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Article Review

The Prone Position Improves the Oxygenation Status of Patients with COVID-19 (Systematic Review-Meta Analysis)

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ABSTRACT

Hypoxemia in Corona Virus 19 patients requires supportive and rehabilitative treatment. PP is a technique that is considered to be safe for improving patient oxygenation. This review aimed to determine a cumulative effect of PP on oxygenation status in COVID-19 patients.The method used The search was carried out independently and systematically on the ProQuest, PubMed, Science Direct, Google Scholar and Semantic Scholar databases from January 2020, until June 2022. Article screening was carried out through 3 stages: screening duplicate articles, titles and abstracts, and full-text screening by the expected criteria with preferred Items for PRISMA Standards. The quality assessment of the article uses the Joanna Briggs Institute (JBI) checklist form and the Review Manager software. The results A total of 323 articles were evaluated using an RCT or Quasi Experiment design with a control group. It was found that PP had an influence on changes in the value of the ROX index, PaO2/ FiO2 Ratio, SPO2, and SaO2 / FiO2 Ratio with p-value 0.05. Qualitatively, several positive results were obtained from the synthesis of each research. PP was assessed using a ventilation-perfusion matching mechanism in increasing oxygenation and preventing lung injuries.It is concluded that PP was considered safe even though it caused side effects but it could still be done with good monitoring from health providers.

Keywords : Covid 19, Prone Position, Systematic Review, Meta-Analysis

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INTRODUCTION

The Corona Virus 19 pandemic that began in 2020 is a global problem. The WHO reported 425 million Corona Virus 19 cases and 5.89 million fatalities by February 2022 [1]. The Indonesian Ministry of Health reported 5.2 million confirmed cases and 146 thousand deaths until February 2022. Corona Virus 19 symptoms range from asymptomatic to mild discomfort without viral pneumonia or hypoxia [2]. According to the CDC, Corona Virus 19 patients may experience loss of smell and taste (Anosmia), rapid decreases in oxygen saturation without shortness of breath, or "happy hypoxia" [3]. Given the unique nature of this problem, the appropriate response from management must be quick and precise. The severity of the disease or the patient's clinical condition is used to determine how the disease should be managed. Patients with mild symptoms can live on their own with the help of some supportive treatments. Patients who have moderate to severe symptoms should be hospitalized and well-monitored[1]. However, the patient's oxygenation situation worsens due to the extremely high rate of therapy failure[4,5].

COVID-19 with hypoxaemia require supportive and rehabilitative therapy to reduce the severity of their symptoms and the risk of

death. Rehabilitative supportive treatment for Corona Virus 19 individuals with severe symptoms involves posture management, breathing exercises, and Neuromuscular Electrical Stimulation (NMES), including Prone NMES. Positioning oxygen-boosting treatment[6] . Prone position (PP) has been the subject of numerous studies to see whether it improves the oxygenation levels in COVID-19. This is a constraint due to the fact that the measurement will be affected by the variety of study methods.

A study revealed a significant increase in oxygen saturation during days 1-3 ($P<0.01$) and PaO2: FiO2 increased significantly on days 4-7 with a value of $P<0.05$[7]. While another study reported that there was an increase in SPO2 in the first 10 minutes from 91.09% to 95.30% and increased to 95.48% in the next 30 minutes[8]. Similar findings were obtained from studies that claimed that PP had an impact on the oxygenation of Corona Virus 19 patients [9–11]. Numerous studies have shown positive effects on oxygenation status; however, practitioners face challenges in determining which evidence should be used as a reference basis for decision-making concerning health services for COVID-19 patients who experience oxygenation disorders due to the wide variation in the application of PP and the quality of diverse research and diverse methods. For this reason, a Systematic Literature Review (SLR) or Meta-Analysis of these studies is necessary to ascertain usage trends and the impact of prone positions on patient oxygenation. Some of the studies that have conducted SLR and meta-analysis include the research of Chua, *et al.*, Li, *et al.*, Reddy, *et al.*, and Tan, *et al.* including the types of Cohorts, RCT and Quasi-Experimental research[12–15] Research of Barone-adesi, *et al.* and Pb, *et al.* only includes cohort studies while cohort research is observational[16,17] . Thus, this review aimed to determine a cumulative effect of PP on oxygenation status in Corona Virus 19 patients.

METHOD

Design

Preferred Reporting Items for PRISMA standards for systemic reviews and meta-analyses criteria, the research employs a variety of systematic literature reviews and meta-analyses.

Study criteria and search strategies

The following keywords were used in the search on the databases of Proquest, Pubmed, Science Direct, Google Scholar, and Semantic Scholar.: (1) "Corona Virus OR nCoV-2 OR Covid-19 OR SARS-Cov2"; (2). (3) "Oxygenation Status OR Oxygenation OR Respiratory OR Respiration"; "Prone Position OR Prone Positions OR PP OR Awake Prone Position". The inclusion criteria for study articles are as follows: adult patient population with Corona Virus 19 and impaired oxygenation status; PP interventions; RCT or quasi-experimental design with a control group; publication between January 2020 and June 2022; and original research. Article screening was carried out through 3 stages: screening duplicate articles, titles and abstracts, and full-text screening by the expected criteria.

Data extraction

Two reviewers independently extracted the following data using a standard form created by the investigator, utilizing the unique code assigned to each eligible study.

Risk of Bias Assessment

Two reviewers critically appraised all included papers using the JBI standard critical appraisal checklist for experimental design (http://www.joannabriggs.org/).

