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Research Article

Comparison of the Effectiveness Lateral Position 30 Degrees and 90 Degrees on Decubitus Events in Stroke Patients

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Abstract

Aims: Stroke is the second leading cause of death and disability globally, characterized by sudden neurological deficits. Pressure ulcers, caused by prolonged bed rest, can be managed non-pharmacologically through immobilization and routine tilting to prevent decubitus. To compare the effectiveness of the lateral position with an inclination of 30 and 90 degrees on the risk of decubitus in stroke patients, in this study the control group was tilted 90 degrees and the intervention group was tilted 30 degrees.

Method: The sampling method is non-probability sampling with purposive sampling, a sample of 22 patients.

Results: Data analysis using Reapeded Measurement Anova resulted in a value in the experimental group resulting in a sum of square value of 24.9, f value 14.3, $P < 0.001$, while in the control group a sum of square value of 76.5, f value 26.8, $P < 0.001$ was obtained, so it can be concluded that the lateral position with an inclination of 90 degrees and 30 degrees has the same effect, namely providing a significant influence on reducing the risk of decubitus.

Conclusions: The study reveals that stroke patients aged 56-65 have a higher risk of pressure ulcers, with low-weight patients at higher risk. Early lateral position intervention and nutrition can significantly reduce the risk of decubitus, highlighting the importance of early wound healing.

Keywords:

Decubitus, Lateral Position, Nursing, Pressure Ulcer, Stroke

INTRODUCTION

Stroke is still a major health problem, not only in Indonesia but in the world. Stroke is the second cause of death and the third cause of disability in the world. According to the World Health Organization, stroke is a condition in which clinical signs develop rapidly and suddenly in the form of focal and global neurological deficits, which can be severe and last for 24 hours or more. A stroke occurs when a brain blood vessel becomes blocked or ruptures, resulting in

part of the brain not getting the blood supply that carries the necessary oxygen, resulting in cell/tissue death (1). The prevalence of stroke according to World Stroke Organization data shows that every year there are 13.7 million new cases of stroke, and around 5.5 million deaths occur due to stroke. Approximately 70% of strokes and 87% of deaths and disabilities due to stroke occur in low and middle income countries. Over the last 15 years, on average, strokes occurred and caused more deaths in low and middle income countries

compared to high income countries. The prevalence of stroke varies in different parts of the world (2). The prevalence of stroke in the United States is approximately 7 million (3.0%), while in China the prevalence of stroke ranges between (1.8%) (rural) and (9.4%) (urban). Throughout the world, China is a country with a fairly high death rate from stroke (19.9% of all deaths in China), along with Africa and North America. (3)

In Indonesia, based on the results of Rikesdas in 2018, the prevalence of stroke increased compared to 2013, namely from (7%) to (10.9%). Nationally, the prevalence of stroke in Indonesia in 2018 based on doctor's diagnosis in people aged ≥ 15 years was (10.9%) or estimated at 2,120,362 people. Based on age groups, the incidence of stroke occurs more frequently in the 55-64 years old age group (33.3%) and the lowest proportion of stroke sufferers is in the 15-24 year age group. Men and women have almost the same proportion of stroke events. Most of the population affected by stroke have completed elementary school education (29.5%). The prevalence of stroke in urban areas is greater, namely (63.9%) compared to those living in rural areas (36.1%) (Ministry of Health of the Republic of Indonesia, 2019). One of the effects of stroke is weakness/paralysis and disruption of activities and the patient experiences quite a long period of treatment and is required to be on bedrest and because this condition results in immobilization so that the patient lies in bed, this will result in pressure on the protruding areas of the body that come into contact with the body. the surface of the bed and the risk of decubitus. Wound prevention measures in pressure ulcer patients must be taken as early as possible and carried out continuously (5).

