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EFFECT OF HEAD ELEVATION 30° ON GCS VALUE, AND OXYGEN SATURATION IN STROKE PATIENTS

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ABSTRACT

This study aims to determine the effect of applying 30° head elevation to increase oxygen saturation and GCS scores in stroke patients. The research method is a systematic review by searching for articles through Pubmed, Google Scholar, Proquest, Emerland, and Garuda. The results showed that the number of articles synthesized was eight, with the result that there were 4 GCS scores and SP02 scores of 2.48% after 30 head elevation. In conclusion, 30° head elevation affects the GCS value and oxygen saturation.

Keywords: Head Elevation 30°, Oxygen Saturation, Stroke

INTRODUCTION

Stroke is a narrowing of blood vessels caused by blockage of blood vessels in cerebral tissue (Syafni, 2020). Cerebral vessel injury is a disruption of the cerebral blood vessels so that brain function stops forcibly in a sudden state in the cerebral tissue (Riberholt et al., 2020).

Based on data WHO (2021) said that every year 15 million people worldwide suffer a stroke, 5 million die, and another 10 million suffer brain disabilities. Data in the Southeast Asia region, there are 4.4 million people who have had a stroke (Hermawati & Muflihatin, 2017). The incidence of stroke in Indonesia shows that men are 15.8% higher than women (Sudarno & Utami, 2020). The incidence of stroke has increased in each province for the last 5 years from 2014 by 7% to 2019 and the most at risk of stroke at age> 15 years (Ulfa & Nurlaily, 2019). The causes of stroke vary widely, including narrowing of blood vessels and blood clots in the brain (Fitriana & Krisdianto, 2020).

One of the complications of stroke include impaired oxygen saturation and decreased level of consciousness which is characterized by bluish skin color (hypoxia), decreased hemodynamics, and damage to the brain blood vessel organ system so that it can worsen the flow of oxygen to the cerebral nerves (Yadeau et al., 2019).

Treatment of stroke patients in hospitals can be done by helping post-stroke physical activity, maintaining personal hygiene, helping to fulfill eating and drinking, and adherence to taking medication during hospitalization (Rosmary & Handayani, 2020). Nursing actions that are appropriate for stroke patients use Orem's self-care theory, by providing either minimal or partial assistance in carrying out care with independent nursing therapy (Sulistyowati et al., 2020).

Independent nursing therapy can be in the form of a half-sitting position, high fowler, and a 30° head-up position to improve self-care for stroke patients which functions to improve gas exchange in the body (Pongantung et al., 2020). The management of the 30° head elevation position is very useful in improving oxygen in the body by facilitating blood to the brain nerves, and increasing the level of consciousness (Pratiwi et al., 2020).

Head elevation 30° is the position of the head being raised 30° while the legs and body are in a parallel position (Hartati, 2020). Head elevation 30° beneficial in increasing the GCS score, so that a 30° elevated head position can improve cerebral blood flow and maximize brain nerve oxygenation (Hermawati & Muflihatin, 2017).

Mustikarani & Mustofa (2020) stated that improvement of SPO^2 (oxygen saturation) in stroke patients with the management of head elevation positions 15°, 30°, and 45° was able to improve oxygen saturation values in stroke patients. The head elevation position of 30° is recommended in increasing oxygen saturation and level of consciousness of stroke patients, while the 45° position should be used more carefully because it has an impact on increasing the risk of brain tissue perfusion deficit (Hasan, 2018). Reinforced by research conducted Sands et al., (2020) stated that the application of head elevation to improve oxygen saturation in stroke patients has increased so that a 30° head elevation position is more recommended in improving tissue perfusion in the brain nerves.

Research conducted Gempitasari & Betriana (2019) about a case study of the implementation of nursing care with non-hemorrhagic stroke with the results that the elevation position of the head has an effect on increasing the GCS (Glasgow Coma Scale) value. This was added by Hermawati & Muflihatin (2017) in his research that the level of consciousness in stroke patients is better using the head elevation position. Dzulhidayati et al., (2021) explained in a literature review study about the analysis of the effectiveness of 30° head elevation in increasing SPO^2 and GCS in stroke patients with the results that the head up position 30 ° for 7 days can be applied to increase GCS and SPO^2 values in stroke with mechanical ventilation installed in ICU room. Based on this background, an analysis was conducted on the effect of giving a 30° head-up position on the GCS value and oxygen saturation of patients with stroke problems.

RESEARCH METHODS

A systematic review was carried out by two researchers in obtaining articles based on the PICO framework, using the Google Scholar, Garuda, Proquest, and Emerald databases, using the following research criteria:

Inclusion Criteria

This systematic review using the inclusion criteria used in determining the article is eligible for review is as follows: article randomized controlled trial (RCT), quasi-experimental studies. The year published in the last 10 years (2011-2021). Research place of all treatment wards in Hospital. The population of articles specifically researching stroke patients. Intervention with 30° head elevation. *Outcome seen by the value of GCS (*Glasgow Coma Scale) *and SPO^2 (oxygen saturation)*.

