



## READMISSION OF STROKE PATIENTS AND RISK FACTORS: LITERATURE REVIEW

Anna Jumatul Laely<sup>1,2\*</sup>, Nursalam<sup>3</sup>, Ferry Efendi<sup>3</sup>

<sup>1</sup>Medical Surgical Nursing Specialist, Faculty of Nursing, Universitas Airlangga, Mulyorejo, Surabaya, East Java 60115, Indonesia

<sup>2</sup>dr. Kariadi General Hospital, Jl. DR. Sutomo No.16, Randusari, Semarang Selatan, Semarang, Central Java 50244, Indonesia

<sup>3</sup>Faculty of Nursing, Universitas Airlangga, Mulyorejo, Surabaya, East Java 60115, Indonesia  
\*[annajumatullaely@yahoo.co.id](mailto:annajumatullaely@yahoo.co.id)

### ABSTRACT

Stroke is still a concern for the health consent due to its high mortality and morbidity rates. Readmission of stroke patients is one of the factors that causes it. Risk factors that causing readmission of stroke patients are the main focus for nurses in order to give nursing services to patients in hospital. The aim of the research is to describe the evidence base for factors that cause readmission in stroke patients. This study is a literature review, with approach using 10 journals. Articles that were reviewed were selected from Google Scholar, Ebsco, Clinical key and Proquest which had been peer-reviewed and published. The inclusion criteria in the search were full-text articles, original text, English language, and the last 5 years, while the keywords used in the search for articles were caused factor, readmission, and stroke patient. The results of the data search obtained 539 articles, 10 articles were then reviewed. The articles used cross-sectional design (n=5) and cohort study (n=5), the cohort design consists of 3 retrospective studies, 2 prospective cohort studies. The causal factors related to the incidence of readmission in stroke patients are unpreventable factor and preventable factor of readmission. Unpreventable factors related to basic demographic data (age, gender, ethnicity, residences) and type of stroke. Meanwhile, preventable factors related to infection, complication of comorbid and the patient's functional ability during discharge. Readmissions of stroke patients are an indicator of services quality provided to patients during their hospitalization. Provision of services according to standards, prevention of infection and complications from patient are the main things that can reduce patient readmission rates.

Keywords: risk factors; readmission; stroke

<b>First Received</b> 10 December 2023	<b>Revised</b> 15 December 2023	<b>Accepted</b> 28 December 2023
<b>Final Proof Received</b> 08 January 2024		<b>Published</b> 22 January 2024
<b>How to cite (in APA style)</b> Laely, A. J., Nursalam, N., & Efendi, F. (2024). Readmission of Stroke Patients and Risk Factors: Literature Review. Indonesian Journal of Global Health Research, 6(1), 75-82. <a href="https://doi.org/10.37287/ijghr.v6i1.2624">https://doi.org/10.37287/ijghr.v6i1.2624</a> .		

### INTRODUCTION

Stroke is a one of disease that still a concern in the health sector at the world and national levels. Stroke is still be the second cause of death and the third cause of disability in patients in the world (Johnson et al., 2016) and in Indonesia it is the first cause of death and is one of the diseases that has the third highest impact on health service costs in 2018 (Kemenkes RI, 2018). Patients who experience their first stroke, after discharged, are still at risk of experiencing a recurrent stroke, requiring readmission. Readmission after the first stroke is one of the factors that causes the morbidity and mortality rates of stroke patients increased. (Abreu et al., 2020)

High readmission rates occur between 6-12 months after hospital discharge which are associated with preventable complications. The Goldfield criteria (Jackson et al., 2014) state

that Unpreventable readmission and Potentially Preventable Readmission (PPR) are the two main factors causing patient readmissions in hospitals and 56% of readmissions in patients under the PPR criteria. Another study stated that the readmission rate for stroke patients within one year was 31.6%, of which 65.3% were preventable factors, caused due to infection and cardiovascular comorbidities (Abreu et al., 2020; Kurniya et al., 2020)

The readmission rate for stroke patients is quite high. The patient readmission rate is an indicator of the quality of health services in hospitals, especially those related to nursing services. Several studies state that the increased risk of complications after discharge is due to the lack of knowledge of nurses to provide education to patients and their care givers regarding the needs of patients with complex post-stroke conditions such as preventing recurrent strokes, awareness of risk factors or comorbidities, signs and symptoms to watch out for, post-stroke rehabilitation such as the need for physiotherapy, occupational therapy and others. (Kitzman et al., 2017)