Data analysis

Cochran's Q was used to test for heterogeneity, and the I2 statistic was used to characterize it; values of 25%, 50%, and >75% indicate low, moderate, and high degrees of heterogeneity. When I2 was greater than 75%, a random-effects model was chosen to summarize the results. To handle the diversity, we ran some subgroup analysis.

RESULTS

The search yielded 323 articles, which were then screened and subjected to a feasibility test. The results showed that all 25 articles were feasible. The 25 articles were then subjected to a qualitative and quantitative synthesis, with as many as 25 entering the qualitative synthesis stage and only 11 entering the quantitative synthesis stage due to 14 being ruled ineligible for the quantitative analysis stage (Figure 1).

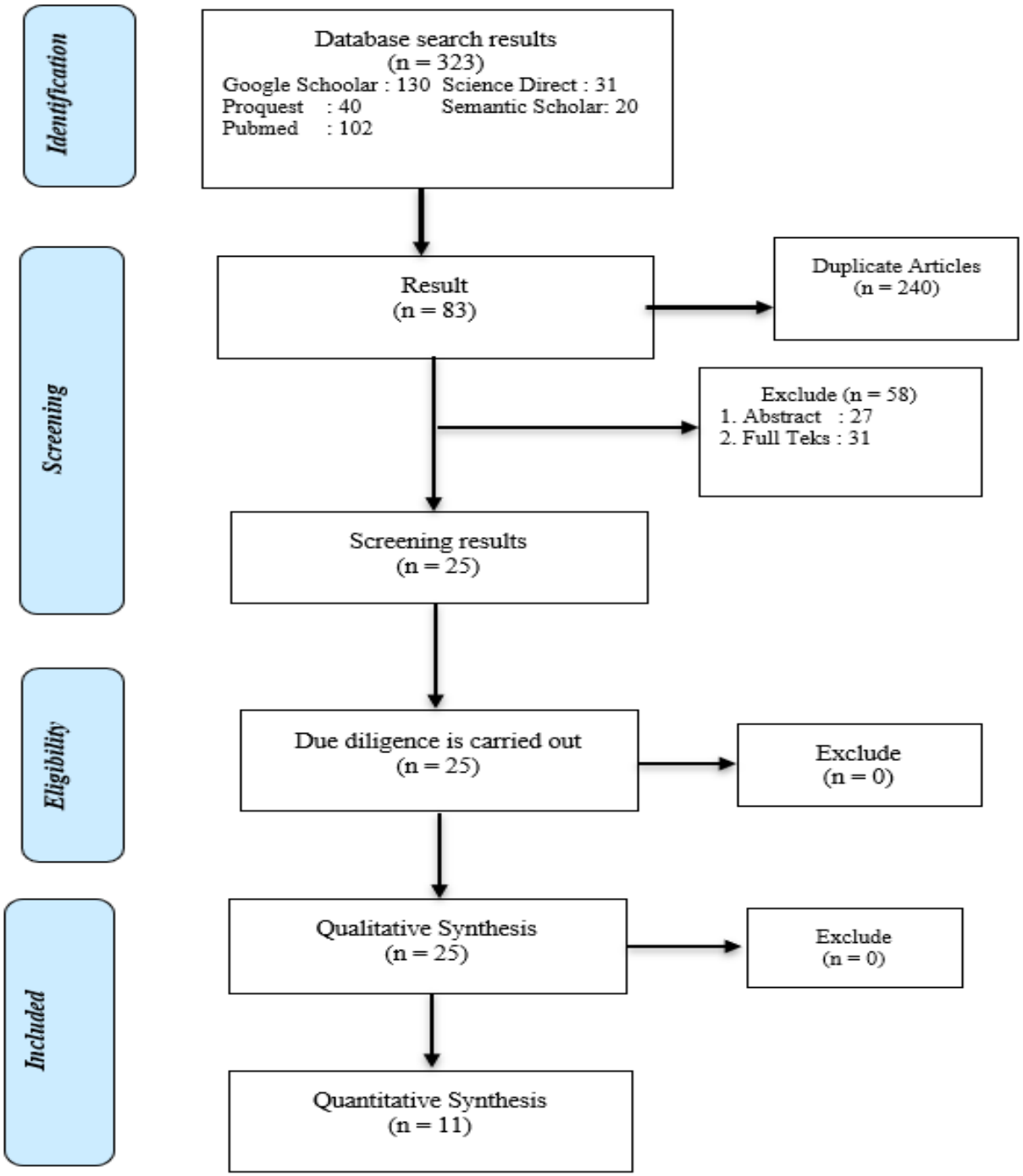


Figure 1. PRISMA Flow Chart

Study Characteristics

A total of 25 articles were screened and declared eligible for entry at the data analysis stage. A total of 15 (60%) research articles were RCT-designed and another 10 (40%) were quasi-experimental. Each study used a different sample size of 14 (56%), which used a sample size of <50 respondents. Based on the use of intubation, as many as 22 articles (88%) intervened in the non-intubated population. For the duration of PP used, most studies applied PP >4 hours (36%) and unspecified (36%) in the sense of adjusting the ability of respondents, while the other 28% applied PP in a period of <4 hours. The oxygenation parameters found in each study were very diverse, but most used the oxygenation parameters SPO2/FIO2, SPO2, and PaO2 (Table 1).