Exclusion Criteria: Article from the review.

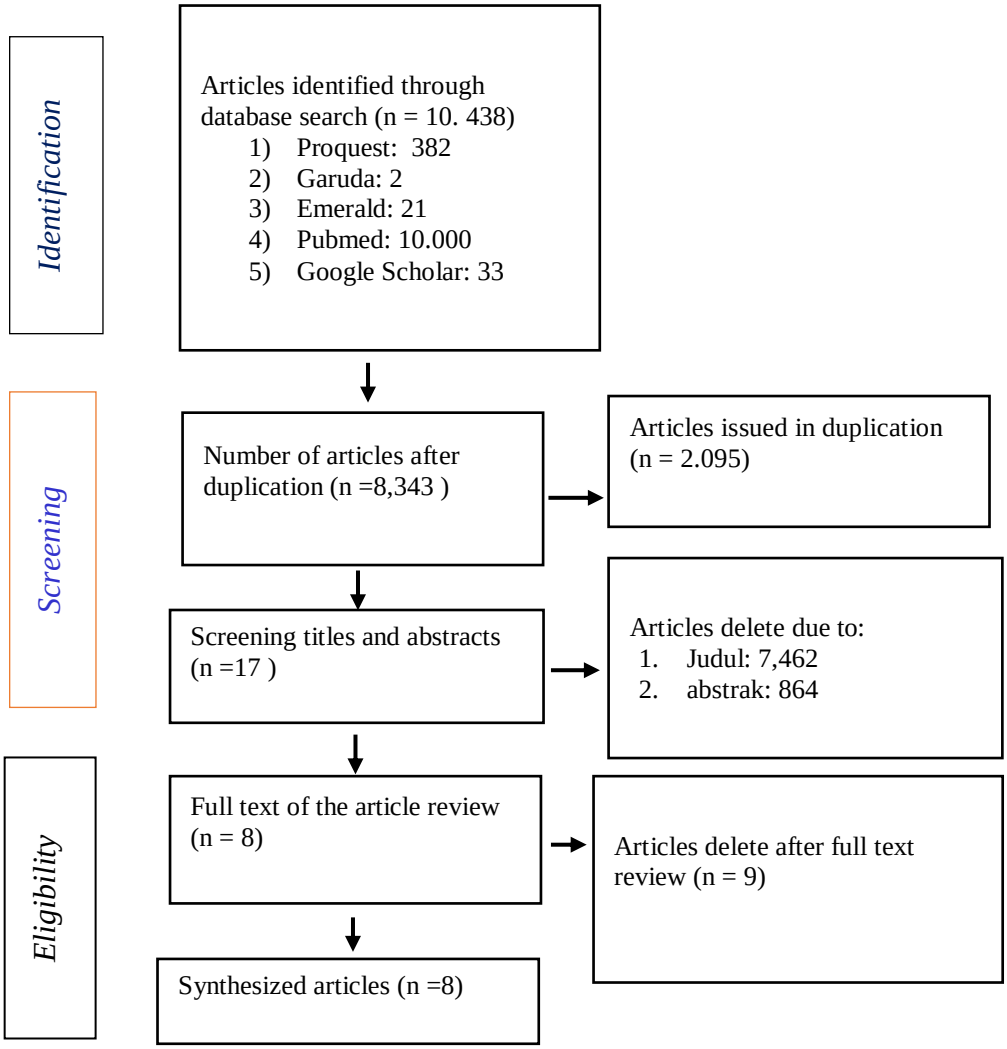

Figure. 1
PRISMA

RESULTS

Table. 1
Literature Review Results

Author Name, Article Title, Literature Type	Year	Aims	Findings
Pertami et al., Effect of 30 Degree Head Elevation on Oxygen Saturation and Sleep Quality of Stroke Patients, Quasi Experimenta	2019	To determine the Effect of 30 Degree Head Elevation on Oxygen Saturation and Sleep Quality of Stroke Patients.	There is an effect of 30° head position in increasing the oxygen saturation value seen in the treatment group is 93.76 and post intervention is 96.24, with the Mann-Whitney bivariate analysis value for oxygen saturation P value = 0.00 < = 0.05

