International Journal of Clinical Pharmacy
https://doi.org/10.1007/s11096-020-01178-y

RESEARCH ARTICLE

Knowledge of stroke and medication adherence among patients with recurrent stroke or transient ischemic attack in Indonesia: a multi-center, cross-sectional study

Karina Kumaladewi Widjaja[1] · Suvatna Chulavatnatol[1] · Thanarat Suansanae[1] · Yosi Irawati Wibowo[2] · Achmad Firdaus Sani[3] · Wardah Rahmatul Islamiyah[3] · Surakit Nathisuwan[1]

Received: 16 July 2020 / Accepted: 20 October 2020

Abstract

*Background*There is a limited data in Indonesia regarding the stroke knowledge and medication adherence among stroke survivors.*Objective*To assess the level of stroke knowledge and medication adherence along with their relationship among stroke survivors.*Setting*Two tertiary-care hospitals in Surabaya, East Java, Indonesia.*Methods*A prospective, cross-sectional study was conducted among 215 stroke survivors. Stroke Knowledge Test and the Morisky Green Levine Adherence Scale questionnaires were used to evaluate stroke knowledge and medication adherence, respectively. Binary logistic regression was performed to assess the relationship between stroke knowledge and medication adherence.*Main outcome measures*Relationship between stroke knowledge and medication adherence.*Results*A total of 215 patients with mean age of 56.34 ± 8.69 years were recruited into this study. Mean Stroke Knowledge Test score was 7.89 ± 3.38 with 76.7% had low level of stroke knowledge. Mean Morisky Green Levine Adherence Scale was 3.05 ± 1.11 with 52.1% had low to medium medication adherence. Education and duration of stroke correlated with stroke knowledge level (Spearman's correlation coefficient: 0.307, $p = 0.001$ and 0.128, $p = 0.041$, respectively). Age and disability correlated with medication adherence (Spearman's correlation coefficient: 0.169; $p = 0.013$ and 0.171; $p = 0.012$), respectively. After adjustment for covariates, stroke knowledge level was independently associated with medication adherence (adjusted OR: 4.37, 95% CI 2.00–9.53; $p < 0.001$).*Conclusion*Stroke knowledge was low among Indonesian stroke survivors and independently related to medication adherence. Attempts should be made to increase stroke knowledge which may improve medication adherence among stroke survivors.

Keywords Indonesia · Knowledge · Medication adherence · Recurrent stroke

Impacts on practice

- Recurrent stroke is very common among stroke survivors, with 50% of recurrent event occurred in less than two years. This may partly be a result of poor stroke knowledge and poor medication adherence among stroke survivors while improvement in risk factors management is also needed. Special attempts should be made for the vulnerable groups including those with advanced age, low level of education and stroke survivors with disability.
- A large proportion of stroke survivors may not have adequate knowledge regarding stroke despite having a prior experience with stroke. As a result, all healthcare professional should make every attempt to constantly assess and improve such knowledge. Efforts should focus on rein-

Electronic supplementary material The online version of this article (https://doi.org/10.1007/s11096-020-01178-y) contains supplementary material, which is available to authorized users.

✉ Surakit Nathisuwan
surakit.nat@mahidol.ac.th

[1] Clinical Pharmacy Division, Department of Pharmacy, Faculty of Pharmacy, Mahidol University, 447 Sri-Ayutthaya Road, Ratchathewi, Bangkok 10400, Thailand

[2] Centre for Medicines Information and Pharmaceutical Care (CMIPC), Faculty of Pharmacy, Universitas Surabaya, Surabaya, Indonesia

[3] Department of Neurology, Faculty of Medicine, Universitas Airlangga, Surabaya, Indonesia

Published online: 29 October 2020

forcement of patient's understanding regarding the signs and symptoms of stroke, importance of early hospital arrival to ensure timely management of all stroke cases and importance of preventive treatment of stroke.
- More than half of stroke survivors had suboptimal level of medication adherence. Pharmacists, as the drug experts, must play a role in assessing and improving medication adherence in this high risk population. Based on our study, stroke knowledge independently and strongly correlates with medication adherence. As a result, a comprehensive plan of patient education which covers both general stroke knowledge and medication therapy may be an effective way to improve medication adherence.

Introduction

Stroke has become a major public health burden both as the leading cause of death and disability in the developing countries [1]. In Indonesia, stroke has been ranked as the number one cause of death for more than 10 years [2]. Stroke also leads to the greatest number of Disability-Adjusted Life Years (DALYs) lost in 2017 [2]. Generally, there are a number of barriers to improve stroke care. However, poor stroke knowledge and low medication adherence for stroke prevention are of particular importance [3, 4]. Studies suggested that a large proportion of stroke survivors lack knowledge about the warning signs of stroke and the importance of rapidly seeking treatment [5, 6]. The scale of problem may be even larger among developing countries with less advanced health system and suboptimal health education among general public. Previous studies indicated that less than half of stroke survivors knew the purpose of an anti-platelet drug [7, 8]. In addition, previous studies reported that 31–65% of stroke survivors had poor self-reported medication adherence [8–10]. Poor adherence to preventive medications has been shown to increase the risk of recurrent stroke and mortality in stroke survivors [11]. Previous studies conducted in atrial fibrillation patients taking an oral anticoagulant suggested a positive relationship between stroke knowledge and medication adherence [12, 13]. Hence, attempts to improve stroke knowledge should be implemented to improve medication adherence. Despite the importance of stroke as a major public health burden for Indonesia, little data exists on the quality of stroke management along with patient aspects of care particularly stroke knowledge and medication adherence.

Aim of the study

This study aimed to assess the level of stroke knowledge and medication adherence to stroke preventive medications, along with the relationship between stroke knowledge and medication adherence. The availability of these data may be beneficial for health authorities in the country to improve stroke care quality.