Pressure ulcers is a pathological condition that appears in patients with prolonged bed rest, resulting in changes in the blood supply to the dermal layer tissue. The main causes of this condition include: pressure, or force per unit area, applied to vulnerable

tissue. Muscle tissue, subcutaneous fat, and dermal tissue are affected differently in the risk of developing the condition. Comorbid conditions, especially those that result in immobility, such as weakness, paralysis, or reduced tissue perfusion, such as hypoxia, greatly increase the risk of developing pressure ulcers (6). Pressure ulcers will experience concentrated pressure wherever the points that support the body's weight are in contact with the surface and area of the bed. These weight-bearing points usually occur in areas of bony prominences. Tissue overlying bony "hard areas" may differ in resistance to hypoxia or pressure compared to "soft areas" away from the bone. This may explain the frequency of pressure ulcer development at these sites. About 95% of pressure ulcers occur in the lower part of the body. Areas of the body that often experience or are at risk of developing pressure ulcers include: sacral and coccygeal, ischial tuberosity, and trochanteric areas. The sacrum is the most frequent site (36% of ulcers). The heel is the next most common site (30%), with other areas of the body each accounting for approximately 6% of pressure ulcers. About 70% of all pressure ulcers occur in people over the age of 65 (7). The prevalence of pressure ulcers varies, it is reported that 5-10% occur in acute care settings, 15-25% in home health settings and 8-40% in ICU due to decreased body immunity. Research results show that the incidence of decubitus in Indonesia is 33.3% . This figure is very high when compared to the incidence of pressure ulcers in ASEAN which is only around 21-31.3% (8).

This is a quite serious problem in both developed and developing countries, because it results in increased treatment costs and slows down the healing program for sufferers as well as aggravating the primary disease and threatening the patient's life. Therefore, it is necessary to have sufficient understanding about pressure ulcers so that a diagnosis can be made early so that management can be carried out promptly and precisely and can

be done to prevent pressure ulcers from occurring (9). Pressure ulcers is the impact of prolonged pressure on a prominent bone surface area and results in reduced blood circulation in the stressed area and over time the local tissue experiences ischemia, hypoxia and becomes necrotic. In cases of pressure ulcers, pharmacological and non-pharmacological management can be carried out. Some non-pharmacological treatments to prevent pressure ulcers consist of arranging a lying position (mobilization) / lateral position and skin massage (10). The first non-pharmacological treatment is immobilization by placing it on the right side and left side every 2 hours. Changing positions is a prevention of decubitus in stroke patients that can be done routinely. Changing positions has the potential to prevent pressure ulcers (11).

How to prevent pressure ulcers by managing pressure (including shear and friction), by changing position at least every 2 hours. The act of changing position is an individual's ability to move freely, easily and regularly with the aim of meeting activity needs to maintain health. (12). Changing positions is a periodic and scheduled change of position, for example every 08.00-10.00 WIB the patient is tilted to the right, then at 10.00-12.00 WIB the patient is put on his back, then at 12.00-14.00 WIB the patient is tilted to the left, this continues. do it continuously according to the schedule that has been made (13).

METHODS

Nursing intervention to prevent decubitus ulcers is to provide mobilization or change of position. The risk factor for immobility, weakness and paralysis in stroke patients is that the body will be static, lying in bed. The back area of the body and the protruding parts will experience friction with the bed, reduced sensation and impaired blood supply to the surrounding dermis area. Changes in position from several article sources discuss the frequency of position assignments, some every two hours, three

hours, four hours and every six hours. In the discussion, it was found that the more frequently you change positions, the better it is to prevent decubitus. The implementation is planned to start from March 2023 to May 2023.

Population

According to Politt and Beck, 2014, population is the entire group of objects in research based on inclusion and exclusion criteria, as all data that is of interest to researchers. The population in this study was stroke patients treated in treatment rooms on seventh floors A and B.

Inclusion Criteria

The inclusion criteria for the implementation are:

1. Ischemic stroke and hemorrhagic stroke patients
2. Age over 30 years
3. Patients who are at risk of developing pressure ulcers, which can be identified using the Braden scale
4. Barden scale scoring results from the moderate-severe category
5. The length of stay is more than a minimum of 2-3 days
6. Patients are being treated in rooms 7 A and B

Exclusion Criteria, the exclusion criteria for the implementation are:

1. Stroke patients who experience decreased consciousness
2. The patient is restless

Sample

The sample size calculation uses G*Power calculation version 3.1.9.4. Data analysis in this research uses Inferential Statistical Analysis, using the T-Test Mean Difference Between Independent (two groups), effect size 1.29, power 80%, with one measurement in two groups (groups); Result 22, the sampling method uses non-probability sampling with purposive sampling, samples are carried out in accordance with inclusion and exclusion criteria.