Ekacahyaningtyas et al., Head Up Position 30° As An Effort To Increase Oxygen Saturation In Hemorrhagic And Non Hemorrhagic Stroke Patients, quasi experiment	2017	To determine the effect of head up position 30° on oxygen saturation in stroke patients.	The results of the study before the action were 97.07% and after head up 30° the oxygen saturation was 98.33%. Bivariate analysis of the Wilcoxon test with p value = 0.009 or p <0.05, meaning that there is a significant difference in the average oxygen saturation before and after the 30° head-up position.
Supadi, The Effect of Head Position Elevation on Hemorrhagic Stroke Clients on Average Arterial Pressure, Blood Pressure and Intracranial Pressure at Margono Soekarjo Hospital, Purwokerto in 2011, Quasi experiment	2017	To investigate the effect of head elevation on mean arterial pressure, blood pressure, and intracranial pressure among hemorrhagic stroke at the Margono Soekarjo Hospital Purwokerto on 2011	This study concluded that the mean arterial pressure MAP in the control treatment (pre 120.809, and post 120.00) and MAP in the intervention treatment (pre 132.86, post 127.00), and GCS of 8 in hemorrhagic stroke clients were quite good. to 12 after using the 30° head elevation position, from the post-intervention treatment group, it was seen that the respondents did not have ICT (66.7%), while the rest still had ICT (33.3%). The results of the analysis had no significant effect on the control group, pre p value of 0.761 and post treatment with a value of 0.092, while the intervention group had a significant effect with p value of 0.00 on systolic and diastolic blood pressure. MAP control group pre and post treatment p value 0.206 while the intervention group had p value 0.00
Munoz-Venturelli et al., Head Position in Stroke Trial (HeadPoST) – sitting-up vs lying-flat positioning of patients with acute stroke: Study protocol for a cluster randomised controlled trial,	2015	To determine the effect of lying flat (0°) compared to head-sitting position (≥30°) in the first 24 hours of hospital admission for patients with acute stroke	The results of this studyfor shift analysis defined as a reduction in death or disability on this scale (α0.05), at least a 16% increase in the ordinal logistic regression analysis of the main outcome. at

			least a 16% improvement in neurological function on the NIHSS scale at day 7, and a 30% reduction in mortality and reduced length of stay. So that it can reduce intracerebral bleeding which causes an improvement in the level of consciousness of stroke patients.
Anderson et al., Cluster-Randomized, Crossover Trial of Head Positioning in Acute Stroke, Randomized control trial	2017	To determine whether outcomes in patients with acute ischemic stroke could be improved by positioning the patient to lie flat (ie, fully supine with the back horizontal and face up) during treatment to improve cerebral perfusion.	This study with the results of the analysis in the use of a 30° elevation position can increase awareness, seen from the resultsDeath or major disability (modified Rankin scale scores from 3 to 6) at 90 days occurred in 38.9% of patients in the flat-lying group and in 39.7% of patients in the 30° head position group (odds ratio in the lying-down group flat, 0.94; 95% CI, 0.85-1.05; P=0.25), and death within 90 days after stroke occurred in 7.3% in the recumbent group and in 7.4% in the supine group. head 30°. Patients in the lying flat group were less likely than patients in the 30° head-sitting group to maintain the position for 24 hours (87% vs 95%, P<0.001).
Favilla et al., Optical Bedside Monitoring of Cerebral Blood Flow in Acute Ischemic Stroke Patients during Head of Bed Manipulation, Quasi experiment with wilcoxon analysis	2014	To perform Optical Bedside Monitoring of Cerebral Blood Flow in Acute Ischemic Stroke Patients During Head of Bed Manipulation	30° head elevation has an impact on CBF improvements in brain perfusion, oxygen saturation, and level of consciousness, seen from the resultsHOB manipulation, CBF decreased at HOB 30° (25%) p value = 0.002), but CBF contraction did not change significantly at 30° compared to flat head position (p = 0.51).

Ugras et al., Effects of Different Head-of-Bed Elevations and Body Positions on Intracranial Pressure and Cerebral Perfusion Pressure in Neurosurgical Patients Quasi experiment	2018	To evaluate the effects of different head of bed (HOB) elevations and body positions on intracranial pressure (ICP) and cerebral perfusion pressure (CPP) and to identify safe positions for neurosurgical patients with different Glasgow Coma Scale (GCS) scores	this research withhead position (Hob) 30° resulted in changes in ICP and CPP with (value = 0.05). In patients with a GCS score of 13-15 (value = 0.024), it was concluded that 30° head elevation caused changes in ICP, CPP, and GCS, but this improvement was not significant.
Lutokhin et al., Optimization of early rehabilitation of patients with ischemic stroke and sleep-disordered breathing, Quasi experiment	2018	To see the Optimization of Early Rehabilitation of Ischemic Stroke Patients and Sleeping Breathing Disorders.	The results of this study were groups A and B, namely the NIHSS score in group A decreased by 2 (1;4), 4.5 points (2; 5.5) points in group B (p=0.03). The mRS value decreased in group A by 1 (0; 1) points versus 2 (0.5; 2) points in group B (p=0.018), a significant decrease in AHI in group B (p=0.02), while in group A , the change in AHI was less (p=0.063). stroke was improved according to the NIHSS score, when using the 30° head elevation intervention.

