 2018, p. 19-41.
- York M. Management of clients with parenchymal and pleural disorders. In: Black JM, Hawks JH, Keene AM eds. *Medical Surgical Nursing*. Philadelphia: WB. Saunders Co.; 2001, P.1726-39.
- Bausewein C, Booth S, Gysels M, Higginson I. Non-pharmacological interventions for breathlessness in advanced stages of malignant and non-malignant diseases. *Cochrane Database of Syst Rev* 2008; 2: CD005623.
- Booth S. Science supporting the art of medicine: improving the management of breathlessness. *Palliat Med* 2013; 27: 483-5.
- Onarici M, Karadag M. Importance of positioning on prevention of ventilator-associated pneumonia among patients undergoing mechanical ventilation. *J Hacettepe Uni Faculty Nurs* 2015; 2: 70-4.
- Johannigman JA, Davis K, Miller SL, Campbell RS, Luchette FA, Frame SB, et al. Prone positioning for acute respiratory distress syndrome in the surgical intensive care unit: who, when and how long? *Surgery* 2000; 128: 708-16.
- Hakverdioglu G. The pulse oximetry using in assessment of oxygen saturation. *Ege Universitesi Hemsirelik Yuksek Okulu dergisi* 2007;11:45-9.
- Leung RS, Bowman ME, Parker JD, Newton GE, Bradley TD. Avoidance of left lateral decubitus position during sleep in patients with heart failure: relationship to cardiac size and function. *J Am Coll Cardiol* 2003; 41: 227-30.
- Fujita M, Miyamoto S, Tambara K, Budgell B. Trepopnea in patients with chronic heart failure. *Int J Cardiol* 2002; 84: 115-8.
- Pump B, Talleruphuus U, Christensen NJ, Warberg J, Norsk P. Effects of supine, prone, and lateral positions on cardiovascular and renal variables in humans. *Am J Physiol Regul Integr Comp Physiol* 2002; 283: R174-80.
- Martinez JA, Rodrigues HBO, Portelinha AM. A novel position for postural relief of Dyspnoea. *Bras Pneumol* 2011; 37: 829-30.
- Chatterton HJ, Pomeroy VM, Connolly MJ, Faragher EB, Clayton L, Tallis RC. The effect of body position on arterial oxygen saturation in acute stroke. *J Gerontol A Biol Sci Med Sci* 2000; 55: M239-44.
- Cankurtaran M, Ariogul S. Heart Failure in Elderly. *Klinik Gelismis* 2004; 17: 90-100.
- Fletcher C. The clinical diagnosis of pulmonary emphysema: an experimental study. *Proc R Soc Med* 1952; 45: 577-84.
- Demir G, Acican T. Clinical approach and assessment of Dyspnoea in COPD. In: BartuSaryal S, Acican T, eds. *Chronic Obstructive Pulmonary Disease*. Ankara: BilimselTipPress; 2003, p.35-48.
- Taspinar B, Gul C, Taspinar F, Aksoy CC, Afsar E. The perception of Dyspnoea and fatigue in young adult smokers. *SDU The Journal of Health Sci* 2015; 6: 15-9.
- Sharp JT, Druz WS, Moisan T, Foster J, Machnach W. Postural relief of Dyspnoea in severe chronic obstructive pulmonary disease. *Am Rev Respir Dis* 1980; 122: 201-11.
- Henderson Y. A practical approach to breathing control in primary care. *Nurs Stand* 2008; 22: 41-3.
- O'Neill S, McMacrthy DS. Postural relief of dyspnoea in severe chronic airflow limitation: relationship to respiratory muscle strength. *Thorax* 1983; 38: 595-600.
- Ozturk O, Has M, Kiztanir S, Akkaya A, Saygin M, Gonca T, et al. The patient sleeping on prone position: case report. *Ege Universitesi Hemsirelik Yuksek Okulu dergisi* 2010;1:101-7.
- Lewejohann JC, Dupree HJ, Lewejohann S, Muhl E, Bruch HP. The importance of prone position in ARDS for the improvement of oxygenation index. *Crit Care* 1999; 3: P035.
- Langer M, Mascheroni D, Morcolin R, Gattinoni L. Prone position in ARDS patients. a clinical study. *Chest* 1988; 94: 103-7.
- Fujikura K, Fukuda T, Furukawa H, Toyooka H. Peripheral oxygen saturation falls in the lateral lumbar puncture position. *Can J Anaesth* 2004; 51: 741-2.
- Hejdra YF, Dekhuijzen PN, Van Herwaarden CL, Folgering HT. Effects of body position, hyperinflation, and blood gas tensions on maximal respiratory pressures in patients with chronic obstructive pulmonary disease. *Thorax* 1994; 49: 453-8.