

IAI SPECIAL EDITION

RESEARCH ARTICLE

The impact of mobile application: "Friends of Heart" in knowledge and compliance of patients with coronary heart disease

Riyan Pratama Putra¹ Ike Dhiah Rochmawati², Delta Ardy Prima³

¹ Faculty of Pharmacy, University of Surabaya, Indonesia

² Department of Clinical and Community Pharmacy, University of Surabaya, Indonesia

³ Programme of Informatics Engineering, Faculty of Engineering, University of Surabaya, Indonesia

Keywords

Adherence
Health mobile application
Knowledge

Correspondence

Ike Dhiah Rochmawati
Department of Clinical and
Community Pharmacy
University of Surabaya
Indonesia
ike.dhiah@staff.ubaya.ac.id

Abstract

Background: The quality of life of coronary heart disease (CHD) patients can be improved by increasing patient compliance with treatment and health literacy rates. Over the past decade, mobile health (mHealth) has improved treatment adherence and demonstrated strong potential to increase health literacy rates. **Objectives:** Analyse the effect of "Friends of Heart" application on the compliance and knowledge of coronary heart disease patients. **Methods:** A randomised controlled trial (RCT) was conducted. The test group (intervention group) used the *Sahabat Jantung/ "Friends of Heart"* application developed for the Android 4.1 operating system, while the control group did not. Compliance was measured for 30 days in outpatient settings; it included pill count and time deviations in taking medication. Knowledge was assessed using questionnaires. **Results:** Statistical results showed significant differences in knowledge and adherence between the intervention and the control group ($p = 0.0001$). **Conclusion:** The use of the "Friends of Heart" application could improve compliance and knowledge of coronary heart disease patients.

Introduction

Primary or secondary prevention of Coronary Heart Disease (CHD) includes non-pharmacological strategies, such as lifestyle modification to prevent the occurrence of CHD (Chen *et al.*, 2018), in addition to medication therapy, including statins, antiplatelets, beta-blockers, and nitrates (Anderson *et al.*, 2016; Roffi *et al.*, 2016). Compliance and knowledge are required whether in preventing or treating CHD. In practice, medication adherence of CHD patients discharged from the hospital is inadequate, irrespective of the social-economic status of the patient (Chen *et al.*, 2018).

Medication adherence is the extent to which the patient adheres to the interval and dosage regimen of the drug prescribed to overcome the disease (Nobre and Domingues, 2017). It has a complex set of

behaviours consisting of initiation, implementation, and termination phases (Rehman *et al.*, 2017). Factors that support poor patient compliance include, among others, polypharmacy, poor knowledge of the disease, low health literacy rates, barriers in accessing treatment, skipping medications and regular visits to the doctor and costs (Zullig, Ramos & Bosworth, 2017).

Low health literacy can prevent patients from obtaining information related to prescribed medications. Moreover, knowledge has been correlated with patient medication adherence (Perera *et al.*, 2012). It should be improved by providing adequate information on active ingredients, indication, dosage, frequency, dosage form, drug and food interactions, and storage. Also, communication and collaboration between healthcare professionals can help them address patient needs and improve treatment (Fröhlich, Dal Pizzol & Mengue,

2010). The quality of life of CHD patients can be improved by increasing patient compliance with treatment and health literacy rates (Rehman *et al.*, 2017).

Over the past decade, mobile health (mHealth) has improved treatment adherence and demonstrated strong potential to increase health literacy rates. This technology integrates treatment compliance and promotes health behaviour changes through messaging, emphasising healthy habits, and tracking treatment success. It is an innovative, practical, and inexpensive way of managing patient compliance with their treatment (Park *et al.*, 2017).

Based on the above, this study aims to explore the differences in treatment compliance and knowledge of CHD patients using the *Sahabat Jantung/"Friends of Heart"* application and the control group. The ultimate goal is to increase knowledge and adherence, thereby reducing the morbidity and mortality of CHD patients and improving their quality of life.

Methods

This Randomised Control Trial (RCT) utilised an experimental pre-test and post-test design, with an intervention group (used the mobile application) and a control group (did not use the mobile application) randomly assigned. Measurements were taken before and after the intervention. Comparative data analysis was performed in this study.