Ethics approval

This study protocol was approved by Faculty of Dentistry/Faculty of Pharmacy Mahidol University Institutional Review Board (reference number: 0517.0319/274) and the Research Committee at Dr. Soetomo General Hospital (reference number: 1021/KEPK/III/2019) and Universitas Airlangga Hospital reference number:123/KEH/2019. Written informed consent was obtained from all study participants. Confidentiality and anonymity of all patients recruited into this study were maintained.

Method

Study design and participants

This study was a prospective, cross-sectional study among adults (aged ≥ 18 years) with recurrent stroke or transient ischemic attack (TIA) who had sufficient cognitive and communicative ability with Mini Mental State Examination (MMSE) score as no and mild cognitive impairment. The study was conducted at two ambulatory neurology clinics of the Dr. Soetomo Academic Medical Center Hospital (SAMC) and Universitas Airlangga Hospital (UAH) in Surabaya city, Indonesia, during April–September 2019. Patients who provided written informed consent were included into the study. Patients who had severe aphasia limiting comprehension, dementia or mental illness were excluded from this study. Data from the East Java's Basic Health Research reported a stroke incidence of 16.4%, a sample size for this study was therefore estimated to be at least 210 patients.

Translation, validation and reliability test of study tools

Since there was no Indonesian version of the questionnaires to assess both stroke knowledge (Stroke Knowledge Test or SKT [14]) and medication adherence (Morisky Green Levine Adherence Scale or MGLS [15]), both questionnaires were translated from the original English version into Indonesian Bahasa version (Supplementary Material No. 1–2). Subsequently, a back translation was performed by two bilingual experts. The language experts compared the translated version against the original English version. After minor adjustments, a face validity test was performed in 20 stroke patients from 2 hospitals. Minor adjustments were done based on the comments of

patients. Reliability tests were done on both Indonesian Bahasa version in 20 stroke patients. Cronbach's alpha values for reliability and internal consistency were 0.69 and 0.65 for SKT and 0.81 and 0.61 for MGL indicating that both tools had acceptable reliability and consistency.

Data collection

After obtaining consent from the patients, data were collected through interview, medical chart and hospital database where appropriate. Demographic data consisted of age, gender, educational status and status of smoking and alcohol use. Comorbidities were obtained from clinical diagnosis from the medical chart and/or the International Classification of Diseases 10th Revision (ICD-10) coding in electronic hospital database. Stroke related information consisted of types of stroke, risk factors of stroke, duration of stroke, level of locomotor disability, number and type of medications related to stroke prevention.

Assessment of stroke knowledge was performed using the Stroke Knowledge Test questionnaire which consists of 20 questions with multiple choices [14]. Medication adherence of patients was measured by Morisky Green Levine Medication Adherence Scale (MGLS) questionnaire which contains 4 questions with "yes" versus "no" answer for each item [15].

Data analysis

Descriptive analysis was used to analyze participant's characteristics. Normally distributed continuous variables were described as mean ± standard deviation (SD), while categorical variables, as absolute and relative (%) frequencies. Kolmogorov–Smirnov test was used to test the normality of the data. SKT score ranges from 0 to 20. A score range of 0–10 indicates low level of stroke knowledge while a score range of 11–20 indicates high knowledge level. MGLS score ranges from 0 to 4. A score range of 0–1, 2–3 and 4 indicates low, medium and high level of adherence, respectively. Spearman's rank correlation and Pearson's Chi squared analysis were used to evaluate the correlation between knowledge of stroke and medication adherence. Multivariate analysis (binary logistic regression) was used to assess the relationship between SKT and MGLS scores. Odds ratio (OR) and 95% confidence interval (CI) were calculated with $p < 0.05$ considered as statistical significance. Subgroup analysis based on study site was also performed to ensure consistency of results. Data were analyzed using SPSS 20 software for Windows.

Results

Baseline characteristics

A total of 215 patients were recruited into this study. Mean age was 56.34 ± 8.69 years, 56.7% were male. The education level of the majority of patients (85.6%) was secondary education or less. (Table 1) The most common comorbidities were hypertension (84.2%), dyslipidemia (44.2%) and diabetes (27.9%). Approximately one-third were smokers while most patients did not consume alcohol. Most patients (96.3%) had a history of ischemic stroke with 13.9% with some levels of disability. The majority of the recurrent events were ischemic stroke (70.2%) and approximately half occurred within 2 years after the previous event (Table 1). Approximately one-third of patients took more than 5 drugs

Table 1 Baseline characteristics of the study population

Characteristics	Total N = 215 N (%)
Age (mean ± SD), years	56.34 ± 8.69
Male	122 (56.74)
BMI (mean ± SD), kg/m^2	23.18 ± 3.02
Educational status	
Secondary education or less	184 (85.58)
University/college	31 (14.42)
Smoking	74 (34.42)
Alcohol use	4 (1.86)
Hypertension	181 (84.19)
Hyperlipidemia	95 (44.19)
Diabetes Mellitus	60 (27.91)
Atrial Fibrillation	6 (2.79)
Types of previous stroke	
Ischemic stroke	207 (96.28)
Hemorrhagic stroke	8 (3.72)
Types of recurrent event	
Recurrent stroke	151 (70.23)
Recurrent TIA	64 (29.77)
Duration of Stroke (mean ± SD), years	4.14 ± 5.45
≤ 2 years	111 (51.63)
> 3 years	104 (48.37)
Presence of locomotor disability	30 (13.95)
Medication use	
< 5 items	136 (63.25)
> 5 items	79 (36.75)
Antithrombotic therapies	200 (93.02)
Anti-hypertensive drugs	204 (94.88)
Lipid lowering agents	84 (39.07)
Anti-diabetic drugs	37 (17.21)

BMI body mass index, *TIA* transient ischemic attack

per day. The most commonly used medications were antithrombotic therapies (93.02%), anti-hypertensive drugs (94.88%), lipid lowering agents (39.07%) and anti-diabetic drugs (17.2%).