Place (Situation Analysis)

National Brain Center Hospital Prof. Dr. Dr. Mahar Mardjono Jakarta, located in the center of East Jakarta with Accreditation A (Plenary) and has the motto "Serve with Nobility", characterized by services that provide services to patients with Neurovascular Disease disorders. RSPON is equipped with various modern and sophisticated facilities and has quality resources with specialization in the nervous system, In order to improve the quality of community services, we are committed to prioritizing patient safety, ease of access and customer satisfaction, as well as continuously making improvements according to technological developments and customer needs. Future success plans will be evaluated through accreditation certification indicators from JCI (Joint Commission International). Among all the advantages it has, stroke receives special attention and must be handled by a team with comprehensive management quickly, precisely and accurately. In terms of quality substance, PON Hospital stands as a Center of Excellence: Advanced Clinical, Restoration & Rehabilitation, Education & Training, Basic Clinical & Comprehensive Research, Product Development, Community Policy Development.

Tools and Materials (Instruments)

1. Extra Pillows and Blankets
2. Stationery (Pen and Observation Sheet)
3. Decubitus risk assessment form (based on the Barden Scale)
4. Wound assessment sheet
5. Logbook with a check list that will be monitored and filled in by the family

Data analysis

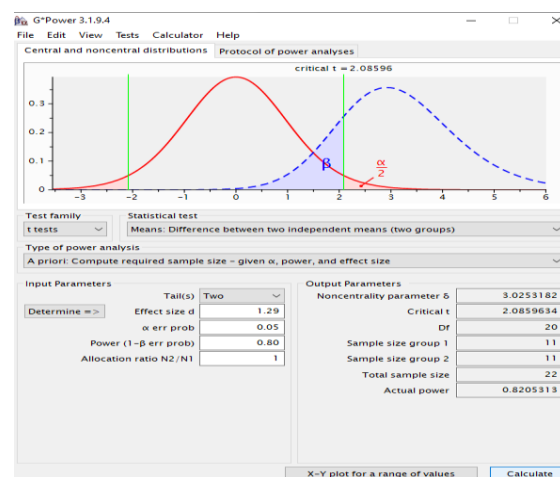
Statistical analysis are activities includes several stages:

Data Homogeneity

If differences in data are found in each variable which is not normally distributed then an Adjust will be carried out, meaning the analysis will continue by eliminating the effect of the variable.

Inferential Statistical Analysis

Data analysis in this research uses Inferential Statistical Analysis, the sample size was calculated using the G*Power calculation version 3.1.9.4. Data analysis in this research used Inferential Statistical Analysis, using the T-Test Mean Difference between Independent (two groups), effect size 1.29, power 80%, with one count. measurements in two groups (groups); Result 22. In implementing EBNP, the sampling method uses non-probability sampling with purposive sampling, samples are carried out in accordance with inclusion and exclusion criteria.



RESULTS

1. Respondent characteristics

Table 1. Frequency distribution based on characteristics of respondents in the intervention group and control group at PON Hospital (n = 22)

Indicators	Intervention group		control group	
	f	%	f	%
Age in Years				
36-45	1	9.1	2	18.8
46-55	4	36.3	2	18.8
56-65	5	45.5	6	54.5
> 65	1	9.1	1	9.1
Total	11	100	11	100
Sex				
Female	2	18	3	27.2
Male	9	82	8	72.8
Total	11	100	11	100
Stroke History				
Never had a stroke	7	63.6	5	45.2
1-2 Years ago stroke	1	9.1	4	36.3
2-3 Years ago stroke	3	27.3	2	18.5
Total	11	100	11	100

Source: Primary Data

Based on table 1, it is known that the characteristics of respondents based on age are 45.5% in the intervention group in the 56-65 year age range, and 54.5% in the control group in the 56-65 year age range. Based on gender, the intervention group was 82% male, and the control group was 72.8% male. Based on a history of previous stroke, 63.6% of respondents had never experienced a stroke before in the intervention group, while 45.2% of respondents had never experienced a stroke before in the control group.