Nurses are one of the frontline health workers in providing care in hospitals, so it is imperative for them to know what factors can cause the readmission of stroke patients. Factors that can be prevented as caused readmissions in stroke patients are the main focus that can be items in education for patients and families, so that it is hoped can reduce readmission rates, improve patient quality of life and satisfaction with health services (Visvanathan, 2019). Therefore, the aim of this research is to find out and describe the risk factors that cause the readmission of stroke patients through a literature review based on an E-database of indexed online journals.

## **METHOD**

The design used to identify research that has been carried out with a literature review. Articles searching were carried out through E-data bases from Proquest, Ebsco, Clinical Key for nursing and Science Direct using several search methods and keywords. Journals used as reviews have inclusion criteria. Inclusion criteria in this systemic review include a maximum time span of article publication of 5 years (2017-2022), open access, the english language, original and full text is available. The research variables used in the article search were readmission and stroke factors. Data search strategy using an E-database in each journal that has been determined by keywords including risk factor, causes, readmission, and stroke and can include Boolean logic (AND, OR, or NOT) between the keywords used. Next, articles are filtered by paying attention to limitations including year, full text, original text, and English language.

### **Extraction and Data Analysis**

The results of the data search obtained 539 articles, consisting of 2 identical articles, and 527 articles were not relevant due to several criteria such as not being full text, being in the form of a systematic review and not meeting other desired inclusion criteria. Before the assessment was carried out, the articles that had been collected were identified, screened, and eligibilized, and finally 10 articles were obtained that were suitable for the final assessment. Research articles that meet the inclusion criteria are then collected and a summary is made including the name of the article researcher, year of publication of the article, design, instruments, analysis methods, sample size, sampling technique, and a summary of the results or findings.

To obtain a clearer analysis, the abstract and full text of the article are read and examined, data synthesis uses a narrative method by grouping similar extracted data according to the results measured to answer the objectives. The data that has been collected is then looked for

similarities and differences and then discussed to draw conclusions. These similarities and differences can provide an understanding of the factors that cause the readmission of stroke patients, from the results obtained new ideas emerge that are useful as a guide for further research.