Knowledge of stroke and medication adherence

The mean SKT score of the study population was 7.89 ± 3.38. One hundred and sixty-five patients (76.7%) had low level of stroke knowledge (Table 2). More than two-thirds of patients were able to identify that brain is an organ involved in stroke. Among 9 SKT items related to risk factors of stroke, patients were able to identify only 5 items as stroke risk factors. Patients performed poorly in recognizing stroke signs and symptoms and immediate response to stroke. In addition, most patients had poor understanding related to stroke treatment and importance of rehabilitation. Detail analysis of each item of SKT is provided in Supplementary Material No. 3. The mean MGLS score of the study population was 3.05 ± 1.11. There were 47.9%, 41.4% and 10.7% of patients who were classified as having high, medium and low medication adherence, respectively (Table 2).

Correlation of stroke knowledge level and medication adherence

Education level (Spearman's rank correlation coefficient [r_s]: 0.307, $p = 0.001$) and duration of stroke (r_s: 0.128, $p = 0.041$) were found to significantly correlate with stroke knowledge level (Table 3). Age (r_s: 0.169; $p = 0.013$) and disability (r_s: 0.171; $p = 0.012$) were found to significantly correlate with medication adherence (Table 4). Results from the Pearson's Chi squared

Table 2 Stroke knowledge test (SKT) and Morisky-Green-Levine Adherence Scale (MGLS) scores of the study population

Level of test scores of study population	Mean ± SD	Total n = 215 N (%)
Stroke knowledge test (SKT)		
Low (score: 0–10)	6.53 ± 2.56	165 (76.74)
High (score: 11–20)	12.36 ± 1.16	50 (23.26)
Morisky-Green-Levine Adherence Scale (MGLS)		
Low (score: 0–1)	0.78 ± 0.42	23 (10.70)
Medium (score: 2–3)	2.54 ± 0.50	89 (41.40)
High (score: 4)	4.00 ± 0.00	103 (47.91)

Table 3 Correlation between baseline characteristics and level of stroke knowledge (N = 215)

Variables	Low N (%)	High N (%)	*p* value[a]	correlation coefficient	*p* value[b]
Gender					
Male	89 (73.00)	33 (27.00)	0.132	− 0.103	0.133
Female	76 (81.70)	17 (18.30)			
Age group					
≤ 50 years	39 (79.60)	10 (20.40)	0.591	0.037	0.593
> 50 years	126 (75.90)	40 (24.10)			
Education level					
Secondary or lower	151 (82.10)	33 (17.90)	0.001	0.307	0.001
Higher	14 (45.20)	17 (54.80)			
Medication					
< 5 items	109 (80.10)	27 (19.90)	0.121	0.106	0.122
≥ 5 items	56 (70.90)	23 (29.10)			
Disability					
No disability	139 (75.10)	46 (24.90)	0.064	0.126	0.064
With disability	26 (86.70)	4 (13.30)			
Duration of stroke					
< 7 years (178)	141 (79.20)	37 (20.80)	0.040	0.128	0.041
≥ 7 years (37)	24 (64.90)	13 (35.10)			

[a]Pearson's Chi squared test, [b]Spearman's rank correlation

analysis were similar to that of Spearman's rank correlation analysis. Gender, education level, number of medication used, and duration of stroke did not show significant impact on the level of medication adherence. A binary logistic regression was performed to evaluate the relationship between level of stroke knowledge and medication adherence. Results showed that high stroke knowledge level was independently associated with high medication adherence (adjusted OR: 4.37, 95% CI 2.00–9.53; $p < 0.0001$) (Table 5). Subgroup analysis based on study sites were performed and results were consistent with the main analysis (Supplementary Material: No. 4–5).

Discussion

To the best of our knowledge, this is the first study evaluating the level of stroke knowledge and medication adherence along with their relationship among stroke survivors of Indonesia which is one of the countries that are most severely afflicted by stroke. Results from the Global Burden of Disease (GBD) study indicated that Indonesia ranked fourth in the number of stroke fatalities in the world and had the highest rate of increase in the stroke age-standardized rates during 1990–2016 [16]. As a result, despite a small sample size, findings from our study provides important information on the current status of stroke care of this country.

Data from the baseline characteristics were consistent with stroke in developing world where patients tended to

Table 4 Correlation between baseline characteristics and level of medication adherence (N = 215)

Variable (n)	Low N (%)	Medium N (%)	High N (%)	*p* value[a]	correlation coefficient	*p* value[b]
Gender						
Male	12 (9.84)	54 (44.26)	56 (45.90)	0.609	0.029	0.668
Female	11 (11.83)	35 (37.63)	47 (50.54)			
Age group						
≤ 50 years	6 (12.25)	28 (57.14)	15 (30.61)	0.019	0.169	0.013
> 50 years	17 (10.24)	61 (36.75)	88 (53.01)			
Education level						
Secondary or lower	18 (9.78)	79 (42.94)	87 (47.28)	0.400	0.004	0.956
Higher	5 (16.13)	10 (32.26)	16 (51.61)			
Medication						
< 5 items	16 (11.76)	53 (38.97)	67 (49.27)	0.588	− 0.017	0.810
> 5 items	7 (8.86)	36 (45.57)	36 (45.57)			
Disability						
No disability	18 (9.73)	73 (39.46)	94 (50.81)	0.012	0.171	0.012
With disability	5 (16.67)	16 (53.33)	9 (30.00)			
Duration of stroke						
< 7 years (178)	17 (9.55)	77 (42.26)	84 (47.19)	0.325	0.002	0.980
≥ 7 years (37)	6 (16.22)	12 (32.43)	19 (51.35)			

[a]Pearson's Chi squared test, [b]Spearman's rank correlation

Table 5 Binary logistic regression evaluating the relationship of baseline characteristics and stroke knowledge versus medication adherence (N = 215)

Factors	B	SE	Wald	df	OR (95%CI)	*p* value
Knowledge	1.474	0.398	13.692	1	4.366 (2.000–9.531)	< 0.0001
Age	0.048	0.018	6.727	1	1.049 (1.012–1.087)	0.009
Gender	0.340	0.298	1.299	1	1.405 (0.783–2.522)	0.254
Number of Medication	− 0.205	0.309	0.440	1	0.815 (0.444–1.494)	0.507
Disability	0.824	0.460	3.213	1	2.279 (0.926–1.581)	0.073
Duration of stroke	− 0.346	0.411	0.712	1	0.707 (0.316–2.051)	0.399
Education	− 0.195	0.466	0.175	1	0.823 (0.330–2.051)	0.675