In the initial search results found 10,438 articles on Google Scholar, Proquest, Pubmed, Garuda, and Emerland according to the search criteria:

This study uses 8 articles that were reviewed by two people, the first researcher conducted a search until the title screening stage, then assisted the second researcher together to carry out a critical appraisal to determine the articles that included. The article uses a quasi-experimental studies design consisting of 6, four include articles with all the "yes" answer components carried out, the next two articles include 1 answer 'no" from 9 question components, namely research conducted and 1 answer ‘’*unclear’’* of the 9 components of the research question. Articles carried out randomized controlled trial type with 13 component questions answered "yes" so that the 8 articles synthesized were stated to include.

This study with the results of the analysis in the use of a 30° elevation position can increase awareness, seen from the resultsDeath or major disability (modified Rankin scale scores from 3 to 6) at 90 days occurred in 38.9% of patients in the flat-lying group and in 39.7% of patients in the 30° head position group (odds ratio in the lying-down group flat, 0.94; 95% CI, 0.85-1.05; P=0.25), and death within 90 days after stroke occurred in 7.3% in the recumbent group and in 7.4% in the supine group. head 30°. Patients in the lying flat group were less likely than patients in the 30° head-sitting group to maintain the position for 24 hours (87% vs 95%, P<0.001).

DISCUSSION

Application of 30° Head Elevation to GCS Score

Stroke is a local or global damage to brain function that occurs suddenly and lasts for 24 hours, due to vascular abnormalities in the brain (Supadi, 2017). Stroke can be in the form of a decreased level of consciousness and brain paralysis that can be life threatening (Sands et al., 2020). Impaired brain function can be seen from a long time of disease and the factors that cause stroke (Navalkele & Martin-Schild, 2017). GCS value as a measure of success in overcoming the problem of stroke (Brunser et al., 2016).

The life expectancy of stroke patients against decreased consciousness can be increased by assisting appropriate nursing actions for stroke patients (Ouyang et al., 2021). Based on Orem's self-care theory that can be applied to stroke patients, namely by providing minimal or partial assistance in performing nursing care (Sulistyowati et al., 2020). Nursing therapy in improving GCS values in stroke patients can use a 30° head elevation position (Pertami et al., 2019).

Head elevation 30° is the position of the head being raised 30° while the legs and body are in a parallel position (Hartati, 2020). Head elevation 30° beneficial in increasing the GCS score, so that a 30° elevated head position can improve cerebral blood flow and maximize brain nerve oxygenation (Hermawati & Muflihatin, 2017).

The results of this systematic review state that the age of the respondents is 18-90 years according to the article (Ugras et al., 2018; Ekacahyaningtyas et al., 2017**).** Supadi (2017) stated that the mean arterial pressure MAP in the treatment respondents had improved, and the percentage reduction in intracranial pressure after the 30° head elevation was performed. This is in accordance with research G et al., (2015) with the results there is a significant relationship between Mean Arterial Pressure on the level of awareness of stroke patients. Monitor Mean Arterial Pressure (MAP) in stroke patients can reduce decreased level of consciousnes (Haryuni, 2017). Research conducted by Paradisma (2019) stated that reducing intracranial pressure in stroke patients can increase awareness with a GCS score >8.

Articles conducted Lutokhin et al., (2018); Ugras et al., (2018); Anderson et al., (2017); Muñoz-Venturelli et al., (2015) explained in his research that there was an improvement in the clinical value of the NIHSS (*National Institute of Health Stroke Scale*) after 30° head elevation in stroke patients. This is in accordance with the research of Wulan & Erlida (2020) which states that the lower the clinical value of the NIHSS, the higher the GCS value in stroke patients. It is proven by research conducted by Gempitasari & Betriana (2019)) that there is an increase in GCS from a score of 7 to 11 on day 7, so that 30° head elevation can be used to increase awareness in stroke patients.

Application of 30° Head Elevation to Oxygen Saturation Values

Research conducted by Pertami et al., (2019) stated that there was an increase in the value of oxygen saturation in stroke patients after the 30° head elevation position was performed. This is clarified by Fitriyah (2018) about the analysis of the head up position in stroke patients with the results that there is an increase in the SPO^2 value after the head elevation action is 30°. Ekayanti (2021) conveyed the same result that the decrease in oxygen saturation could be corrected after giving the head up position 30° for 1 x 24 hours. Head elevation 30° causes neck relaxation and improves blood flow to carry oxygen to the brain (Ardilla et al., 2020).

Ekacahyaningtyas et al., (2017) stated that there was a significant difference in oxygen saturation after the procedure of 0.63% between the oxygen saturation before and after the 30° head up position in stroke patients. This is in accordance with the research of Priagung (2021) that a 30° head elevation position is recommended to increase SPO^2 in stroke patients. This research is supported and can be proven by research conducted by Ardilla et al., (2020) that hemorrhagic stroke patients with impaired compliance with effective oxygenation are given 30° elevation therapy, seen from observations every 30 minutes within 2 hours shows the oxygen saturation value has increased 3% to 99% in stroke patients.