2. Effectiveness of lateral position on risk of pressure ulcers in the intervention group and control group

Table 2. Effectiveness of lateral position on risk of pressure ulcers in the intervention group and control group at PON Hospital (n = 22)

Decubitus Risk	Mean Difference (95%CI)	Sum of Squares	f	Pvalue	ugh2G
Experiment group	-3.45	24.9	14.3	< .001	0.102
control group	-0.90	76.5	26.8	< .001	0.818

Source: Primary Data

Based on table 2, it was found that the results in the intervention group and control group both had a significant effect after being given the intervention, with a P value <0.001 in the intervention group and the intervention group. It was concluded that this lateral position intervention was effective in reducing the risk of pressure ulcers.

3. Post hoc effectiveness of the lateral position on the risk of pressure ulcers in the intervention group and control group

Table 3. Post Hoc effectiveness of lateral position on the risk of pressure ulcers in the intervention group and control group at PON Hospital (n = 22)

Decubitus Risk		Mean Difference (95%CI)	S.E	Pvalue
Experiment group	Post 1	0,000	0,000	NaN
	Post 2	-0.73	0.180	0.02
	Post 3	-1.82	0.23	< .001
	Post 4	-3.45	0.42	< .001
control group	Post 1	0,000	0,000	NaN
	Post 2	-0.09	0.18	1,000
	Post 3	-0.55	0.23	1,000
	Post 4	-0.90	0.42	< .001

Source: Primary Data

Based on table 5.3.3, it was found that the intervention group and control group experienced changes in the negative direction after the measurement was carried out (giving the effect of reducing the risk of pressure ulcers), in the first measurement there was no significant change, the second measurement and up to the fourth measurement experienced significant changes. It can be concluded that the longer it is carried out, the better this intervention will be.

4. Trend of risk scores for pressure ulcers in the intervention group and control group

Table 4. Trend of risk scores for pressure ulcers in the intervention group and control group at PON Hospital (n = 22)

Experiment Group			Control Group		
	MD	Pvalue		MD	Pvalue
Post 1	0,000	NaN	Post 1	0,000	NaN
Post 2	-0.73	0.02	Post 2	-0.09	1,000
Post 3	-1.82	< .001	Post 3	-0.55	1,000
Post 4	-3.45	< .001	Post 4	-0.90	< .001



Source: Primary Data

Based on table 4, it is known that the trend in the risk values for pressure ulcers appears good and appears significant in the intervention group, seen on the third day of measurement and increasing on the fourth day with a P value <0.001. The control group experienced a trend in measurements on the fourth day with a P value <0.001. It can be concluded that a trend of improvement in the risk of equilibus with lateral positioning was seen in the intervention and control groups, however, the intervention group experienced more improvement.

DISCUSSION

Respondent characteristics

The research results showed that the average age of respondents who experienced a stroke was 56-65 years, the youngest age of all respondents was 36 years and the oldest was 72 years. Study conducted by (14) recorded the greatest incidence of stroke in people aged over 50 years. The aging process occurs in all organs, tissues up to the cellular level, experiencing a decline in function, resulting in an increase in cases of degenerative diseases, increasing in line with a person's age, in various countries stroke cases are in the age range above 51 years. This research shows that 25% of patients in hospital are likely to suffer from pressure ulcers and this mostly occurs in stroke patients and elderly patients.

Age affects changes in all functions and organs of the human body, with increasing age, changes in the integumentary area experience changes in the structure of the skin, becoming brittle, thin, wrinkled, the collagen content and water content decrease so that it looks wrinkled and dry and there is a risk of damage. The research above reports that pressure sores are experienced by people aged over 50 years and over. In connection with the stroke experienced by the respondent, stroke is a risk of developing pressure sores (decubitus), due to the tendency of these patients to lie more often on one side due to weakness or even paralysis in the extremity area. This immobilization factor increases the risk of decubitus.