B coefficient for the constant (intercept); *CI* confidence interval; *df* degrees of freedom; *OR* odds ratio; *SE* standard error; *Wald* Wald Chi square test

be much younger compared to those from developed world [1]. Consistent with being a country with predominantly Muslim population, there was a very low rate of alcohol use [17]. However, one-third was active smokers. As a result, tobacco control campaign may be useful to reduce this modifiable risk factor along with better control of most common risk factors including hypertension, dyslipidemia and diabetes [18]. From our study, there was a discrepancy between the amount of comorbidities and medication use. This may potentially indicate suboptimal utilization of preventive pharmacotherapies such as statins to name a few. All these risk factors may contribute to a very high rate of stroke recurrence found in our study population. Half of these Indonesian stroke survivors suffered a recurrent event within 2 years while the reported annual rate of stroke recurrence in developed countries ranges from 4.9 – 8.7% due to the much better implementation of preventive strategies [19].

Our analysis on SKT indicates a number of areas of improvement on patient's knowledge. Despite having a prior experience with stroke, stroke knowledge in our study population remains poor. Lack of understanding on signs and symptoms of stroke and failure to recognize the importance of early hospital arrival may contribute to the late hospital arrival which may limit patients' eligibility for intravenous thrombolysis [20]. Even more troubling is the fact that these stroke survivors had inadequate knowledge on stroke treatment which may increase the risk of recurrent events due to non-compliance to treatment [17]. With late hospital arrival, high rates of morbidity, mortality and disability in this high-risk population are expected. This fact highlights an urgent need for a more rigorous effort to improve stroke knowledge among stroke survivors to lessen the burden on the country's healthcare system.

Secondary prevention of stroke requires effective pharmacotherapy regimen along with optimal medication adherence [4, 18]. Findings from our study clearly indicates suboptimal adherence among stroke survivors. Less than half of our study population had high medication adherence level. Medication adherence is a result of a complex interplay of various factors such as patient-related factors (e.g., knowledge), socioeconomic factors, therapy-related factors, health system factors, and stroke-related factors [3, 4]. As a result, evaluating and tackling medication adherence issue is a unique challenge for each country. Our analysis indicated that stroke knowledge independently and strongly correlates with medication adherence. This is clearly a call to action that improving stroke knowledge and increasing medication adherence among stroke survivors are urgently needed.

There are several limitations in this study. First, due to the study design as a cross-sectional study, there is no longitudinal data to observe changing level of medication adherence through time. Second, causal relationship cannot be drawn with certainty from a cross-sectional study. Third, there is a possibility of bias from the subjectivity of adherence measurement, since it was based on self-administered questionnaire. Fourth, this study was performed in limited geographic area with data collection from only 2 hospitals in Surabaya city. As a result, generalizability of the study results is limited to the areas with similar social and health context and cannot be a representative of a vast country like Indonesia. More research on stroke is clearly needed to guide health policy and action against this important disease. Lastly, we acknowledged that the validity of MGLS is not perfect. However, among the self-reported medication adherence questionnaires available, MGLS is one of the most widely used and validated tools across broad range of patient population [21]. With only 4 items, it is very easy to use in clinical practice particularly in developing countries where overcrowded hospitals are common. Results from our validation suggested that this tool was acceptable to use in our study.

Conclusion

Despite having a prior experience with stroke, 3 out of 4 stroke survivors in Indonesia had low stroke knowledge. Lack of understanding on signs and symptoms of stroke, failure to recognize the importance of early hospital arrival and inadequate knowledge on stroke treatment are the three main areas of discrepancies in stroke knowledge. In addition, less than half of stroke survivors had optimal level of medication adherence. Stroke knowledge independently and strongly correlates with medication adherence. As a result, attempts should be made to increase stroke knowledge which may positively improve medication adherence among this high risk population. This, in the long run, will ultimately lead to a reduction in healthcare burden of this deleterious condition.

Acknowledgements The authors would like to acknowledge and thank all the staff of the two ambulatory clinics of the Neurology Department of Dr. Soetomo General Hospital and Universitas Airlangga Hospital for their support during the study period. We thank Professor Karen Sullivan for her kind permission to use the Stroke Knowledge Test in this study. We also thank the Lembaga Bahasa Universitas Sanata Dharma and the Ubaya Language Center for their help with forward and backward translation of questionnaires, respectively.

Funding The authors received no financial support for the research, authorship, and/or publication of this article.

Conflicts of interests The authors declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