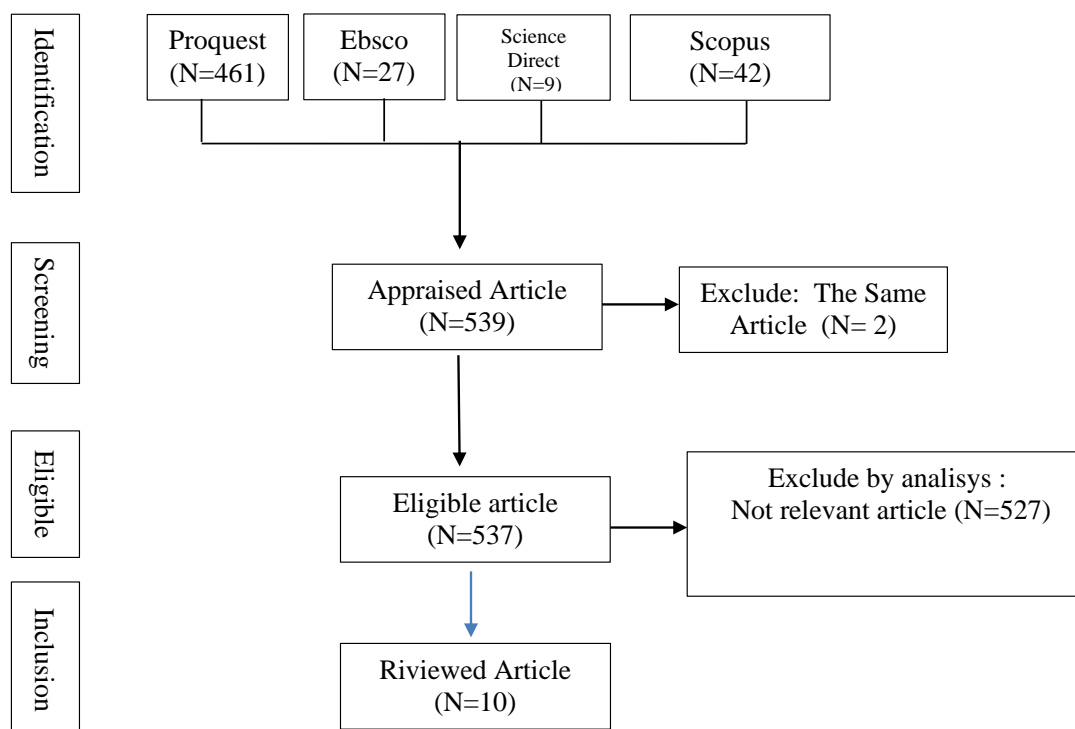


Figure 1. Flow diagram of Journal Review results

## RESULTS

Table 1.  
Article Analysis Results

Researcher/title/doi	Sample size	Design	Result
Swee Hung Ang, Wen Yea Hwong, Michiel L. Bots et al. Risk of 28-day readmissions among stroke patients in Malaysia (2008–2015): Trends, causes and its associated factors.(2021) PLOS ONE16(1):e0245448. doi: 10.1371/journal.pone.0245448	151729 subjects who were discharged from hospital during 2008-2015 due to stroke	Cross-sectional survey, derived from secondary data from patient medical records for 2008-2015	In general, about 60% of patients are men and almost two thirds (61.4-63.5%) are between 50 and 74 years old, in accordance with the theory of 85% of ischemic strokes. The average readmission rate is 10.9%-13.3% every year. Factors associated with readmission after 28 days post-discharge were age, ethnic group, stroke subtype and length of stay. The increase in readmission rates was seen in men and women aged over 50 years, Malay ethnic groups, bleeding stroke types and patients who received longer treatment. Meanwhile, the 5 most common diagnoses or causes for readmissions after stroke are recurrent stroke (32.1%), followed by stroke complications such as pneumonia (13.0%), sepsis (4.8%) and urinary tract infection (UTI) ( 2.9%) and ischemic heart disease (3.7%).
Tiancai Wen, Baoyan Lu, et al. Risk factors associated with 31-day unplanned readmission in 50,912 discharged patients after stroke in China.	50,912 patients who experienced unplanned readmissions between	The survey from medical record data from 375 hospitals in 29	From 50,912 patients, the readmission rate for unplanned stroke patients <31 days after discharge was 28.8%. The causes that most influence the unplanned readmission of stroke patients <31 days are age, type of stroke, health insurance/payment, pathway use, length of stay in hospital and the presence of comorbidities in the patient. Patients aged less than 50 years have a higher risk of