Table 1. Characteristics of included study

Name of Researcher (Year)	Country	Study Design	Sample size	Intervention Group	Control Group	Characteristics of Respondents	Pronation Administration	Outcome	
Erhmann, et al (2021)	Canada, Francis, Ireland, Mexico, USA, Spain	*RCT*	1126 Respondents	567 Respondents received a prone position	559 Respondents received standard care	Adult patients with acute hypoxaemic respiratory failure due to CORONA VIRUS 19 and requiring intubation	Patients were instructed and assisted to perform PP as long and as often as possible.	SpO2, FiO2, respiratory rate, and ROX index increased significantly during the first PP session.	
Taylor, et al (2020)	United States	*RCT*	40 Respondents	27 Respondents received Awake PP	13 Respondents received standard care	Adult patients declared CORONA VIRUS 19 with oxygen saturation ≥93% without requiring mechanical ventilation	PP is carried out for at least 48 hours or until there is an indication of intubation, transfer to the ICU unit, hospital discharge, or death.	SaO2/FiO2 Intervention After Mean = 233% SD = 63% Control After Mean = 224% SD = 104%	Patients in the UC group had a median S/F ratio of 216 compared to 253 in the APPS group.
Johnson, et al (2021)	United States	*RCT*	30 Respondents	15 Respondents performed PP	15 Respondents received standard care	Adult patients with confirmed Corona Virus 19 non-intubation	PP was performed during the day every 4 hours for 1-2 hours or as long as tolerated and at night. .	The change in PaO2/FiO2 at 48 h was significantly worse in the PP group compared to the usual care group.	
Rosen, et al (2021)	Sweden	*RCT*	75 Respondents	36 *awake prone position* (APP)	39 Respondents received standard care	Adults with confirmed Corona Virus19 were given a high-flow nasal cannula or non-invasive ventilation, as well as a PaO2/ratio FiO2 of 20 kPa.	PP was performed 16 hours per day for 30 days.	PP technique improved posture but did not reduce intubation.	
Kharat, et al (2020)	Switzerland	*RCT*	27 Respondents	10 Respondents did Self-prone	Respondents 17 standard care respondents	Patients diagnosed with Corona Virus 19 and not using mechanical ventilation	PP is instructed every 4 hours as long as the respondent can and is measured every 24 hours.	PaO2/FiO2 Ratio Intervention After Mean = 99% SD = 27.2% **Control** **After** Mean = 93.2% SD = 25%	Coronavirus 19 patients on low-flow oxygen therapy had a clinically significant decrease in oxygen flow when lying self-prone. Median oxygen flow was 1.0 L min1 and saturation/inspiration oxygen ratio fraction was 390 in the PP group

								ROX Intervention Before Mean = 3.2 SD = 0.8 After Mean = 7.3 SD = 1.4 Control Before Mean = 3.4 SD = 0.5 After Mean = 5.2 SD = 0.9	and 336 in the control group.
Jayakumar, et al (2021)	India	*RCT*	60 Respondents	30 Respondents self-prone for 6 hours per day	30 Respondents' standard care	Adults with non-intubated Corona Virus 19 pneumonia who have developed acute hypoxic respiratory failure.	Patients performing PP for at least 6 hours a day (cumulative)	PaO2/FiO2 Intervention Before Mean = 198.6% SD = 126.1% After Mean = 198.5% SD = 87.6% Control Before Mean = 201.4% SD = 118.8% After Mean = 171.7% SD = 100.6%	No significant difference in fluid balance, length of stay, respiratory escalation, drug use, or mortality between groups.
Gad, et al (2021)	Egypt	*RCT*	30 Respondents	15 Respondents prone position	15 Respondents using NIV	Adult patients (>18 years) diagnosed with CORONA VIRUS 19 without intubation	Both PP and NIV last for 1 to 2 hours according to patient tolerance in each session with 3 hours apart during waking hours	PaO2 intervention Pre Mean = 126 mmHg SD = 21 mmHg Mean = 107 mmHg SD = 12 mmHg Control Before Mean = 123.5	PP or NIV raised mean saO2 and paO2 to 93.9% and 107.12 mmHg, respectively, while NIV had a lower mean pacO2 and 20% ICU mortality.

							mmHg SD = 22.5 mmHg After Mean = 129 mmHg SD = 11 mmHg		
Fralick, et al. al (2022)	Canada	*RCT*	248 Respondents	126 Respondents prone to group	122 Respondents in the control group (standard care)	Adult patients with confirmed or diagnosed Corona Virus 19 and requiring supplemental oxygen (up to 50% inspired oxygen fraction) and non-intubation	PP was performed at 72 hours first and continued according to the patient's ability within 7 days	SaO2/FiO2 Intervention Before Mean = 300,7% SD = 21.6% After Mean = 331.5% SD = 64.1% Control Before Mean = 304% SD = 20.7% After Mean = 336 mmHg SD = 91 mmHg	The median (IQR) S/F ratio after 72 hours is 336 (216-438) PP and 336 (232-443) controls, with no difference between the two groups.
Garcia, et al (2021)	Spain	*RCT*	286 Respondents	173 Respondents doing self-prone position	113 respondents receiving usual care	Adult patients with confirmed or suspected CORONA VIRUS 19 being treated in a medical ward or planned to be treated in a medical ward.	Patients are recommended to be in PP for up to 12 hours per 24-hour period (up to four times a day for 1-2 hours at a time and at night for as long as possible.	The increased flow rate of oxygen supplementation but not known to be due to clinical deterioration or provided to facilitate increased activity (eg, physical therapy participation).	
Estarda, et al (2022)	Mexico	*RCT*	430 Respondents	216 respondents underwent APP	214 respondents received standard care	Patients ≥18 years of age with *reverse-transcriptase polymerase chain reaction* (RT-PCR) confirmed COVID-19, and pulse oximetry (SpO2) <90% despite receiving oxygen at 15 L/min via a *non-rebreather*	Patients in the intervention group were instructed to perform APP as best they could with a target of at least 1 hour/day for 28 days	Decreased pulmonary ultrasound score 2 in 3 the first day was associated with treatment success, with APP group having more treatment outcome and shorter length of stay.	