The increase in CBF and MFV on hemodynamics has an impact on the balance between oxygen supply in the brain which causes an increase in oxygen saturation (Lam et al., 2020). This is in accordance with research Sari (2019) that oxygen administration and 30° head up position on hemodynamic changes in stroke patients with the result that there is a significant difference in hemodynamic status followed by an increase in oxygen saturation in each respondent after 30° head up action.

Ugras et al., (2018) reported that 30° head elevation is beneficial in increasing oxygen saturation in terms of changes in intracranial pressure and cerebral perfusion pressure. Study Mustikarani & Mustofa (2020) stated that there was a relationship between intracranial pressure and cerebral perfusion followed by an increase in SPO^2 value of 2% at 30 minutes after treatment of 30° head elevation position in stroke patients. This research is supported by Affandi & Panggabean (2016) that a decrease in intracranial pressure causes an improvement in tissue perfusion and blood flow to brain tissue so that it has a good effect on oxygen saturation in stroke patients.

The results of a review of the 30° head elevation position can be used to increase SPO^2 in stroke patients according to the results of the study by Kiswanto & Chayati (2021) that the 30° head elevation position is recommended as a nursing intervention to increase oxygen saturation in stroke patients. Research Parijan (2020) conveyed the same results that the 30° head elevation position was beneficial in increasing oxygen saturation which led to an increase in GCS scores in stroke patients.

Truijen et al., (2018) said that oxygen saturation and the patient's level of consciousness in the application of the head elevation position were influenced by the shape of the bed used by stroke patients. A good quality patient bed is easier to use and more efficient in adjusting the 30° head elevation position (Gregori-Pla et al., 2018).

This is clarified by Sufiani (2022) that bed modification with a 30° head elevation position can improve the level of consciousness and oxygen saturation in stroke patients. It can be concluded that 30° head elevation can be used as a nursing independent intervention in increasing oxygen saturation and GCS values in stroke patients.

Abidin (2022) said that a healthy position is recommended in Islamic teachings such as when sleeping it is recommended to face the Qibla, and lean on the right side to maintain a healthy body, so that the health sector innovates a position to improve health status as has been done by Muslim-majority countries, namely Turkey, and can be done in Indonesia (Ugras et al., 2018).

CONCLUSION

A systematic review of the application of 30° head elevation to increase in GCS values and oxygen saturation in stroke patients, based on four articles reporting an increase in oxygen saturation and 6 articles discussing increased consciousness after 30° head elevation in stroke patients. The highest saturation increase was 2.48% and the highest GCS increase was 4 scores after the 30° head elevation intervention, so it was concluded that there was an effect of applying 30° head elevation in increasing GCS and oxygen saturation values in stroke patients.

SUGGESTIONS

In providing maximum nursing care, especially for stroke patients, you can apply evidence based practice so that the interventions given to patients are more optimal.

REFERENCE

Abidin, M. A. Z. (2022). *Posisi Tidur yang Dianjurkan dalam Islam*. Sumber: https://nu.or.id/tafsir-mimpi/posisi-tidur-yang-dianjurkan-dalam-islam-banbm

Affandi, I. G., & Panggabean, R. (2016). Pengelolaan Tekanan Tinggi Intrakranial pada Stroke. *CDK Cermin Dunia Kedokteran, 43*(3), 180-184. http://dx.doi.org/10.55175/cdk.v43i3.30

Anderson, C. S., Arima, H., Lavados, P., Billot, L., Hackett, M. L., Olavarría, V. V., Muñoz Venturelli, P., Brunser, A., Peng, B., Cui, L., Song, L., Rogers, K., Middleton, S., Lim, J. Y., Forshaw, D., Lightbody, C. E., Woodward, M., Pontes-Neto, O., & De-Silva, H. A. (2017). Cluster-Randomized, Crossover Trial of Head Positioning in Acute Stroke. *The New England Journal of Medicine, 376*(25), 2437–2447. https://doi.org/10.1056/NEJMoa1615715

Ardilla, S. E., Nafi'ah, R. H., & Susilaningsih, E. Z. (2020). *Asuhan Keperawatan Pada Pasien Dalam Cerebro Vascular Accident (Cva) Hemoragik*. Universitas Kusuma Husada Surakarta. http://eprints.ukh.ac.id/id/eprint/1491

Brunser, A. M., Venturelli, P, M., Lavados, P. M., Gaete, J., Martins, S., Arima, H., Anderson, C. S., & Olavarria, V. V. (2016). Head Position and Cerebral Blood Flow in Acute Ischemic Stroke Patients: Protocol for the Pilot Phase, Cluster Randomized, Head Position in Acute Ischemic Stroke Trial (Headpost Pilot). *International Journal Stroke, 11*(2), 253-259. https://doi.org/10.1177/1747493015620808

Dzulhidayati, A. S. (2021). *Literature Review: Analisa Efektivitas Head Up 30 Derajat terhadap Peningkatan Saturasi OKsigen dan Kesadaran (GCS) Pada Pasien Stroke Terpasang Ventilator Mekanik di Ruang ICU* Politeknik Kesehatan Kemenkes Semarang. https://repository.poltekkes-smg.ac.id/index.php?p=show_detail&id=25739