Researcher/title/doi	Sample size	Design	Result
(2018) BMC Neurology 18 : 218. 2018 doi:10.1186/s12883-018-0129-y	2016-2016	provinces	readmission, this may be related to lifestyle such as smoking, diabetes and hypertension. Regarding the type of stroke, hemorrhagic strokes have a higher risk of readmission in patients. Meanwhile, treating stroke patients in accordance with standard operating procedures with the use of pathways and a treatment duration of <7 days is a lower risk factor for readmission. Recurrent stroke attacks are higher in patients with comorbidities, namely hypertension, cardio/cerebrovascular disease and diabetes/diabetes complications. Where a higher risk is associated with diabetes.
Bjerkreim Anna, Khanevsky Andrej et al. The Impact of Ischaemic Stroke Subtype on 30-day Hospital Readmission. Stroke Research and Treatment (2018) Volume. Article ID 7195369, 7 pages. 2018  doi:10.1155/2018/7195369	1874 patients were treated for ischemic stroke and Ischemic Attack (TIA).	Retrospektif cohort study from July 2007 - December 2013 from medical record data	Of the 1874 patients, the number of unplanned readmissions was 200 patients (10.7%) within 30 days of discharge. The most frequent predictive factors for readmissions are events related to recurrent stroke or TIA, the presence of infection and comorbid heart disease. Meanwhile, factors that cannot be prevented include age, gender, functional results, length of treatment, presence of other risk factors, and type of stroke. Risk factors for readmission in patients who are older and male, have lower functional independence (high level of dependency), higher NIHSS score at discharge, length of stay of more than 7 days, complications that arise during treatment and patients with large-artery atherosclerosis (LAA) and Other Determinant Etiology (SOE) strokes. Predictors of readmission within 30 days were independent of the occurrence of death at one year
Bjerkreim Anna, Khanevsky Andrej et al. <i>Thirty-day readmission after spontaneous intracerebral haemorrhage</i> (2019). Wiley, brain and behaviour. DOI: 10.1002/brb3.935	226 patients with ICH	Retrospektif cohort study from July 2007 - December 2013 from medical data records	226 patients with spontaneous ICH, 70 (31.0%) died before discharge or discharge to palliative care. Of the remaining 156 patients with ICH, 28 (18.0%) were readmitted within 30 days. Median time to readmission was 12 days (IQR 4.5 – 18.5). The causative factor for readmission in most patients was infection (N = 13). The most common infection was pneumonia (n = 6), of whom five suffered from pneumonia during hospitalization and infections caused by patients receiving enteral feeding (nasogastric tube or endoscopic percutaneous ngastrostomy) during hospitalization.
Jing Zhang ,1 Ping Zhu et al. Time to recurrence after first-ever ischaemic stroke within 3 years and its risk factors in Chinese population: a prospective cohort study. BNJ open. 2019;9:e032087. doi :10.1136/bmjopen-2019-032087	641 survivors with ischaemic stroke over a period of 3 years	Prospektif cohort study from January 2010 until december 2016	Of the 641 living patients who were followed up for 3 years. Stroke readmissions occurred in 115 patients, including 16 patients who died due to recurrent stroke. Cumulative risk of stroke recurrence rate/recurrent stroke was 11.51% (9.20%-14.35%) at 1 year, 16.76% (13.96%–20.05%) at 2 years and 20.07% (17.00%–23.61%) at 3 years. Modified Rankin Scale (mRS) score and medication adherence are predictive factors for stroke recurrence.
Kilkenny F Monique, L Lachlan, Dalli, B BiomedSci (Hons), et al (2019) . <i>Factors Associated With 90-Day Readmission After Stroke or Transient Ischemic</i>	13.594 patients who discharged caused stroke/TIA which record in Australian Clinical	Observation cohort study from 2009-2013	Of the 13,594 patients recorded as admitted from 2009-2013, 80% were diagnosed with stroke of any type (the largest was ischemic stroke, namely 81%) and 20% had TIA. Within 90 days after discharge, 3444 patients (25.3%) experienced readmissions, of which 2038 (59%) were unplanned readmissions. Stroke patients who experienced an unplanned readmission within 90 days after discharge were due to a fall, namely 6% and 15% due to another