Rossi, et al (2022)	Italy	*Quasi-Experimenta*	25 Respondents	25 Respondents underwent a change in supine and pronation position	No control group	Adult patients with confirmed COVID- 19, were admitted to the ICU and undergoing NIV	Patient was in supine position for 5 minutes, then pronation for 5 minutes.	PaO2/FiO2 increased from supine to prone, resulting in a balance between dorsal and ventral atelectasis.	
Sryma, et al (2021)	India	*Quasi-Experimenta*	45 Respondents	30 Respondents in the prone position	15 respondents received standard care	Subjects with confirmed Corona Virus 19 RT-PCR nasopharyngeal swabs had oxygen saturation (SpO2) <94% non-intubated Prone	The position maintained at least 2 hours per session and with a target duration of 8 hours/day	Respiratory Rate Intervention Before Rox Intervention Before Mean = 8.5 SD = 2,3 After Mean = 12.4 SD = 4.5 Control Before Mean = 7.3 SD = 2.6 After Mean = 6.4 SD = 3.0 SPO2 Intervention Before Mean = 92.4% SD = 2.8% After Mean = 95 ,3% SD = 2.3% Control Before Mean = 94.1% SD = 4.3% After Mean = 93.9% SD = 8.1%	At 30 minutes of proning initiation, there was a significant difference in ROX index between cases and controls. At 12 hours, respiratory rates per minute and ROX index were significantly different between the two groups.
Page, et al (2022)	UK	*RCT*	52 Respondents	26 Respondents engaged in prolonged PP	26 Respondents engaged in traditional PP	Respondents were Adult patients with confirmed CORONA VIRUS 19 and endotracheal intubation	Patients were randomised to receive either 16-hour (traditional) or 24-hour (prolonged) PP for 96 hours	PaO2/FiO2 Intervention Before Mean = 99.0 SD = 27.2	There was no significant difference

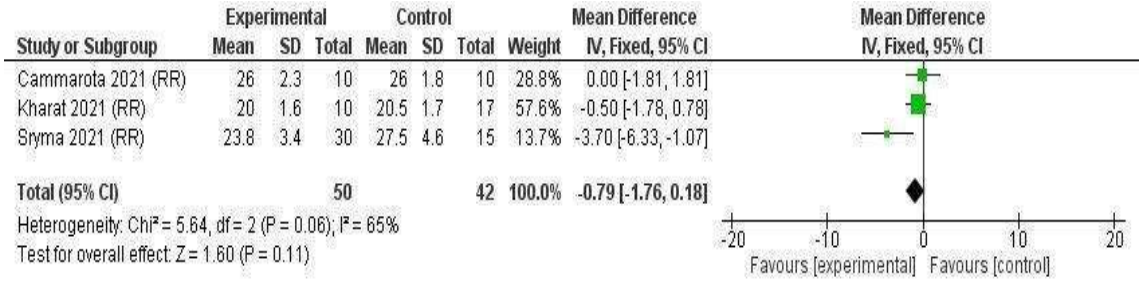
								After Mean = 145.7 SD = 40 Control Before Mean = 93.2 SD = 25 After Mean = 143 SD = 61.4	in respirator y mechanis m in the two groups after 96 hours
Kaur, et al (2021)	America	*RCT*	125 Respondents	92 Respondents' early awake positioning	33 Late Awake PP Confirmed	Adult patients with Corona Virus 19 and receiving high-flow nasal cannula (HFNC) oxygen therapy and non-intubation	The patient was instructed in a prone position as long as it could be tolerated, performed every day for 28 days	SaO2/FiO2 Intervention Before Mean = 138.2 SD = 15 After Mean = 167.4 SD = 22 Control Before Mean = 157 SD = 16.4 After Mean = 140.1 SD = 19.5 ROX Intervention Before Mean = 3.2 SD = 0.8 After Mean = 7.3 SD = 1.4 Control Before Mean = 3.4 SD = 0.5 After Mean = 5.2 SD = 0.9	The late APP group had a lower ROX index than the early APP group, but no significan t difference in SpO2/FiO 2 ratio.
Friedman, et al (2021)	UK	*RCT*	18 Respondents	15 Respondents	3 Respondents	Adult patients ≥18 years with confirmed Corona Virus 19, requiring	Maintenance-PP during scheduled hours does not require awakening.	As many as 14% of patients in the intervention arm required some improvement	