The results of the research showed that of the 22 respondents who experienced a stroke, the highest were men, 9 respondents (56%) and the lowest, namely women, 5 (65%). Study conducted by (15) Based on gender, it was found that men had a greater chance of having a stroke, but in other journals there was no difference between men and women. This is based on the theory of many factors (multi factorial) that influence the occurrence of stroke, including: lifestyle, age, history of hypertension, diabetes mellitus (DM), hyperlipidemia, abnormality of blood vessels (AVM) etc.

Risk of pressure ulcers in the control group and intervention group

The results of the study showed that the control group and intervention group had a chance of developing pressure ulcers. Study conducted by (16) It was found that factors that influence the risk of pressure ulcers are the level of weakness, length of stay and body weight. Weakness and long periods of hospitalization provide opportunities for decubitus to occur due to immobilization and static positions. Static conditions cause blood flow that carries oxygen and nutrients to not be widely distributed. The dermis area, especially the lower back area (os sacrum), is lacking in supply, thereby inhibiting oxygen and nutrients in this area, with long or long periods of care making the condition worse and increasing the opportunity for pressure ulcers to occur.

In research conducted by (17) It was found that patients with low weight (thin) had a risk of decubitus with an OR value of 2.3 compared to ideal weight. Weight factor (BB), the condition of patients who have less or thin weight will provide greater opportunities than those with ideal BB and overweight (obese), patients with less weight (thin) tend to have a more prominent bone structure which is easily affected by pressure. any surface or device that comes into contact with the patient's skin/dermis layer (bed/perlak/steaklaken/linen). Without the protection of adipose tissue (fat), the protective tissue that covers the bony prominences is inadequate, the dermis tissue in this condition is more susceptible to tissue occlusion and ischemia so decubitus injuries tend to occur.

Relationship between respondent characteristics and pressure ulcer scores

The results of this study show that there is a relationship between age and the length of the wound healing process. The average age of respondents in this study was 58 years. Study conducted by (18) It was found that the age factor influences changes in all functions and organs of the human body, with increasing age changes in the integument area experience changes in the structure of the skin, becoming thinner,

wrinkled, the collagen content and water content decrease so that it looks wrinkled and dry and there is a risk of damage. The research above reports that pressure sores are experienced by people aged over 50 years and over. In connection with strokes experienced by elderly respondents, the risk of developing pressure sores (decubitus) increases, the body static factor is caused by the tendency of these patients to lie more often on one side due to weakness or even paralysis in the extremity area. The most common places for pressure ulcers to occur are over bony prominences (bone close to the skin) such as the bottom, heel, hip, elbow, ankle, shoulder,

The effect of lateral position on the risk of decubitus

The results of this study indicate the influence of lateral position intervention on the risk of decubitus. Study conducted by (19) obtained a change in the risk score for decubitus using the Braden Scale instrument with a P value of 0.00, this intervention can significantly prevent the risk of decubitus in stroke patients.

The main function of the lateral position change intervention is to improve circulation of the dermis tissue. The principle of preventing decubitus is to avoid exposing the skin to prolonged and continuous pressure, as well as repeated sliding or friction. There are also several factors that influence the risk of decubitus and things that need to be considered, including:

Pressure theory

Stress affects cellular metabolism by reducing or inhibiting tissue circulation, which ultimately leads to tissue ischemia and necrosis. Tissue ischemia is the absence of blood or a localized reduction in blood flow due to obstruction. type patient in a lying or sitting position, body weight is supported on the bony prominences. The longer the pressure lasts, the greater the risk of skin damage. When the pressure is removed, there is a period of reactive

hyperemia or sudden increase in blood in the area, this is called a response or compensation and this will only be useful if the pressure on the skin is removed before necrosis.

Tissue damage occurs when the pressure exceeds the normal capillary closing pressure of 13-32 mmHg. After an ischemic period, white or light-colored skin may change to normal or abnormal hyperemic reactivity. Normal reactive hyperemia is characterized by normal vasodilation as the body's response to a lack of blood flow to the underlying tissue, usually less than one hour. Meanwhile, abnormal hyperemic reactivity is excessive vasodilation which can only stop > 1 hour to 2 weeks after the pressure disappears.