The samples consisted of CHD outpatients of the Sidoarjo Regional General Hospital. Inclusion criteria were as follows: 1) aged 30-56 years; 2) diagnosed since at least three months; 3) controlled two months before the study; 4) taking CHD medications (statins, beta-blockers, calcium channel blockers, or others); 5) outpatient at Sidoarjo Hospital; 6) owning an Android smartphone 4.1 and above; 7) willing to take the interview; and 8) willing to participate in the study, evidenced by the patient's signature on the statement of willingness (Consent Form Statement). Exclusion criteria included 1) hearing loss; 2) illiteracy; 3) memory impairment (dementia or Alzheimer's disease); and 4) using other reminder applications. The final sample consisted of 50 participants divided into two groups of 25 patients each.

The application used in this study was developed and designed with Adobe XD, phpMyAdmin software, Sublime Text, and Android Studio. Furthermore, MySQL was used to construct the database. Before it was released on the Google Play Store, the *Sahabat Jantung/"Friends of Heart"* application was put through

its paces. At the implementation stage, the application and a knowledge questionnaire were used.

Results

A total of 50 CHD outpatients took part in this research. They were asked to fill out sociodemographic information, such as gender, age, education level, occupation, and place of residence. According to these data, most participants were men, with 17 (68.0%) and 20 (80.0%) in the control and intervention groups, respectively. Most patients were in their 50s and 55s, with 15 (60.0%) patients in the control group and 14 (56.0%) in the test group. The majority had a high school/vocational education. Table I displays patient characteristics.

Table I: Patient characteristics

Patients' demographic		Control n=25		Test n=25	
		N	%	N	%
Gender	Male	17	68.0	20	80.0
	Female	8	32.0	5	32.0
Age(years)	35-39	3	12.0	2	8.0
	40-44	3	12.0	4	16.0
	45-49	4	16.0	5	20.0
	50-55	15	60.0	14	56.0
Educational background	No education	0	0.0	0	0.0
	Ungraduated from elementary school	0	0.0	1	4.0
	Graduated from elementary school	0	0.0	2	8.0
	Graduated from junior high school	5	20.0	3	12.0
	Graduated from senior high school	18	72.0	14	56.0
	Graduated with a bachelor's degree	2	8.0	5	20.0
Job	Civil servants	2	8.0	6	24.0
	Private sectors	9	36.0	12	48.0
	Businessman	3	12.0	1	4.0
	Farmer	2	8.0	0	0.0
	Jobless	8	32.0	5	20.0
	Other	1	4.0	1	4.0
Living with others	Family	25	100.0	25	100.0
	Alone	0	0.0	0	0.0

The results showed that patient compliance rates in the control group ranged from poor to moderate in the pre-test. After 30 days (post-test), re-measurements showed no discernible differences in compliance levels. The pre-test compliance levels of the intervention group ranged from low to moderate. After using the

application for 30 days, some patients had increased compliance levels at re-measurement (post-test). The difference in the intervention group was statistically significant ($p = 0.001$), as shown in Table II.

The results showed that patient knowledge was mostly low in the control and the intervention group pre-test. It significantly improved post-test in the intervention group ($p = 0.001$), as seen in Table III.

Table II: Frequency and percentage of patient's compliance

Patient's compliance	Control				p - value	Test				p - value
	Pre-test		Post-test			Pre-test		Post-test		
	N	%	N	%		N	%	N	%	
Low	5	20.0	6	24.0	0.527	5	20.0	0	0.0	0.0001
Moderate	20	80.0	19	76.0		20	80.0	22	88.0	
High	0	0.0	0	0.0		0	0.0	3	12.0	

Table III: The profile of patient's knowledge in both groups

Patient knowledge	Control				p - value N	Test				p - value Post-test %
	Pre-test		Post-test			Pre-test		Pre-test		
	N	%	N	%		%	N	%	N	
Low	14	56.0	14	56.0	0.166	14	56.0	2	8.0	0.0001
Moderate	9	36.0	9	36.0		11	44.0	13	52.0	
High	2	8.0	2	8.0		0	0.0	10	40.0	