Ekacahyaningtyas, M., Setyarini, D., Agustin, W. R., & Rizqiea, N. S. (2017). Posisi Head Up 30° sebagai Upaya untuk Meningkatkan Saturasi Oksigen pada Pasien Stroke Hemoragik dan Non Hemoragik. *Adi Husada Nursing Journal, 3*(2), 55–59. https://adihusada.ac.id/jurnal/index.php/AHNJ/article/view/98

Ekayanti, N. L. P. D. T. (2021). *Asuhan Keperawatan Resiko Perfusi Serebral Tidak Efektif pada Pasien dengan Stroke Hemoragik di Ruang IGD Rsup Sanglah Denpasar Tahun 2021*. Poltekkes Kemenkes Denpasar. http://repository.poltekkes-denpasar.ac.id/7587/

Fitriana, E. R., & Krisdianto, M. A. (2020). *Asuhan Keperawatan pada Pasien Stroke Non Hemoragik dengan Pemenuhan Kebuthan Fisiologis: Oksigenasi*. Universitas Kusuma Husada Surakarta. http://eprints.ukh.ac.id/id/eprint/926

Fitriyah, S. H. (2018). *Analisis Posisi Head Up terhadap Nilai Saturasi Oksigen pada Pasien CVA (Cerebrovascular Accident) di Ruang ICU Rumah Sakit Islam Darus Syifa' Surabaya*. Universitas Muhammadiyah Surabaya. http://repository.um-surabaya.ac.id/3337/

G, A. C., Hartanto, O. S., & Risono, S. (2015). *Hubungan Mean Arterial Pressure dengan Peristiwa Kematian pada Stroke Perdarahan Intraserebral*. Universitas Sebelas Maret. https://digilib.uns.ac.id/dokumen/download/44638/MTU4ODU4.pdf

Gempitasari, F. K., & Betriana, F. (2019). Implementasi Evidence Based Nursing pada Pasien dengan Stroke Non-Hemoragik: Studi Kasus. *Jurnal Endurance : Kajian Ilmiah Problema Kesehatan*, *4*(3), 601–607. https://doi.org/10.22216/jen.v4i3.4421

Gregori-Pla, C., Cotta, G., Blanco, I., Zirak, P., Giovannella, M., Mola, S., Fortuna, A.,Durduran, T., & Mayos, M. (2018). Cerebral Vasoreactivity in Response to A Head-of-Bed Position Change is Altered in Patients with Moderate and Severe Obstructive Sleep Apnea. *Plos One*. https://doi.org/10.1371/journal.pone.0194204

Hartati, J. H. (2020). *Asuhan Keperawatan pada Tn. Y dengan Stroke Hemoragik dalam Pemberian Inovasi Intervensi Posisi Elevasi Kepala 30 Derajat Diruangan Neurologi RSUD Dr. Achmad Mochtar Bukittinggi Tahun 2020*. Universitas Perintis Indonesia. http://repo.stikesperintis.ac.id/id/eprint/1182

Haryuni, S. (2017). Mean Arterial Pressure (MAP) Berhubungan dengan Kejadian Mortalitas pada Pasien Stroke Perdarahan Intraserebral. *Care Jurnal Ilmiah Ilmu Kesehatan, 5*(1), 123-129. https://doi.org/10.33366/cr.v5i1.397

Hasan, A. K. (2018). Study Kasus Gangguan Perfusi Jaringan Serebrall dengan Penurunan Kesadaran pada Klien Stroke Hemoragik Setelah Diberikan Posisi Kepala Elevasi 30^{o}. *Babul Ilmi: Jurnal Ilmiah Multi Science Kesehatan, 9*(2). https://jurnal.stikes-aisyiyah-palembang.ac.id/index.php/Kep/article/view/135/115

Hermawati, H., & Muflihatin, S. K. (2017). *Analisis Praktik Klinik Keperawatan pada Pasien Stroke dengan Intervensi Inovasi Pemberian Posisi Elevasi Kepala Untuk Meningkatkan Nilai Saturasi Oksigen di Ruang Unit Stroke RSUD Abdul Wahab Sjahranie Samarinda*. Unversitas Muhammadiyah Kalimantan Timur. https://dspace.umkt.ac.id//handle/463.2017/351

Kiswanto, L., & Chayati, N. (2021). Efektivitas Penerapan Elevasi Kepala terhadap Peningkatan Perfusi Jaringan Otak pada Pasien Stroke. *Journal of Telenursing (JOTING)*, *3*(2), 519–525. https://doi.org/10.31539/joting.v3i2.2559

Lam, M. Y., Haunton, V. J., Nath, M., Panerai, R. B., & Robinson, T. G. (2020). The Effect of Head Positioning on Cerebral Hemodynamics: Experiences in Mild Ischemic Stroke. *Journal of the Neurological Sciences*, *419*, 117201. https://doi.org/10.1016/j.jns.2020.117201