The skin and subcutaneous tissue can tolerate some pressure, however, if external pressure exceeds the pressure in the capillary walls it will decrease and inhibit blood flow to the tissue. This tissue will experience hypoxia and ultimately injury due to ischemia. If the pressure is more than 32 mmHg and continues to reach the point of hypoxia, then the blood vessels will collapse and a thrombus will form, and if this pressure can be avoided before the critical point of hypoxia, then circulation to the tissue will recover.

High surface pressure is a significant factor in the risk of developing pressure ulcers. Surface pressure (interface) is measured by placing a surface pressure measuring device (Portable Interface Pressure Sensor) between the stressed area and the mattress. The standard measurement of normal interface pressure in Indonesia is < 35 mmHg². Pressure ulcer prevention should focus more on efforts to prevent excessive pressure³. Pressure ulcer prevention and management is the selection of appropriate support surface pressure distribution or pressure redistributing interface for lying in bed⁴. The length of treatment days and the condition of the disease will threaten the occurrence of decubitus. Nurses have been making efforts to prevent pressure ulcers by moving to bed.

Measuring interface pressure is applied externally, namely on the skin layer by placing an interface pressure measuring device (pressure pad evaluator) between the stressed area and the mattress. This emphasis can be reduced by: Techniques: static and dynamic. Technique: static is distributed to other parts of the body surface. Pressure theory (obese people are at risk because with a heavier weight, the pressure of gravitational forces will press harder on the bed area. Solutions to this problem include: changing linen regularly to warm and soft material, or using a bed made of or filled with air/ foam/gel. Dynamic Technical is a dynamic device used a power source to generate air currents (air circulation, introducing attacks that will distribute the pressure on areas of the body, dynamic examples:

Trend of daily average values after intervention

The results of this study show that looking at the average after being measured with an instrument every day, it can be concluded that the quicker the mobilization (lateral position) is carried out, the more the risk will be reduced. Study conducted by (20) shows the influence of nutritional status on the length of the wound healing process and the need for early position changes when patients experience extremity.

CONCLUSION

The study found that the average age of stroke patients is 56-65 years, with the highest incidence occurring in those over 50 years. Age affects changes in the human body, leading to a decline in function and increased risk of degenerative diseases. Pressure ulcers are more common in stroke patients and elderly patients, with 25% of hospitalized patients suffering from pressure ulcers. Factors influencing the risk of pressure ulcers include weakness, length of stay, and body weight. Patients with low weight have a higher risk of decubitus due to their prominent bone structure, which is easily affected by pressure. The study also found a relationship between age and the

length of the wound healing process. The study reveals that lateral position intervention significantly reduces the risk of decubitus in stroke patients. The main function of this intervention is to improve circulation of dermis tissue, preventing skin damage from prolonged pressure and repeated sliding. Factors influencing the risk of decubitus include pressure theory, high surface pressure, and pressure ulcer prevention. The study suggests that quicker mobilization and early position changes can reduce the risk of decubitus. Nutritional status also plays a role in the wound healing process and the need for early position changes when patients experience extremity injuries. Therefore, lateral position changes can significantly reduce the risk of decubitus in stroke patients.

LIMITATIONS

In carrying out this research there are limitations and deficiencies that researchers get which can allow for the non-optimality of the results of this study, including: The hospital allows intervention to be carried out by physiotherapists, so they cannot intervene according to the time the researcher has. Researchers must adjust the time with physiotherapists so that research time becomes more limited. Researchers cannot control the administration of analgesics to patients which is another factor that can affect the results of interventions in reducing pain in patients.