References

1. Venketasubramanian N, Yoon BW, Pandian J, Navarro JC. Stroke epidemiology in south, east, and south-east asia: a review. J Stroke. 2017;19:286–94.
2. Gani A, Budiharsana MP. The consolidate health report on Indonesia health sector review 2018. Jakarta: Ministry of National Development Planning; 2018. ISBN 978-602-50133-7-9.
3. Ferdinand KC, Senatore FF, Clayton-Jeter H, Cryer DR, Lewin JC, Nasser SA, et al. Improving medication adherence in cardiometabolic disease: practical and regulatory implications. J Am Coll Cardiol. 2017;69:437–51.
4. Jamison J, Graffy J, Mullis R, Mant J, Sutton S. Barriers to medication adherence for the secondary prevention of stroke: a qualitative interview study in primary care. Br J Gen Pract. 2016;66:e568–76.
5. Saengsuwan J, Suangpho P, Tiamkao S. Knowledge of Stroke Risk Factors and Warning Signs in Patients with Recurrent Stroke or Recurrent Transient Ischaemic Attack in Thailand. Neurol Res Int. 2017;2017:8215726.
6. Hickey A, O'Hanlon A, McGee H, Donnellan C, Shelley E, Horgan F, et al. Stroke awareness in the general population: knowledge of stroke risk factors and warning signs in older adults. BMC Geriatr. 2009;9:35.
7. Sowtali SN, Harith S, Mohamed M, Yusoff DM. Stroke knowledge level among stroke patients admitted to hospital Raja Perempuan Zainab II, Kelantan, Malaysia. J Exp Stroke Transl Med. 2016;9:1–11.
8. Kronish IM, Diefenbach MA, Edmondson DE, Phillips LA, Fei K, Horowitz CR. Key barriers to medication adherence in survivors of strokes and transient ischemic attacks. J Gen Intern Med. 2013;28:675–82.
9. Ruksakulpiwat S, Liu Z, Yue S, Fan Y. The association among medication beliefs, perception of illness and medication adherence in ischemic stroke patients: a cross-sectional study in China. Patient Prefer Adherence. 2020;14:235–47.
10. Cheiloudaki E, Alexopoulos EC. Adherence to Treatment in Stroke Patients. Int J Environ Res Public Health. 2019;16:196.
11. Yeo SH, Toh M, Lee SH, Seet RCS, Wong LY, Yau WP. Impact of medication nonadherence on stroke recurrence and mortality in patients after first-ever ischemic stroke: insights from registry data in Singapore. Pharmacoepidemiol Drug Saf. 2020;29:538–49.
12. Fang MC, Machtinger EL, Wang F, Schillinger D. Health literacy and anticoagulation-related outcomes among patients taking warfarin. J Gen Intern Med. 2006;21:841–6.
13. Rolls CA, Obamiro KO, Chalmers L, Bereznicki LRE. The relationship between knowledge, health literacy, and adherence among patients taking oral anticoagulants for stroke thromboprophylaxis in atrial fibrillation. Cardiovasc Ther. 2017;35:e12304.
14. Sullivan K, Dunton NJ. Development and validation of the stroke knowledge test. Top Stroke Rehabil. 2004;11:19–28.
15. Morisky DE, Green LW, Levine DM. Concurrent and predictive validity of a self-reported measure of medication adherence. Med Care. 1986;24:67–74.
16. GBD 2016 Stroke Collaborators. Global, regional, and national burden of stroke, 1990–2016: a systematic analysis for the Global Burden of Disease Study 2016. Lancet Neurol. 2016;18:439–58.
17. Appalasamy JR, Joseph JP, Seeta Ramaiah S, Quek KF, Md Zain AZ, Tha KK. Exploring stroke survivors' self-efficacy in understanding and taking medication and determining associated factors: a cross-sectional study in a neurology clinic in Malaysia. Patient Prefer Adherence. 2019;13:1463–75.
18. Kernan WN, Ovbiagele B, Black HR, Bravata DM, Chimowitz MI, Ezekowitz MD, et al. Guidelines for the prevention of stroke in patients with stroke and transient ischemic attack: a guideline for healthcare professionals from the American Heart Association/American Stroke Association. Stroke. 2014;45:2160–236.
19. Hong KS, Yegiaian S, Lee M, Lee J, Saver JL. Declining stroke and vascular event recurrence rates in secondary prevention trials over the past 50 years and consequences for current trial design. Circulation. 2011;123:2111–9.
20. Misbach J, Ali W. Stroke in Indonesia: a first large prospective hospital-based study of acute stroke in 28 hospitals in Indonesia. J Clin Neurosci. 2001;8:245–9.
21. Lam WY, Fresco P. Medication adherence measures: an overview. Biomed Res Int. 2015;2015:217047.


IJCP
International Journal of
Clinical Pharmacy

International Journal of Clinical Pharmacy

Editors

International Journal of Clinical Pharmacy

Journal home > Volumes and issues > Volume 43, issue 3

Search within journal

Volume 43, issue 3, June 2021

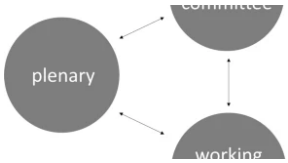
44 articles in this issue

Editorial

Derek Stewart, Bart Pouls & Filipa Alves da Costa

Editorial | Published: 13 June 2021 | Pages: 439 - 440

Enhancing medication therapy in Parkinson's disease by establishing an interprofessional network including pharmacists

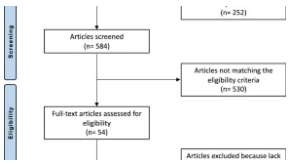


Olaf Rose, Svenja Happe ... Susanne Erzkamp

ESCP Best Practice | Published: 23 April 2021

Pages: 441 - 448

Prognostic factors for patients with heparin-induced thrombocytopenia: a systematic review

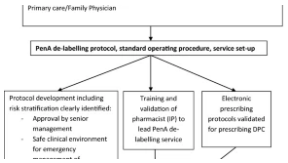


Giorgia Colarossi, Heike Schnöring ... Filippo Migliorini

Review Article | Published: 12 October 2020

Pages: 449 - 460

The role of a clinical pharmacist in spurious Penicillin allergy: a narrative review

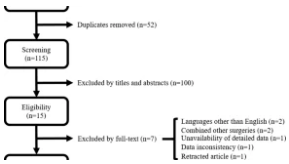


Rashmeet Bhogal, Abid Hussain ... Mamidipudi T. Krishna

Review Article | Published: 13 January 2021

Pages: 461 - 475

Prophylactic antiemetic effects of dexamethasone versus 5-HT3 receptor antagonists in ear surgery: a systematic review and meta-analysis

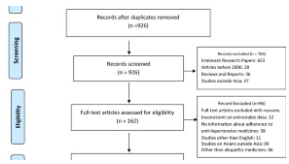


Hsin-Ming Liu, Jin-Hua Chen ... Cher-Ming Liou

Review Article | Published: 13 January 2021

Pages: 476 - 485

Prevalence of non-adherence to antihypertensive medication in Asia: a systematic review and meta-analysis



Sajid Mahmood, Zahraa Jalal ... Kifayat Ullah Shah

Review Article | Published: 29 January 2021

Pages: 486 - 501

Community pharmacists' knowledge and practice regarding malaria and its treatment in Sudan: a cross-sectional survey