Lutokhin, G. M., Geraskina, L. A., Fonyakin, A. V., & Maksimova, M. Y. (2017). Optimization of Early Rehabilitation of Patients with Ischemic Stroke and Sleep-Disordered Breathing. *Анналы клинической и экспериментальной неврологии*, №11(2) (2017). https://doi.org/10.18454/ACEN.2017.2.1

Muñoz-Venturelli, P., Arima, H., Lavados, P., Brunser, A., Peng, B., Cui, L., Song, L., Billot, L., Boaden, E., Hackett, M. L., Heritier, S., Jan, S., Middleton, S., Olavarría, V. V., Lim, J. Y., Lindley, R. I., Heeley, E., Robinson, T., Pontes-Neto, O., Natsagdorj, L., Lin, R., Watkins, C., & Anderson, C. S. (2015). Head Position in Stroke Trial (HeadPoST)–Sitting-Up VS Lying-Flat Positioning of Patients with Acute Stroke: Study Protocol for a Cluster Randomised Controlled Trial. *Trials*, *16*(1), 256. https://doi.org/10.1186/s13063-015-0767-1

Mustikarani, A., & Mustofa, A. (2020). Peningkatan Saturasi Oksigen pada Pasien Stroke melalui Pemberian Posisi Head Up. *Ners Muda*, *1*(2), 114–119. https://doi.org/10.26714/nm.v1i2.5750

Navalkele, D., & Martin-Schild, S. (2017). Cluster-Randomized, Crossover Trial of Head Positioning in Acute Stroke-Have We Lost Our Position on This? *Journal of Emergency and Critical Care Medicine*, *1*, 21–21. https://doi.org/10.21037/jeccm.2017.08.07

Ouyang, M., Roffe, C., Billot, L., Song, L., Wang, X., Muñoz-Venturelli, P., Lavados, P. M., Robinson, T., Middleton, S., Olavarría, V. V., Watkins, C. L., Lee, T. H., Brunser, A. M., Pontes-Neto, O. M., Hackett, M. L., & Anderson, C. S. (2021). Oxygen Desaturation and Adverse Outcomes in Acute Stroke: Secondary Analysis of the HeadPoST study. *Clinical Neurology and Neurosurgery*, *207*, 106796. https://doi.org/10.1016/j.clineuro.2021.106796

Paradisma, G. (2019). Efektifitas Asuhan Keperawataan Penurunan Kapasitas Adaptif Intrakranial terhadap Tekanan Intrakranial Pasien Stroke Hemorragik Intrasereberal. *Jurnal Keperawatan*, *13*(3). https://nersbaya.poltekkesdepkes-sby.ac.id/index.php/nersbaya/article/view/5

Parijan, N. P. P. (2020). *Gambaran Pemenuhan Oksigenasi Otak dengan Posisi Elevasi Kepala 30° pada Pasien Stroke Hemoragik*. Politeknik Kesehatan Kementerian Kesehatan Medan. http://ecampus.poltekkes-medan.ac.id/xmlui/handle/123456789/4366

Pertami, S. B., Munawaroh, S., & Rosmala, N. W. D. (2019). Pengaruh Elevasi Kepala 30 Derajat terhadap Saturasi Oksigen dan Kualitas Tidur Pasien Stroke. *Health Information : Jurnal Penelitian*, *11*(2), 134–145. https://doi.org/10.36990/hijp.v11i2.133

Pongantung, H., Anita, F., Palango, C., & Manuel, C. (2020). Hubungan Self Efficacy dengan Quality of Life pada Pasien Sesudah Stroke. *Journal of Islamic Nursing*, *5*(1), 21–31. https://doi.org/10.24252/join.v5i1.13894

Pratiwi, F. E., Setiyawan, S., & Sulistyawati, R. A. (2020). *Saturasi Oksigen pada Pasien Kritis dalam Posisi Head Up: Studi Literatur*. Universitas Kusuma Husada Surakarta. https://eprints.ukh.ac.id/id/eprint/424/1/Naskah%20Publikasi.pdf

Priagung, B. (2021). *Literatur Review: Pengaruh Pemberian Posisi Elevasi Kepala 30° terhadap Peningkatan Saturasi Oksigen pada Pasien Stroke*. Akademi Keperawatan Pemkab Purworejo. https://doi.org/10.31219/osf.io/yrg3w

Riberholt, C. G., Wagner, V., Lindschou, J., Gluud, C., Mehlsen, J., & Møller, K. (2020). Early Head-Up Mobilisation Versus Standard Care for Patients with Severe Acquired Brain Injury: A Systematic Review with Meta-Analysis and Trial Sequential Analysis. *PLOS ONE*, *15*(8), e0237136. https://doi.org/10.1371/journal.pone.0237136

Rosmary, M. T. N., & Handayani, F. (2020). Hubungan Pengetahuan Keluarga dan Perilaku Keluarga pada Penanganan Awal Kejadian Stroke. *Holistic Nursing and Health Science*, *3*(1), 32–39. https://doi.org/10.14710/hnhs.3.1.2020.32-39