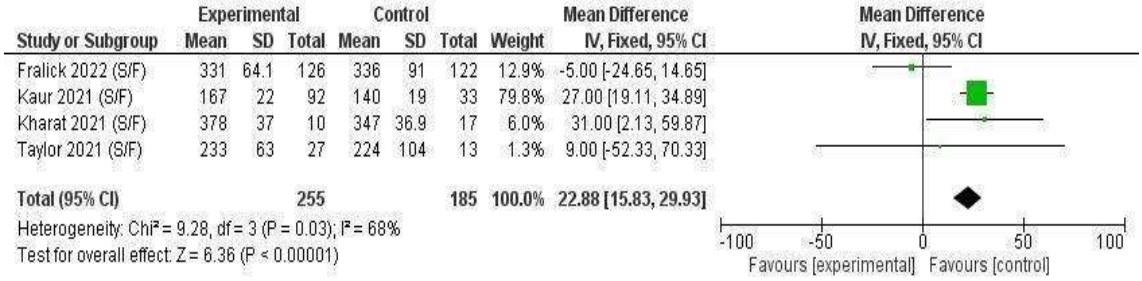
						supplemental oxygen and not intubated		in respiratory-related care.	
Hafez, et al (2022)	Egypt	*RCT*	52 Respondents	26 Respondents in the 24-hour proning group	26 respondents in the 16-hour proning group	Respondents were adult patients with confirmed Corona Virus 19 and undergoing mechanical ventilation	Both groups with different durations of 16 hours and 24 hours	PaO2/FiO2 Intervention Before Mean = 78.9 SD = 30.8 After Mean = 125.38 SD = 33.42 Control Before Mean = 83.8 SD = 30.8 After Mean = 111.23 SD = 42.22 PaO2 Intervention After Mean = 71.23 SD = 39.97 Control After Mean = 34.38 SD = 30.91	Extending the duration of the PP from 16 hours to 24 hours was associated with an increase in PaO2, PaO2/FiO2 in static lung compliance and an insignificant change in extubation rate.
Darban, et al (2022)	Iran	*Quasi-Experiment*	30 Respondents	15 Respondents performed PP	15 Respondents were in the supine position	Adult patients aged 18-70 years diagnosed with Corona Virus 19 and experiencing acute hypoxaemia.	PP was performed 6 hours per day for 3 days.	PaO2 Intervention Before Mean = 59.13 SD = 12.53 After Mean = 68.15 SD = 17.55 Control Before Mean = 52.90 SD = 4.36 After Mean = 56.73 SD = 4.8 PaO2/FiO2	Intervention resulted in significant changes in PaO2 and PA/FiO2 values after 3 days, with mean + SD PaO2 56.73 + 4.80

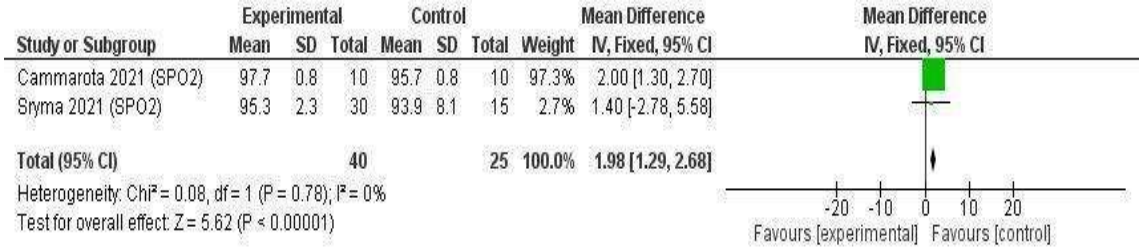
								Intervention Before Mean = 59.13 SD = 12.53 After Mean = 68.15 SD = 17.55 Control Before Mean = 52.9 SD = 4.36 After Mean = 56.73 SD = 4.8	Supine vs. 68.15 + 17, 55 PP.
Cammarota, et al (2022)	Italy	*Quasi-Experiment*	20 Respondents	10 Respondents prone to positioning	10 Respondents' supine position	Adult patients diagnosed with Corona Virus19 and admitted to the intensive care unit (ICU) for hypoxaemia and underwent NIV	Prone position is given for 1 hour then in the supine position, repeated for 48 hours	Respiratory Rate Intervention After Mean = 26 SD = 2,3 Control After Mean = 26 SD = 1.17 SPO2 Intervention After Mean = 97.75 SD = 0.82 Control After Mean = 95.7 SD = 0.82	Change to pronation worsened comfort score and increased diaphragm thickening.
Alhazani, et al (2022)	Canada, Kuwait, Saudi Arabia, and the USA	*RCT*	400 Respondents	205 Respondents prone to positioning	195 Respondents to position other than pronation	Patients aged 18+ with COVID-19 and an oxygen requirement of at least 40%.	The target duration of the prone position is 8-10 hours/day with breaks.	Oxygenation was a responder characteristic in the prone position group and control group.	
Qian, et al (2022)	United States	*Quasi-Experimenta*	501 Respondents	258 Respondents received PP	243 Respondents received the usual care	Adult patients with acute hypoxaemic respiratory failure without mechanical ventilation receive NIV.	Patient instructed to perform PP as often and consistently as possible.	On day 3, the aOR was 1.22 (95% CrI: 0.88-1.70; P=.12), and on day 4, it was 1.39 (0.99-1.94; P=.03).	