Elkhanssa Abdelhameed Ahmed Elhag & Syed Azhar Syed Sulaiman

Research Article | Published: 06 October 2020 | Pages: 502 - 508

You have access to our articles

For authors

Submission guidelines

Ethics & disclosures

Open Access fees and funding

Contact the journal

Submit manuscript

Explore

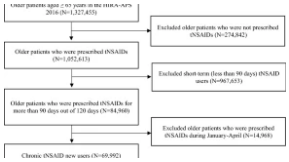
Online first articles

Volumes and issues

Sign up for alerts

Pages: 637 - 644

Underutilization of gastrointestinal prophylaxis in high-risk chronic nonsteroidal anti-inflammatory drug users in Korea



Woo-Youn Kim, Suhyun Lee ... Ju-Yeun Lee

Research Article | Published: 04 November 2020

Pages: 645 - 653

Exploration of health professional stakeholders' views and experiences regarding minor ailments services' education, training and assessment

Mariyam Aly, Carl R. Schneider ... Cherie Lucas

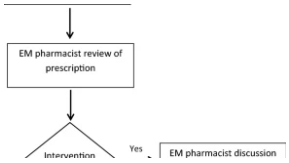
Research Article | Published: 30 October 2020 | Pages: 654 - 665

Knowledge of stroke and medication adherence among patients with recurrent stroke or transient ischemic attack in Indonesia: a multi-center, cross-sectional study

Karina Kumaladewi Widjaja, Suvatna Chulavatnatol ... Surakit Nathisuwan

Research Article | Published: 29 October 2020 | Pages: 666 - 672

Discharge prescription optimization by emergency medicine pharmacists in an academic emergency department in the United States

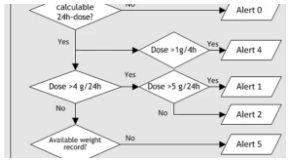


Jesse Castillo, Matthew J. Campbell ... Seth Podolsky

Research Article | Published: 29 October 2020

Pages: 673 - 680

Implementation and outcome of an electronic tool for detection of paracetamol overdose in a tertiary care hospital



Francisco Cabrera-Diaz, Claudia Zaugg ... Ali Reza Salili

Research Article | Open Access

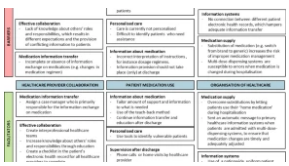
Published: 29 October 2020 | Pages: 681 - 688

Impact of pharmacist-led educational interventions on asthma control and adherence: single-blind, randomised clinical trial

Kosisochi C. Amorha, Mathew J. Okonta & Chinwe V. Ukwe

Research Article | Published: 02 November 2020 | Pages: 689 - 697

Medication management during transitions from hospital to home: a focus group study with hospital and primary healthcare providers in the Netherlands



S. Daliri, C. L. Bekker ... F. Karapinar-Çarkit

Research Article | Published: 31 October 2020

Pages: 698 - 707

Community pharmacist's professional adaptation amid Covid-19 emergency: a

national survey on Italian pharmacists

Corrado Giua, Giovanni Paoletti ... on behalf of SIFAC Group of Clinical Community Pharmacists (SGCP)

Research Article | Published: 15 January 2021 |

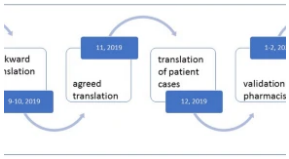
Pages: 708 - 715

Burnout and the challenges facing pharmacists during COVID-19: results of a national survey

Karlee Johnston, Claire L. O'Reilly ... Imogen Mitchell

Research Article | Published: 13 April 2021 | Pages: 716 - 725

Pharmaceutical Care Network Europe (PCNE) drug-related problem classification version 9.00: German translation and validation

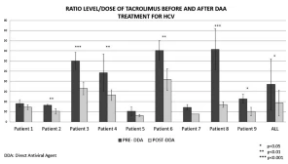


Elisabeth Schindler, Ina Richling & Olaf Rose

Short Research Report |

Published: 06 October 2020 | Pages: 726 - 730

Levels of tacrolimus after treatment for chronic hepatitis C with direct antiviral agents in solid organ transplant recipients



Sara Ibáñez-García, Eduardo Zataraín-Nicolás ... Maria Sanjurjo Sáez

Short Research Report |

Published: 09 October 2020 | Pages: 731 - 736

Real-life data of survival and reasons for discontinuation of biological disease-modifying drugs 'in' rheumatoid arthritis

Ana Paula Monteiro Gomides, Cleandro Pires de Albuquerque ... Geraldo da Rocha Castelar Pinheiro

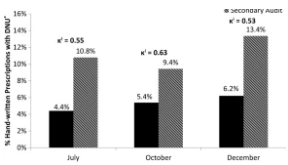
Short Research Report | Published: 21 October 2020 | Pages: 737 - 742

Assessment of the complexity of drug therapy and psychosocial and behavioral aspects in people living with type 2 diabetes mellitus

Waleska Jaclyn Freitas Nunes de Sousa, Heloísa Carvalho de Torres ... Maria Auxiliadora Parreiras Martins

Short Research Report | Published: 30 October 2020 | Pages: 743 - 747

Evaluation of the quality of 'do not use' medication abbreviation audits: a key enabler to successful implementation of audit and feedback



Edmond Li, Jennifer Marrandino ... Sean K. Gorman

Short Research Report | Published: 30 January 2021 |

Pages: 748 - 752

Practical considerations when treating chronic hepatitis E in solid organ transplant recipients

David K. Choi, Michelle T. Martin ... Adam E. Mikolajczyk

Commentary | Published: 09 November 2020 | Pages: 753 - 755

International Journal of Clinical Pharmacy

COUNTRY

Netherlands

Universities and research institutions in Netherlands

SUBJECT AREA AND CATEGORY

Health Professions
Pharmacy

Medicine
Pharmacology (medical)