Discussion

The study started with sociodemographic data collection via questionnaire sheets. In both groups, patients were predominantly male. Most participants were 50-55 years. Men generally suffer from heart disease at a younger age and have a higher potential for CHD than women (Bots, Peters & Woodward, 2017) due to abdominal obesity, often called apple obesity, which is strongly associated with risk factors for CHD (Fodor and Tzerovska, 2004; Wiklund *et al.*, 2008). Besides obesity type, men do not benefit from the protective effect of the steroid hormones, especially oestrogen, like women (Bots, Peters & Woodward, 2017). Oestrogens are beneficial because they prevent atherosclerotic plaque development, favour vasodilation, regulate blood pressure, and have antioxidant and anti-inflammatory properties (Jamee, Abed & Jalambo, 2013). Decreased oestrogen levels in women, e.g. during menopause, make them at equal risk of CHD as men (Maas & Appelman, 2010; Jamee, Abed & Jalambo, 2013; Mozaffarian *et al.*, 2015; Regitz-Zagrosek *et al.*, 2016; Bots, Peters & Woodward, 2017).

The success of therapies delivered by healthcare providers to patients, particularly those with chronic conditions like CHD, depends on patient medication adherence. Indeed, non-adherence to pharmacological treatment can harm the patient and raise the risk of a heart attack (relapse). Measuring and monitoring CHD therapy in outpatients is critical for determining treatment success and avoiding adverse drug reactions

in those patients. However, it is essential to dedicate time and assign clinical pharmacists to supervise therapy for successful outcomes (Kini & Ho, 2018). For more than four decades, much research has been conducted on measuring compliance levels about treatment accurately and precisely. However, nothing is considered the standard of measuring patient compliance levels with treatment (Lam & Fresco, 2015). Direct methods include measuring the concentration of drugs (or metabolites) found in body fluids. Although it is considered the most accurate and adequate method, it causes discomfort in patients. Indirect methods include pill count, electronic health records, and self-reported measures (Questionnaire) (Lam & Fresco, 2015; Anghel, Farcas & Oprean, 2019).

The medication adherence questionnaire (MAQ), average time deviation, and pill count were utilised as measurement methods in this study. The results showed that patient compliance rates in the control group ranged from poor to moderate pre-test. At re-measurement after 30 days (post-test), there was no discernible difference in the patient compliance levels, where 24 patients did not see improvement in compliance, and one had decreased compliance from moderate to low. Patient compliance levels in the intervention group ranged from low to moderate pretest. Thirty days after using the application (post-test), some patients had increased adherence levels, where compliance increased from moderate to high in three patients, from low to moderate in five patients, and remained the same in 17 participants.

These results are consistent with previous findings showing improved compliance among 104 CHD patients in Sydney, Australia, after using the MedApp-CHD mobile application (Santo *et al.*, 2017). Another study also reported an improved adherence among patients using mHealth (Ni *et al.*, 2018). In our modern era, health applications deserve to be taken into account to become one of the options for improving patient compliance (Santo *et al.*, 2017; Ni *et al.*, 2018).

Patient knowledge of their treatment is essential. Research shows that poor health literacy is a barrier to prescribed medication adherence (Perera *et al.*, 2012). The results showed the *Sahabat Jantung*/"Friends of Heart" application could increase patient knowledge. This result is consistent with previous findings showing that patients with atrial fibrillation who used the mAF application had significantly improved knowledge levels compared to patients who received regular care (Guo *et al.*, 2017).

Conclusion

The *Sahabat Jantung*/"Friends of Heart" application could influence the compliance and knowledge of coronary heart disease outpatients.