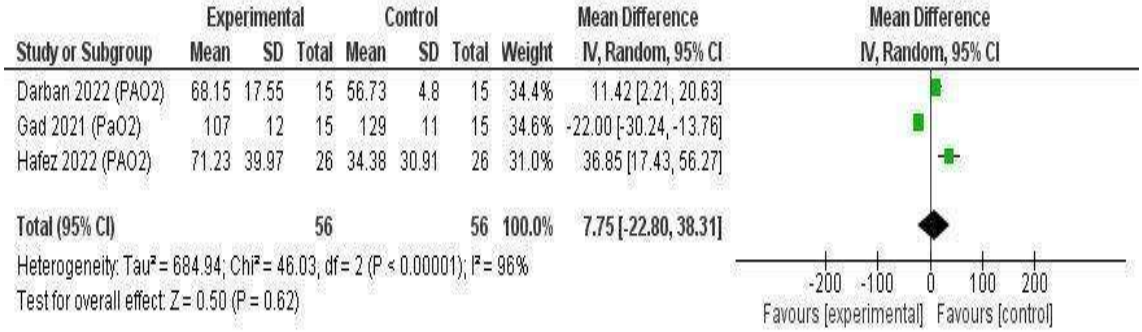
Sartini, et al (2020)	Italy	*Quasi-Experimenta*	15 Respondents	15 Respondents	No control group	Adult patients with acute hypoxaemic respiratory failure without mechanical ventilation receive NIV.	Duration of prone position 60 minutes for 14 days.	All patients' respiratory rates decreased during and after pronation (P 0.001), and their SpO2 and PaO2:FIO2 ratios improved.
Elharar, et al (2020)	France	*Quasi-Experiment*	24 Respondents	4 (17%) did not tolerate PP for more than one hour, 5 (21%), 1 to 3 hours, and 15 (63%) tolerated more than 3hours.	There is no control group	Adult patients with Corona Virus 19 non-intubated oxygen supplementation.	Target-PP is 3 hours but adjusted according to the respondent's tolerance level.	Patients who sustained PP for 3 hours or more had a mean PaO2 of 73.6 before and 94.9 during PP, similar to before and after resupination.
Thompson, et al (2022)	USA Union	*Quasi-Experimenta*	25 Respondents	13 Respondents	12 Respondents	Adults with CORONA VIRUS 19 have acute hypoxaemia and spontaneous breathing.	PP was performed by respondents as long as tolerated up to 24 hours	SpO2 increased significantly after one hour of PP, with a range of 1%-34% (median SE, 7%; 95% CI, 4.6%-9.4%).
Taboada, et al (2020)	Spain	*Quasi-Experiment*	29 Respondents	29 Respondents	No control group	Non-ICU adult patients with Corona Virus 19	Patients were told to perform prone positions for at least thirty minutes three times per day, or as tolerated by the patient.	PP significantly increased blood oxygen (SpO2, PaO2, and PaO2/FiO2) in 23 (79%) individuals and 18 (62%) overall, and increased PaO2/FiO2 (242-107; P = 0.0072).
Tu, et al (2020)	China	*Quasi-Experiment*	9 Respondents	9 Respondents	No control group	Adult patients diagnosed with Corona Virus 19 with severe hypoxaemia and using HNCF	PP is done 2 times a day for 2 hours or according to the ability of respondents	PP combined with HFNC can improve oxygenation and potentially avoid mechanical ventilation, with mean blood oxygen saturation increasing from 90%2% to 96%3% and carbon dioxide partial pressure decreasing from 477 to 395 mmHg.

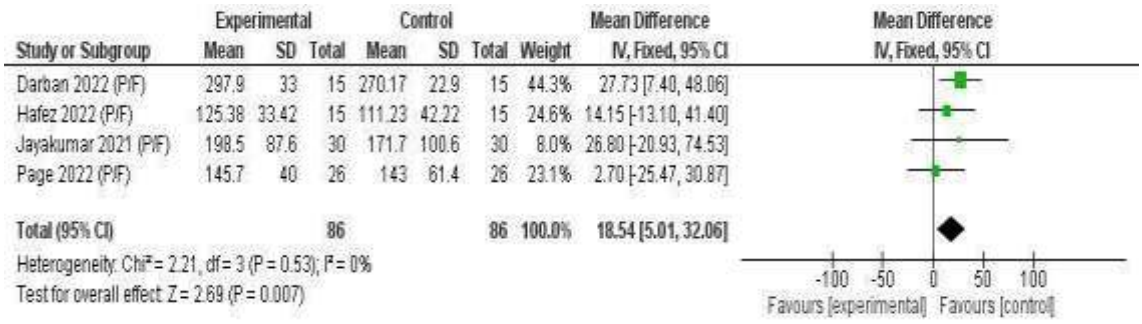
The effect of prone position on oxygenation status