Pharmacology, Toxicology and Pharmaceutics
Pharmaceutical Science
Pharmacology
Toxicology

PUBLISHER

Springer Netherlands

H-INDEX

63

PUBLICATION TYPE

Journals

ISSN

22107703, 22107711

COVERAGE

2011-2021

INFORMATION

Homepage

How to publish in this journal

SCOPE

The aim of International Journal of Clinical Pharmacy is to provide a medium for the publication of articles on clinical pharmacy and related practice-oriented subjects in the pharmaceutical sciences. The scope of the journal is clinical pharmacy, its research and its application in e.g. pharmaceutical care. The editors therefore welcome contributions on the above-mentioned topics and especially on the following: • Pharmacotherapy and outcome research • Clinical pharmacy • Pharmacoepidemiology • Pharmacoeconomics • Pharmaceutical care • Medicines and medical devices utilisation • Medicines and medical devices information • Pharmacy services research • Medication management • Other clinical aspects of pharmacy The journal welcomes papers in the following categories: Review articles, Research articles, Short research reports, Commentaries, ESCP best practice papers and Letters to the Editor. Case reports are not considered for publication. All submissions (including Commentaries and, if necessary, Letters) will be peer-reviewed by experts. This is a single blinded procedure.

Join the conversation about this journal

Quartiles

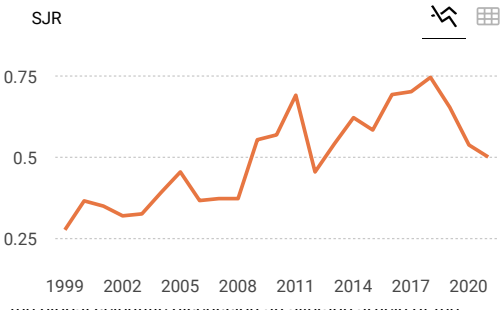
FIND SIMILAR JOURNALS

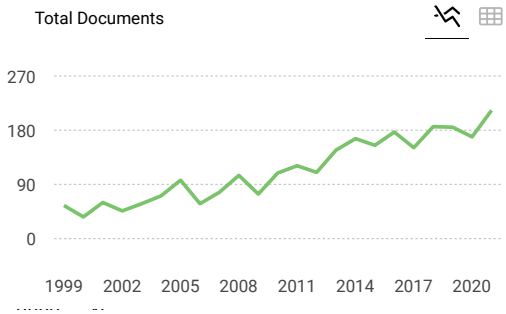
1
Journal of Pharmaceutical Health Services Research
GBR
63%
similarity

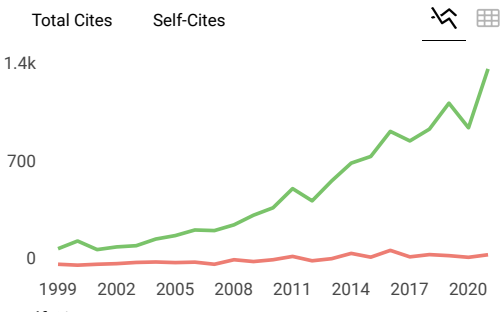
2
International Journal of Pharmacy Practice
GBR
61%
similarity

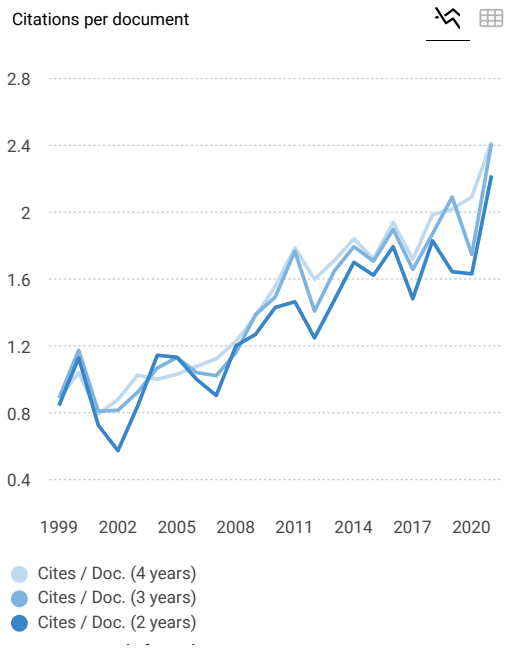
3
European Journal of Hospital Pharmacy
BEL
60%
similarity

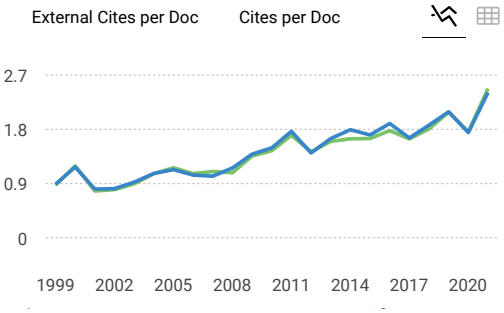
4
Research in Social and Administrative Pharmacy
USA
59%
similarity

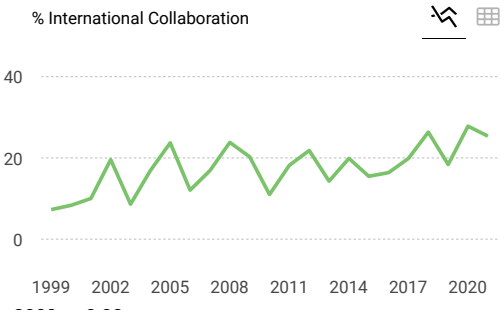


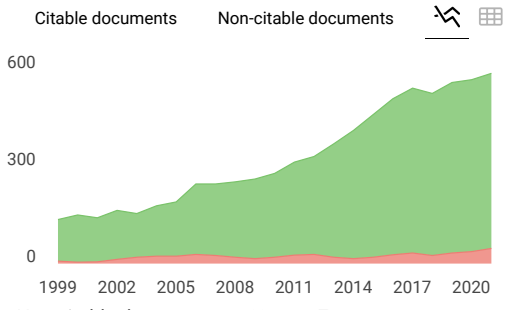


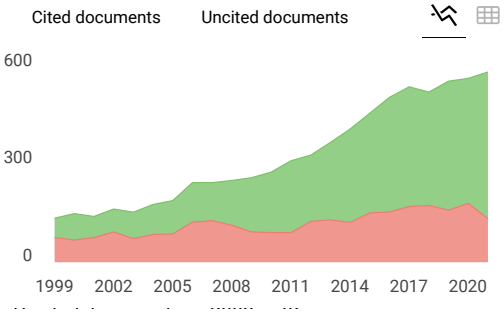












← Show this widget in your own website

Just copy the code below and paste within your html code:

<a href="https://www.scima

SCImago Graphica

tool.