Researcher/title/doi	Sample size	Design	Result
Attack <i>Linked Data From the Australian Stroke Registry. ahajournals, 2019</i> DOI: 10.1161/STROKEAH A.119.026133	Stroke Registry (AusCSR)		stroke, while TIA patients were caused by a stroke as much as 8%. Factors causing unplanned readmissions are not only basic demographic factors (age, gender, place of residence) but also comorbidities. Female patients and older age are factors that are often reported as the main causes of readmissions, while comorbidities include a history of diabetes mellitus, cancer, heart disease and kidney disease.
Amelia K. Boehme, PhD, MSPH; Erin R. Kulick, PhD, MPH; Michelle Canning, MPH, et al (2019). <i>Infections Increase the Risk of 30-Day Readmissions Among Stroke Survivors, Analysis of the National Readmission Database. ahajournals, December,2019</i> DOI: 10.1161/STROKEAH A.118.022837	319 317 patients ischaemic stroke	Cross-sectional survey from readmission National data of 2013 in all US hospital	Among 319,317 ischemic stroke patients, 12.1% were readmitted within 30 days, and 29% experienced infections during their hospitalization. Stroke patients who experienced an infection during hospitalization had a 21% higher chance of experiencing an unplanned readmission compared to patients who did not experience any infection. Sepsis, pneumonia and UTI are associated with an increased chance of readmission within 30 days after discharge in stroke patients.
Farhaan S. Vahidy, MD, PhD; John P. Donnelly, MSPH; Louise D. McCullough, MD, PhD; et al. (2017). <i>Nationwide Estimates of 30-Day Readmission in Patients With Ischemic Stroke. ahajournals, 2017</i> DOI: 10.1161/STROKEAHA. 116.016085	319 317 patients ischaemic stroke	Cross-sectional survey from readmission National data of 2013 in all US hospital	Of the 319,317 patients with acute ischemic stroke, 12.1% experienced readmissions. Of these, 89.6% experienced unplanned readmissions and 12.9% were potentially preventable. More than 20% of patients who experienced readmissions were caused by acute cerebrovascular disease. These patients were older and had a higher burden of comorbidities. After controlling for age, gender, insurance status, and comorbidities, patients who underwent recanalization therapy had significantly lower odds of readmission after 30 days post-hospitalization
Kun-Yang Chuang, Shwu-Chong Wu Ai-Hsuan Sandra Ma, Yu-Hui Chen, Chen-Long Wu. (2017). <i>Identifying Factors Associated With Hospital Readmissions Among Stroke Patients in Taipei. Journal of Nursing Research Vol. 13, No. 2, 2017.</i>	489 stroke patients	Cross-sectional study	489 stroke patients who were recorded as inpatients in the neurology wards of 7 hospitals, 24.3% of these patients experienced readmissions. Factors associated with readmission in these patients are due to the level of dependency or limitations in fulfilling ADLs, the first incident of stroke, the need for wound care, planning for further care and location of residence. Other factors such as age, length of stay, counseling before going home, and busyness of the care giver are not related to the readmission factor. Findings from research results state that limitations in fulfilling ADL are a predictor. effective ones related to readmission
Swanson, Moger Anders. <i>Comparisons of readmissions and mortality based on post-discharge ambulatory follow-up services received by stroke patients discharged home: a</i>	5096 stroke patients treated in several hospitals in Oslo from 2009-2014	cohort study	There was no significant difference between post-stroke patients who received post-hospital follow-up from a doctor or not in terms of readmission rates. Patients who received care and/or rehabilitation at home had no higher readmission rates at 90 and 365 days post-hospitalization compared to those who did not receive any services. There was no significant difference between patients who received further care at home by a general practitioner or not after risk adjustment. For patients who received post-

Researcher/title/doi	Sample size	Design	Result
<i>register-based study.</i> (2019) <i>BMC Health Services Research</i> (2019) 19:4 <a href="https://doi.org/10.1186/s12913-018-3809">https://doi.org/10.1186/s12913-018-3809</a>			discharge rehabilitation, the mortality rate was higher compared to those who did not receive the service, while the mortality rate for patients who only received home care was no different from those who did not.

## DISCUSSION

All identified articles were obtained through literature searches from journal databases. Of the ten articles reviewed, there were 5 articles that used a cross-sectional study design through surveys, and 5 cohort studies. The cohort design consists of 3 retrospective studies, 2 prospective cohort studies. All research uses secondary data from patient medical records. (Ang et al., 2021; Bjerkreim, Khanevski, Glad, et al., 2018; Bjerkreim, Khanevski, Selvik, et al., 2018; Boehme et al., 2018; Chuang et al., 2005; Kilkenny et al., 2020; Swanson & Moger, 2019; Vahidy et al., 2017; Wen et al., 2018b; Zhang et al., 2019a)

The results show that the incidence of readmissions for stroke patients ranges from 10% -28% each year, where readmissions for stroke patients can occur 7-30 days after the patient is discharged. The causal factors related to the incidence of readmission in stroke patients can be concluded to be divided into 2 factors, namely factors that cannot be prevented and factors that can be prevented. Non-preventable factors relate to basic demographic data (age, gender, ethnicity, residence) and type of stroke. Meanwhile, factors that can be prevented include the presence of infections, comorbidities or accompanying diseases, the patient's functional ability to fulfill Activity Daily Living needs.