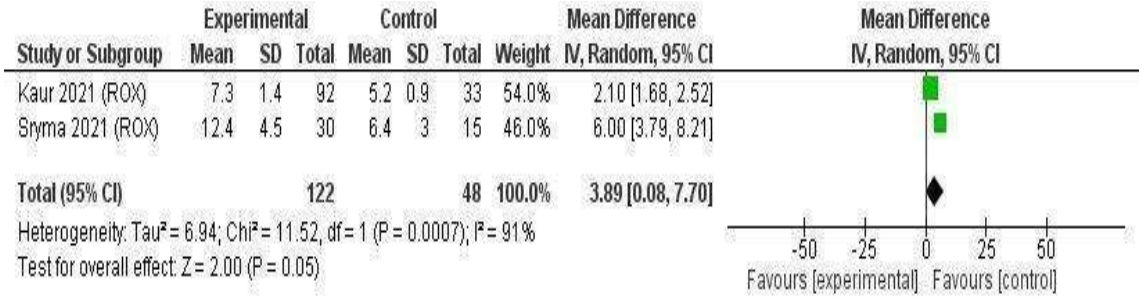
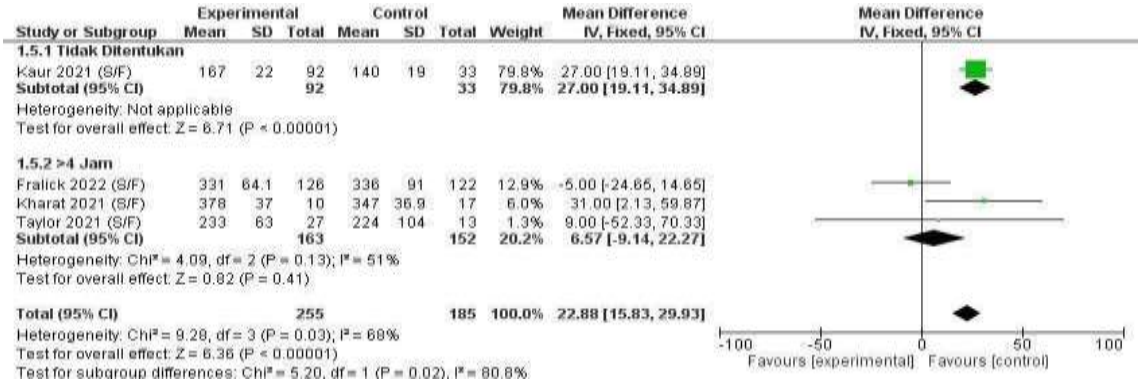
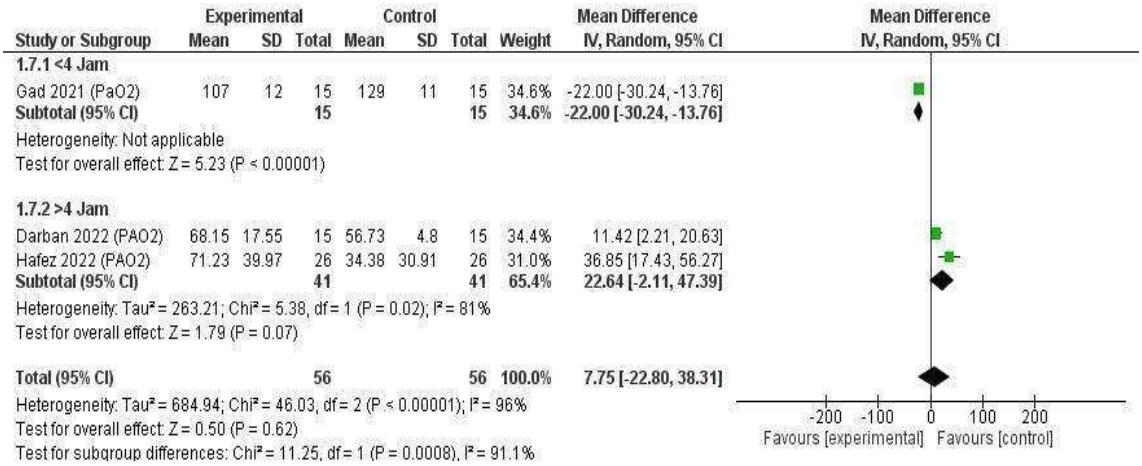


Figure 2. Forest plot for the effect of prone position

PP is predicted to have a P-Value of 0.05 or less on changes in the ROX Index, PaO2/FiO2 Ratio, SPO2, and SaO2/FiO2 Ratio. Additionally, the heterogeneity value in the PaO2 and ROX Index parameters, specifically I2, was high, meaning that the model employed in the meta-analysis was significantly different (Figure 2).