References

- Anderson, T.J., Grégoire, J., Pearson, G.J., Barry, A.R., Couture, P., Dawes, M., Francis, G.A., Genest, J., Jr, Grover, S., Gupta, M., Hegele, R.A., Lau, D.C., Leiter, L.A., Lonn, E., Mancini, G.B., McPherson, R., Ngui, D., Poirier, P., Sevenpiper, J.L., Stone, J.A., Thanassoulis, G., Ward, R. (2016). 2016 Canadian Cardiovascular Society Guidelines for the Management of Dyslipidemia in the Prevention of Cardiovascular Disease in the Adult. *The Canadian journal of cardiology*, **32**(11), 1263–1282. <https://doi.org/10.1016/j.cjca.2016.07.510>
- Anghel, L.A., Farcas, A.M., & Oprean, R.N. (2019). An overview of the common methods used to measure treatment adherence. *Medicine and pharmacy reports*, **92**(2), 117–122. <https://doi.org/10.15386/mpr-1201>
- Bots, S.H., Peters, S., & Woodward, M. (2017). Sex differences in coronary heart disease and stroke mortality: a global assessment of the effect of ageing between 1980 and 2010. *BMJ global health*, **2**(2), e000298. <https://doi.org/10.1136/bmjgh-2017-000298>
- Chen, S., Gong, E., Kazi, D.S., Gates, A.B., Bai, R., Fu, H., Peng, W., De La Cruz, G., Chen, L., Liu, X., Su, Q., Girerd, N., Karaye, K.M., Alhabib, K.F., Yan, L.L., & Schwalm, J.D. (2018). Using Mobile Health Intervention to Improve Secondary Prevention of Coronary Heart Diseases in China: Mixed-Methods Feasibility Study. *The Journal of Medical Internet Research*, **6**(1), e9. <https://doi.org/10.2196/mhealth.7849>
- Developers, A. (2015) Mengenal Android Studio | Developer Android | Android Developers. Available at: <https://developer.android.com/studio/intro?hl=id>
- Fodor, J.G., & Tzerovska, R. (2004). Coronary heart disease: Is gender important? *The Journal of Men's Health & Gender*, **1**(1), 32–37. <https://doi.org/10.1016/j.jmhg.2004.03.005>
- Fröhlich, S.E., Dal Pizzol, T., & Mengue, S.S. (2010). Instrument to evaluate the level of knowledge about prescription in primary care. *Revista de saude publica*, **44**(6), 1046–1054. <https://doi.org/10.1590/s0034-89102010000600009>
- Guo, Y., Chen, Y., Lane, D.A., Liu, L., Wang, Y., & Lip, G. (2017). Mobile Health Technology for Atrial Fibrillation Management Integrating Decision Support, Education, and Patient Involvement: mAF App Trial. *The American journal of medicine*, **130**(12), 1388–1396.e6. <https://doi.org/10.1016/j.amjmed.2017.07.003>
- Jamee, A., Abed, Y., & Jalambo, M.O. (2013). Gender difference and characteristics attributed to coronary artery disease in Gaza-Palestine. *Global journal of health science*, **5**(5), 51–56. <https://doi.org/10.5539/gjhs.v5n5p51>
- Kini, V., & Ho, P.M. (2018). Interventions to Improve Medication Adherence: A Review. *Journal of the American Medical Association*, **320**(23), 2461–2473. <https://doi.org/10.1001/jama.2018.19271>
- Lam, W.Y., & Fresco, P. (2015). Medication Adherence Measures: An Overview. *BioMed research international*, 2015, 217047. <https://doi.org/10.1155/2015/217047>
- Maas, A.H., & Appelman, Y.E. (2010). Gender differences in coronary heart disease. *Netherlands heart journal*, **18**(12), 598–602. <https://doi.org/10.1007/s12471-010-0841-y>
- Mozaffarian, D., Benjamin, E.J., Go, A.S., Arnett, D.K., Blaha, M.J., Cushman, M., de Ferranti, S., Després, J.P., Fullerton, H.J., Howard, V.J., Huffman, M.D., Judd, S.E., Kissela, B.M., Lackland, D.T., Lichtman, J.H., Lisabeth, L.D., Liu, S., Mackey, R.H., Matchar, D.B., McGuire, D.K., MohlerIII, E.R., Moy, S.C., Muntner, P., Mussolino, M.E., Nasir, K., Neumar, R.W., Nichol, G., Palaniappan, L., Pandey, D.K., Reeves, M.J., Rodriguez, C.J., Sorlie, P.D., Stein, J., Towfighi, A., Turan, T.N., Virani, S.S., Willey, J.Z., Woo, D., Yeh, R.W., Turner, M.B. American Heart Association Statistics Committee and Stroke Statistics Subcommittee (2015). Heart disease and stroke statistics--2015 update: a report from the American Heart Association. *Circulation*, **131**(4), e29–e322. <https://doi.org/10.1161/CIR.000000000000152>
- Ni, Z., Liu, C., Wu, B., Yang, Q., Douglas, C., & Shaw, R. J. (2018). An mHealth intervention to improve medication adherence among patients with coronary heart disease in China: Development of an intervention. *International journal of nursing sciences*, **5**(4), 322–330. <https://doi.org/10.1016/j.ijnss.2018.09.003>
- Nobre, M., & Domingues, R. (2017). Patient adherence to ischemic heart disease treatment. *Revista da Associacao Medica Brasileira (1992)*, **63**(3), 252–260. <https://doi.org/10.1590/1806-9282.63.03.252>
- Park, L.G., Collins, E.G., Shim, J.K., & Whooley, M.A. (2017). Comparing Mobile Health Strategies to Improve Medication Adherence for Veterans with Coronary Heart Disease