Metrics based on Scopus® data as of April 2022

ABDUL RAUF QURESHI 9 months ago

do u charge fee for the publication in this journal
International Journal of Clinical Pharmacy

reply

SCImago Team

Melanie Ortiz 9 months ago

Dear Abdul,
Thank you for contacting us.
We are sorry to tell you that SCImago Journal & Country Rank is not a journal. SJR is a portal with scientometric indicators of journals indexed in Elsevier/Scopus.
We suggest you visit the journal's homepage or contact the journal's editorial staff , so they could inform you more deeply.
Best Regards, SCImago Team

J **Jayda Dogheim** 1 year ago

If i am a pharmacist and published a paper in this journal, will it be classified as Q1 ?

reply

SCImago Team

Melanie Ortiz 1 year ago

Dear Jayda,
Thank you for contacting us. All the articles published in a journal that has been listed in different categories and has different quartile data inherit all the subject categories of the journal.
Best Regards, SCImago Team

I **Ismaila Adamu** 2 years ago

I will like to know the price for printed copy of this journal

SCImago Team

Melanie Ortiz 2 years ago

Dear Ismaila, thank you very much for your comment. Unfortunately, we cannot help you with your request, we suggest you contact the journal's editorial staff so they could inform you more deeply. Best Regards, SCImago Team

H **Huda** 3 years ago

Does this journal publish protocols of randomised controlled trials?

reply

SCImago Team

Melanie Ortiz 3 years ago

Dear Huda,
thank you for contacting us.
Sorry to tell you that SCImago Journal & Country Rank is not a journal. SJR is a portal with scientometric indicators of journals indexed in Elsevier/Scopus.
Unfortunately, we cannot help you with your request, we suggest you to visit the journal's homepage or contact the journal's editorial staff , so they could inform you more deeply.
Best Regards, SCImago Team

A **Ana Braga** 3 years ago

Are there submission fees for this journal?

reply

SCImago Team

Melanie Ortiz 3 years ago

Dear Ana,
thank you for contacting us.
Sorry to tell you that SCImago Journal & Country Rank is not a journal. SJR is a portal with scientometric indicators of journals indexed in Elsevier/Scopus.
Unfortunately, we cannot help you with your request, we suggest you to visit the journal's homepage. Best Regards, SCImago Team

Z **Zahra** 3 years ago

Is the journal indexed in PubMed and Scopus

reply

SCImago Team

Dear Zahra, thank you very much for your comment, unfortunately we cannot help you with your request. We suggest you to consult the Scopus database directly. Remember that the SJR is a static image of a database (Scopus) which is changing every day. Best regards, SCImago Team

T **taras** 4 years ago

Good day. I would like to print an article in your magazine ....
I would like to know if you are printing an article and what requirements to the article, and what price article?
Thank you.
Good day for you.

reply

SCImago Team

Elena Corera 4 years ago

Dear Taras, in the link below you will find the information corresponding to the author's instructions of this journal. Best regards, SCImago Team
http://www.editorialmanager.com/ijcp/default.aspx

Leave a comment

Name

Email
(will not be published)

I'm not a robot
reCAPTCHA
Privacy - Terms

Submit

The users of Scimago Journal & Country Rank have the possibility to dialogue through comments linked to a specific journal. The purpose is to have a forum in which general doubts about the processes of publication in the

Developed by: SCImago

Powered by: Scopus

Follow us on @ScimagoJR

EST MODUS IN REBUS
Horatio (Satire 1,1,106)

Edit Cookie Consent

Source details

International Journal of Clinical Pharmacy

Formerly known as: Pharmacy World and Science

Scopus coverage years: from 2011 to Present

Publisher: Springer Nature

ISSN: 2210-7703 E-ISSN: 2210-7711

Subject area: Health Professions: Pharmacy | Pharmacology, Toxicology and Pharmaceutics: Pharmaceutical Science | Medicine: Pharmacology (medical) | Pharmacology, Toxicology and Pharmaceutics: Pharmacology | Pharmacology, Toxicology and Pharmaceutics: Toxicology

Source type: Journal

CiteScore 2021
3.3

SJR 2021
0.501

SNIP 2021
1.091

View all documents > | Set document alert | Save to source list

CiteScore | CiteScore rank & trend | Scopus content coverage

CiteScore 2021

$$3.3 = \frac{2{,}128 \text{ Citations } 2018 - 2021}{652 \text{ Documents } 2018 - 2021}$$

Calculated on 05 May, 2022

CiteScoreTracker 2022

$$2.8 = \frac{1{,}589 \text{ Citations to date}}{562 \text{ Documents to date}}$$

Last updated on 05 August, 2022 • Updated monthly

CiteScore rank 2021

Category	Rank	Percentile
Health Professions Pharmacy	#5/36	87th
Pharmacology, Toxicology and Pharmaceutics Pharmaceutical Science	#81/171	52nd
Medicine Pharmacology (medical)	#123/255	51st

View CiteScore methodology > | CiteScore FAQ > | Add CiteScore to your site

About Scopus

What is Scopus

Content coverage

Scopus blog

Scopus API

Privacy matters

Language

日本語版を表示する

查看简体中文版本

查看繁體中文版本

Просмотр версии на русском языке

Customer Service

Help

Tutorials

Contact us