Difference effect of Prone based on Positioning Duration





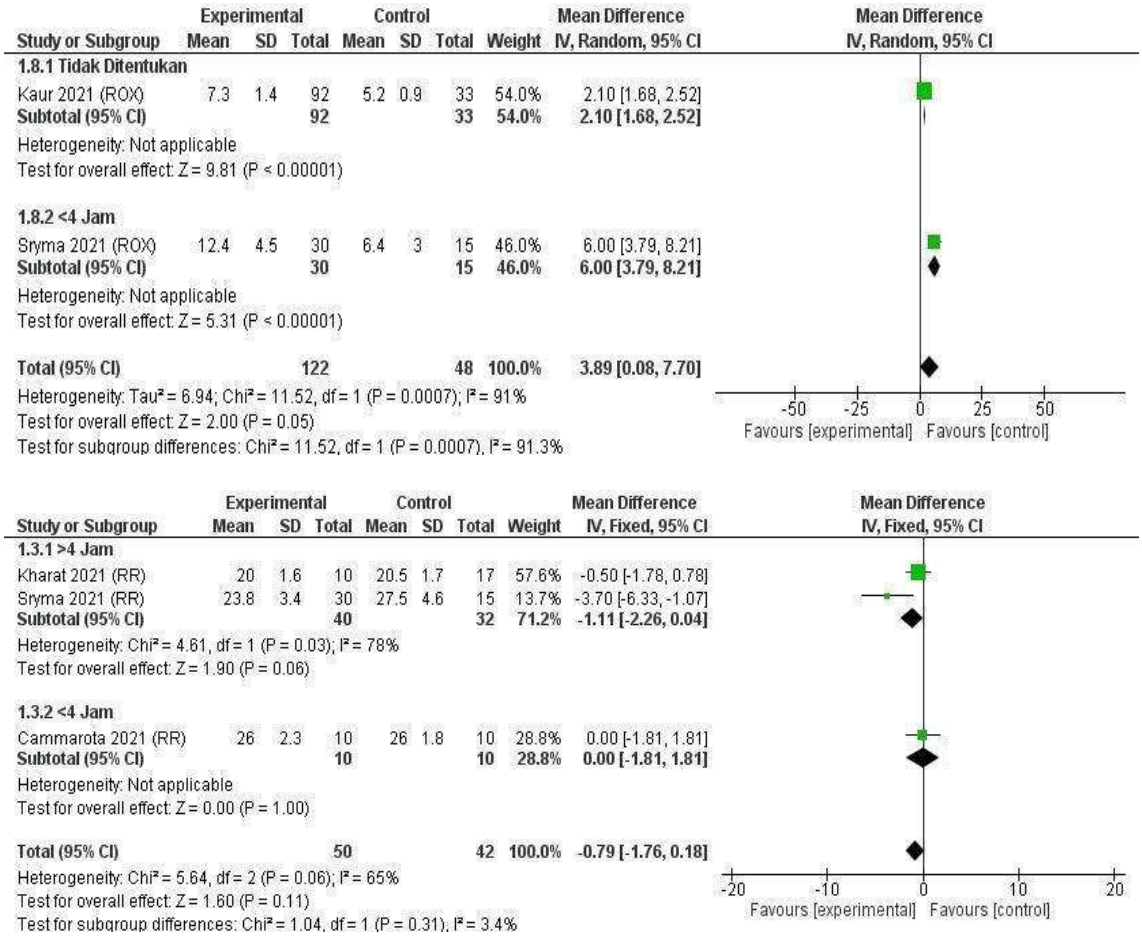


Figure 3. Subgroup results based on PP duration

The sub-group analysis of the effectiveness of PP on the oxygenation status of Corona Virus 19 patients based on the duration of PP patients revealed that in the 4-hour duration group there were significant changes in the oxygenation status values of the ROX index and PaO2 with p-value 0.05, and in the >4-hour duration group, the oxygenation values that experienced significant changes were in the PaO2 / FiO2 Ratio, and the PaO2 Then, it was established that neither the S/F ratio nor the ROX Index changed in the group that remained prone for a longer period of time (Figure 3).

DISCUSSION

This study looked at the effectiveness of PP on oxygenation as measured by various oxygenation parameters. According to the findings of the meta-analysis, PP was found to influence changes in the values of the ROX Index, PaO2 / FiO2 Ratio, SPO2, and SaO2 / FiO2 Ratio when looking at various oxygenation parameters. Several studies have suggested that implementing PP in Corona Virus 19 patients. Ehrmann et al. discovered that PP can result in a more homogeneous distribution of pleural pressure across the lung region based on observations during invasive mechanical ventilation. Additionally, during PP, there is a decrease in respiratory frequency, which indicates a decrease in respiratory drive and may result in a decrease in transpulmonary pressure changes. However, further research into these potential mechanisms is needed. According to Tu et al research, .'s the PP mechanism that affects the oxygenation of Corona Virus 19 patients is a physiological effect called "lung recruitment," which can improve ventilation-perfusion matching.

However, based on the findings, the effect was only temporary, and the respiratory rate and oxygenation parameters frequently returned to their original state after resupination. Other benefits of PP include reducing the need for intubation, improving treatment success, and lowering the incidence of pressure sores in patients[10,18–21].

PP is also considered to be safe. Ehrmann et al [18] found that the mortality and duration of invasive mechanical ventilation were comparable across groups, indicating that there were no danger signals from PP. Jayakumar et al. also found no significant differences in cumulative fluid balance, length of stay, respiratory escalation, use of other drugs, or death between groups, indicating that PP is safe. [10] PP improves gas exchange by lowering transpulmonary pressure (difference between airway opening pressure and pleural pressure)[9,22]. The weight of the intrathoracic viscera and abdomen decreases in the Prone position, relieving the limited diaphragm. Furthermore, because the dorsal part of the lung, which is rich in gravity-dependent blood flow, is placed in a non-dependent position, it improves aeration of poorly ventilated alveolar units. Other advantages include more uniform aeration distribution, increased ventilation-perfusion, increased secretion clearance, lung protection, and decreased mortality.

Higher transpulmonary pressure in the ventral part of the lungs causes hyperinflation, while lower transpulmonary pressure in the dorsal part of the lung causes atelectasis, where prone reduces the difference between dorsal and ventral transpulmonary, thereby causing a decrease in ventral alveolar hyperinflation and dorsal alveolar collapse[26] . The study that stated the effectiveness of PP on oxygenation status used 4 hours, while the research of Hafez et al. compared 16 hours to 24 hours. Extending the duration of pronation sessions was found to be associated with a significant increase in PaO2 and PaO2/FiO2. This is consistent with a study conducted on 103 non-Crona ARDS patients by Jochmans et al., who conducted an extension of PP sessions to evaluate the time required to obtain maximum physiological effects and to look for parameters related to patient survival in PP. The results of the study recommended an extension of PP sessions for at least up to 24 hours, and even more if the Ratio of PaO2/FiO2 at 24 the clock remains below[27] Another study. Some research revealed that short duration is associated with increased adherence to the pronation programme and minimising patient discomfort[7,19,28,29].

CONCLUSION

PP on the oxygenation status of Corona Virus 19 patients has a significant influence on the ROX Index, PaO2/FiO2 Ratio, SPO2, and SaO2/FiO2 Ratio values. Significant changes in the <4-hour duration group, namely in the oxygenation status values of the ROX index and PaO2, in the >4-hour duration group at the PaO2 / FiO2 Ratio, SpO2, and SaO2 / FiO2 Ratio values Then in the group with the duration of PP, no change was determined to occur in the S / F ratio and ROX Index values.

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