REFERENCES

- Lindsay MP, Norrving B, Sacco RL, Brainin M, Hacke W, Martins S, et al. World Stroke Organization (WSO): Global Stroke Fact Sheet 2019. *International Journal of Stroke*. 2019;14(8):806–17.
- Xing L, Jing L, Tian Y, Liu S, Lin M, Du Z, et al. High prevalence of stroke and uncontrolled associated risk factors are major public health challenges in rural northeast China: A population-based study. *International Journal of Stroke*. 2020;15(4):399–411.
- Chao BH, Yan F, Hua Y, Liu JM, Yang Y, Ji XM, et al. Stroke prevention and control system in China: CSPPC-Stroke Program. *International Journal of Stroke*. 2021;16(3):265–72.
- Brier J, lia dwi jayanti. No 主観的健康感を中心とした在宅高齢者における健康関連指標に関する共分散構造分析Title. 2020;21(1):1–9.
- Shibabaw wondimeneh, Aynalem YA, Yirga T. Evidence on the Effect of Position Change on Pressure Ulcer among Hospitalized Adult Patients in Ethiopia: Meta-Analysis and Systematic Review. *Evidence on the Effect of Position Change on Pressure Ulcer among Hospitalized Adult Patients in Ethiopia: Meta-Analysis and Systematic Review*. 2019;(August):1–21.
- Bergstrom N, Horn SD, Rapp MP, Stern A, Barrett R, Watkiss M. Turning for ulcer Reduction: A Multisite randomized clinical trial in nursing homes. *Journal of the American Geriatrics Society*. 2013;61(10):1705–13.
- Moore Z, Cowman S, Conroy RM. A randomised controlled clinical trial of repositioning, using the 30° tilt, for the prevention of pressure ulcers. *Journal of Clinical Nursing*. 2011;20(17–18):2633–44.
- McKenzie H. by Doctor of Philosophy JJ-IJ. PhD thesis. 2014;
- Chao BH, Yan F, Hua Y, Liu JM, Yang Y, Ji XM, et al. Stroke prevention and control system in China: CSPPC-Stroke Program. *International Journal of Stroke*. 2021;16(3):265–72.
- Avsar P, Moore Z, Patton D, O'Connor T, Budri AMV, Nuget L. Repositioning for preventing pressure ulcers: A systematic review and meta-analysis. *Journal of Wound Care*. 2020;29(9):496–508.
- Padula W V., Wald HM, Makic MBF. Pressure ulcer risk assessment and

- prevention. *Annals of Internal Medicine*. 2013;159(10):718.
12. Jiang H, Liang Y, Liu X, Ye D, Peng M, Chen Y, et al. The risk factors-based nursing case management could effectively reduce the incidence of pressure sores in hospitalized patients. *Iranian Journal of Public Health*. 2021;50(3):566–72.
 13. Meliza SC, Ritarwa K, Sitohang NA. The Prevention of Ulcers Decubitus with Mobilization and The Usage of Olive Oil on Stroke Patients. *Elkawnie*. 2020;6(2):189.
 14. Xia X, Yue W, Chao B, Li M, Cao L, Wang L, et al. Prevalence and risk factors of stroke in the elderly in Northern China: data from the National Stroke Screening Survey. *Journal of Neurology*. 2019;266(6):1449–58.
 15. Liao X, Ju Y, Liu G, Zhao X, Wang Y, Wang Y. Risk Factors for Pressure Sores in Hospitalized Acute Ischemic Stroke Patients. *Journal of Stroke and Cerebrovascular Diseases*. 2019;28(7):2026–30.
 16. Ghiasian M, Niroomandi Z, Dastan D, Poorolajal J, Zare F, Ataei S. Clinical and phytochemical studies of *Plantago major* in pressure ulcer treatment: A randomized controlled trial. *Complementary Therapies in Clinical Practice*. 2021;43(September 2020).
 17. Su Y, Yuki M, Otsuki M. Prevalence of stroke-related sarcopenia: A systematic review and meta-analysis. *Journal of Stroke and Cerebrovascular Diseases*. 2020;29(9).
 18. Bilir Kaya B. Pressure ulcer rates of stroke patients in a public rehabilitation hospital and training rates of nurses for pressure ulcer. *Journal of Surgery and Medicine*. 2019;3(7):512–4.
 19. Ghiasian M, Niroomandi Z, Dastan D, Poorolajal J, Zare F, Ataei S. Clinical and phytochemical studies of *Plantago major* in pressure ulcer treatment: A randomized controlled trial. *Complementary Therapies in Clinical Practice*. 2021;43(September 2020).
 20. Su Y, Yuki M, Otsuki M. Prevalence of stroke-related sarcopenia: A systematic review and meta-analysis. *Journal of Stroke and Cerebrovascular Diseases*. 2020;29(9).