Sands, E., Wong, L., Lam, M. Y., Panerai, R. B., Robinson, T. G., & Minhas, J. S. (2020). The Effects of Gradual Change in Head Positioning on the Relationship between Systemic and Cerebral Haemodynamic Parameters in Healthy Controls and Acute Ischaemic Stroke Patients. *Brain Sciences*, *10*(9), 582. https://doi.org/10.3390/brainsci10090582

Sari, R. A. (2019). *Pengelolaan Pasien Stroke Hemoragic dengan Pemberian Oksigen dan Posisi Head Up 30° terhadap Perubahan Hemodinamik Tubuh di Ruang Igd Rsud Tugurejo Semarang*. Politeknik Kesehatan Kemenkes Semarang. https://repository.poltekkes-smg.ac.id/index.php?p=show_detail&id=18064&keywords=

Sudarno, S., & Utami, T. W. (2020). Kajian Regresi Proporsional Hazard untuk Menentukan Faktor Penyebab Stroke Menggunakan Metode Efron. *Jurnal Statistika Universitas Muhammadiyah Semarang*, *8*(1), . https://jurnal.unimus.ac.id/index.php/statistik/article/view/5763

Sufiani, F. (2022). *Literature Review: Pengaruh Pemberian Oksigenasi dan Posisi Elevasi Kepala 30^0 untuk Meningkatkan Kesadaran pada Pasien Cedera Kepala* Akademi Keperawatan Pemkab Purworejo. https://doi.org/10.31219/osf.io/tfyjh

Sulistyowati, D., Aty, Y. M. V. B., & Gatum, A. M. (2020). Hubungan Self Efficacy dengan Perilaku Self Care (dengan Pendekatan Teori Orem) Pasien Stroke di Poli Saraf RSUD Prof. Dr. W. Z. Johannes Kupang. *CHMK Applied Scientific Journal*, *3*(3), 70–75. https://doi.org/10.37792/casj.v3i3.815

Supadi, S. (2017). Pengaruh Elevasi Posisi Kepala pada Klien Stroke Hemoragik terhadap Tekanan Rata-Rata Arterial, Tekanan Darah dan Tekanan Intra Kranial di Rumah Sakit Margono Soekarjo Purwokerto Tahun 2011. *Kesmas Indonesia*, *5*(2), 154-168. http://jos.unsoed.ac.id/index.php/kesmasindo/article/view/42

Syafni, A. N. (2020). Post Stroke Patient Medical Rehabilitation. *Jurnal Ilmiah Kesehatan Sandi Husada*, *9*(2), 873–877. https://doi.org/10.35816/jiskh.v12i2.428

Truijen, J., Rasmussen, L. S., Kim, Y. S., Stam, J., Stok, W. J., Pott, F. C., & van Lieshout, J. J. (2018). Cerebral Autoregulatory Performance and the Cerebrovascular Response to Head-of-Bed Positioning in Acute Ischaemic Stroke. *European Journal of Neurology*, *25*(11), 1365-e117. https://doi.org/10.1111/ene.13737

Ugras, G. A., Yüksel, S., Temiz, Z., Eroğlu, S., Sirin, K., & Turan, Y. (2018). Effects of Different Head-of-Bed Elevations and Body Positions on Intracranial Pressure and Cerebral Perfusion Pressure in Neurosurgical Patients. *Journal of Neuroscience Nursing*, *50*(4), 247-251. https://doi.org/10.1097/jnn.0000000000000386

Ulfa, F., Nurlaily, A. P. (2019). *Asuhan Keperawatan Pasien Stroke Hemoragik dalam Pemenuhan Kebutuhan Fisiologis: Oksigenasi*. STIKes Kusuma Husada Surakarta. https://eprints.ukh.ac.id/id/eprint/54/

WHO. (2021). *WHO EMRO | Stroke, Cerebrovascular accident | Health topics*. World Health Organization - Regional Office for the Eastern Mediterranean. http://www.emro.who.int/health-topics/stroke-cerebrovascular-accident/index.html

Wulan, D. R., & Erlida, B. A. (2020). The Effect of Nihss Clinical Score Output Toward Delirium Incident on Stroke Patient. *Journal of Nursing Invention*, *1*(1), 23–31. https://ejurnal.unism.ac.id/index.php/JNI/article/view/12

Yadeau, J. T., Kahn, R. L., Lin, Y., Goytizolo, E. A., Gordon, M. A., Gadulov, Y., Garvin, S., Fields, K., Goon, A., Armendi, I., Dines, D. M., & Craig, E. V. (2019). Cerebral Oxygenation in the Sitting Position Is Not Compromised During Spontaneous or Positive-Pressure Ventilation. *HSS Journal ®*, *15*(2), 167–175. https://doi.org/10.1007/s11420-018-9642-4