## DISCUSSION

The readmission rate for stroke patients should be used as an indicator of the quality of service provided to stroke patients during their hospitalization. This is in accordance with the results of research which states that the cause that most influences the unplanned readmission of stroke patients <31 days is compliance in using standards in patient care by health workers in hospitals. Treatment of stroke patients according to standard operating procedures with the use of pathways and treatment duration of <7 days reduces the risk factors for readmission (Wen et al., 2018a). In another study, it was stated that recanalization therapy had a significantly lower chance of readmission after 30 days post-hospitalization. (Vahidy et al., 2017)

Several risk factors for preventable readmissions must also be a focus in providing services to stroke patients during hospitalization. Infections and complications from patient comorbidities are the main factors that cause readmissions, so it is necessary to prevent these two things. (Khanevski et al., 2018; Zhang et al., 2019b) Stroke patients who experience infection during hospitalization have a 21% higher chance of experiencing an unplanned readmission. (Bjerkreim, Khanevski, Glad, et al., 2018; Boehme et al., 2018; Miller et al., 2019) The five most common diagnoses or causes for readmission after stroke were recurrent stroke (32.1%), followed by stroke complications such as pneumonia (13.0%), sepsis (4.8%) and urinary tract infection (UTI) ( 2.9%) and ischemic heart disease (3.7%). (Ang et al., 2021) Based on the results of other studies, it is also stated that a high level of dependence on patients when they are discharged can also be a risk factor for readmissions in patients. Patients with lower functional ability to fulfill their activity daily needs, who still have a high NIHSS score at

discharge, may experience higher readmissions < 30 days post discharge. (Bjerkreim, Khanevski, Selvik, et al., 2018; Chuang et al., 2005; Lin et al., 2022)

## **CONCLUSION**

Overall, the article states that the readmission rate in stroke patients is quite high, where there are several factors that cause patient readmissions which should be prevented, thereby reducing the readmission rate. Preventable factors that lead to the readmission of stroke patients are a concern that must be considered by care providers, especially in determining discharge planning for patients. The limitation in this research is that all articles found are based on research originating from secondary data, from patient medical record, so that to strengthen the research results, it is necessary to carry out research that originates from primary data, namely the patients themselves through questionnaires or qualitative studie.

## **REFERENCES**

- Abreu, P., Magalhães, R., Baptista, D., Azevedo, E., Silva, M. C., & Correia, M. (2020). Readmissions and Mortality During the First Year After Stroke—Data From a Population-Based Incidence Study. *Frontiers in Neurology*, 11(July), 1–11. <https://doi.org/10.3389/fneur.2020.00636>
- Ang, S. H., Hwong, W. Y., Bots, M. L., Sivasampu, S., Aziz, A. F. A., Hoo, F. K., & Vaartjes, I. (2021). Risk of 28-day readmissions among stroke patients in Malaysia (2008–2015): Trends, causes and its associated factors. In *PLoS ONE* (Vol. 16, Issue 1 January). Public Library of Science. <https://doi.org/10.1371/journal.pone.0245448>
- Bjerkreim, A. T., Khanevski, A. N., Glad, S. B., Thomassen, L., Naess, H., & Logallo, N. (2018). Thirty-day readmission after spontaneous intracerebral hemorrhage. *Brain and Behavior*, 8(3). <https://doi.org/10.1002/brb3.935>
- Bjerkreim, A. T., Khanevski, A. N., Selvik, H. A., Waje-Andreassen, U., Thomassen, L., Naess, H., & Logallo, N. (2018). The Impact of Ischaemic Stroke Subtype on 30-day Hospital Readmissions. *Stroke Research and Treatment*, 2018. <https://doi.org/10.1155/2018/7195369>
- Boehme, A. K., Kulick, E. R., Canning, M., Alvord, T., Khaksari, B., Omran, S., Willey, J. Z., & Elkind, M. S. V. (2018). Infections increase the risk of 30-day readmissions among stroke survivors: Analysis of the National Readmission Database. *Stroke*, 49(12), 2999–3005. <https://doi.org/10.1161/STROKEAHA.118.022837>
- Chuang, K.-Y., Wu, S.-C., Ai-Hsuan, ., Ma, S., Chen, Y.-H., & Wu, C.-L. (2005). Identifying Factors Associated With Hospital Readmissions Among Stroke Patients in Taipei. *Journal of Nursing Research*, 13(2), 117–127.
- Jackson, A. H., Fireman, E., Feigenbaum, P., Neuwirth, E., Kipnis, P., & Bellows, J. (2014). Manual and automated methods for identifying potentially preventable readmissions: A comparison in a large healthcare system. *BMC Medical Informatics and Decision Making*, 14(1), 0–4. <https://doi.org/10.1186/1472-6947-14-28>
- Johnson, W., Onuma, O., Owolabi, M., & Sachdev, S. (2016). Stroke: A global response is needed. *Bulletin of the World Health Organization*, 94(9), 634A-635A. <https://doi.org/10.2471/BLT.16.181636>
- Kemenkes RI. (2018). Stroke Dont Be The One (p. 10).

- Khanevski, A. N., Bjerkreim, A. T., Novotny, V., Næss, H., Thomassen, L., Logallo, N., & Kvistad, C. E. (2018). Thirty-day recurrence after ischemic stroke or TIA. *Brain and Behavior*, 8(10). <https://doi.org/10.1002/brb3.1108>
- Kilkenny, M. F., Dalli, L. L., Hons, B., Kim, J., Sundararajan, V., Andrew, N. E., Dewey, H. M., Johnston, T., Alif, S. M., Lindley, R. I., Jude, M., Blacker, D., Gange, N., Grimley, R., Katzenellenbogen, J. M., Thrift, A. G., Lannin, N. A., & Cadilhac, D. A. (2020). Factors Associated With 90-Day Readmission After Stroke or Transient Ischemic Attack Linked Data From the Australian Stroke Clinical Registry. 27–31. <https://doi.org/10.1161/STROKEAHA.119.026133>
- Kitzman, P., Hudson, K., Sylvia, V., Feltner, F., & Lovins, J. (2017). Care Coordination for Community Transitions for Individuals Post-stroke Returning to Low-Resource Rural Communities. *Journal of Community Health*, 42(3), 565–572. <https://doi.org/10.1007/s10900-016-0289-0>
- Kurniya, D., Elasari, Y., & Noor Anisa, F. (2020). Faktor-Faktor yang Mempengaruhi Terjadinya Readmission pada Pasien Stroke di Rumah Sakit: Literature Review. *Proceeding of Sari Mulia University Nursing National Seminars*, 69–79.
- Lin, S., Wang, C., Wang, Q., Xie, S., Tu, Q., Zhang, H., Peng, M., Zhou, J., & Redfern, J. (2022). The experience of stroke survivors and caregivers during hospital-to-home transitional care: A qualitative longitudinal study. *International Journal of Nursing Studies*, 130. <https://doi.org/10.1016/j.ijnurstu.2022.104213>
- Miller, E. C., Wen, T., Elkind, M. S. V., Friedman, A. M., & Boehme, A. K. (2019). Infection During Delivery Hospitalization and Risk of Readmission for Postpartum Stroke. *Stroke*, 50(10), 2685–2691. <https://doi.org/10.1161/STROKEAHA.119.025970>
- Swanson, J. O., & Moger, T. A. (2019). Comparisons of readmissions and mortality based on post-discharge ambulatory follow-up services received by stroke patients discharged home: A register-based study. *11 Medical and Health Sciences 1117 Public Health and Health Services. BMC Health Services Research*, 19(1). <https://doi.org/10.1186/s12913-018-3809-z>
- Vahidy, F., Donnelly, J., McCullough, L., Tyson, J., Miller, C., Boehme, A., Savitz, S., & Albright, K. (2017). Nationwide Estimates of 30-Day Readmission in Patients With Ischemic Stroke. *Stroke*. <https://doi.org/10.1161/STROKEAHA.110.599159>
- Visvanathan, V. (2019). Early supported discharge services for people with acute stroke: A Cochrane review summary. *International Journal of Nursing Studies*, 94, 186–187. <https://doi.org/10.1016/j.ijnurstu.2018.07.007>
- Wen, T., Liu, B., Wan, X., Zhang, X., Zhang, J., Zhou, X., Lau, A. Y. L., & Zhang, Y. (2018a). Risk factors associated with 31-day unplanned readmission in 50,912 discharged patients after stroke in China. *BMC Neurology*, 18(1). <https://doi.org/10.1186/s12883-018-1209-y>
- Zhang, J., Zhu, P., Liu, B., Yao, Q., Yan, K., Zheng, Q., Li, Y., Zhang, L., Li, M., Wang, J., Zhu, C., & Zhou, M. (2019a). Time to recurrence after first-ever ischaemic stroke within 3 years and its risk factors in Chinese population: A prospective cohort study. *BMJ Open*, 9(12). <https://doi.org/10.1136/bmjopen-2019-032087>