(Mobile4Meds): Protocol for a Mixed-Methods Study.

Journal of Medical Internet Research, **6**(7), e134.

<https://doi.org/10.2196/resprot.7327>

Perera, T., Ranasinghe, P., Perera, U., Perera, S., Adikari, M., Jayasinghe, S., & Constantine, G.R. (2012). Knowledge of prescribed medication information among patients with limited English proficiency in Sri Lanka. *BMC research notes*, **5**, 658. <https://doi.org/10.1186/1756-0500-5-658>

EUGenMed Cardiovascular Clinical Study Group, Regitz-Zagrosek, V., Oertelt-Prigione, S., Prescott, E., Franconi, F., Gerdt, E., Foryst-Ludwig, A., Maas, A.H., Kautzky-Willer, A., Knappe-Wegner, D., Kintscher, U., Ladwig, K.H., Schenck-Gustafsson, K., & Stangl, V. (2016). Gender in cardiovascular diseases: impact on clinical manifestations, management, and outcomes. *European heart journal*, **37**(1), 24–34. <https://doi.org/10.1093/eurheartj/ehv598>

Rehman, H., Kamal, A.K., Morris, P.B., Sayani, S., Merchant, A.T., & Virani, S.S. (2017). Mobile Health (mHealth) Technology for the Management of Hypertension and Hyperlipidemia: Slow Start but Loads of Potential. *Current atherosclerosis reports*, **19**(3), 12. <https://doi.org/10.1007/s11883-017-0649-y>

Roffi, M., Patrono, C., Collet, J.P., Mueller, C., Valgimigli, M., Andreotti, F., Bax, J.J., Borger, M.A., Brotons, C., Chew, D.P., Gencer, B., Hasenfuss, G., Kjeldsen, K., Lancellotti, P., Landmesser, U., Mehilli, J., Mukherjee, D., Storey, R. F., Windecker, S., & ESC Scientific Document Group (2016). 2015 ESC Guidelines for the management of acute coronary syndromes in patients presenting without persistent ST-segment elevation: Task Force for the Management of Acute Coronary Syndromes in Patients Presenting without Persistent ST-Segment Elevation of the European Society of Cardiology (ESC). *European heart journal*, **37**(3), 267–315. <https://doi.org/10.1093/eurheartj/ehv320>

Santo, K., Chow, C.K., Thiagalingam, A., Rogers, K., Chalmers, J., & Redfern, J. (2017). Medication reminder APPs to improve medication adherence in Coronary Heart Disease (MedApp-CHD) Study: a randomised controlled trial protocol. *BMJ open*, **7**(10), e017540. <https://doi.org/10.1136/bmjopen-2017-017540>

Wiklund, P., Toss, F., Weinehall, L., Hallmans, G., Franks, P. W., Nordström, A., & Nordström, P. (2008). Abdominal and gynoid fat mass are associated with cardiovascular risk factors in men and women. *The Journal of clinical endocrinology and metabolism*, **93**(11), 4360–4366. <https://doi.org/10.1210/jc.2008-0804>

Zullig, L.L., Ramos, K., & Bosworth, H.B. (2017). Improving Medication Adherence in Coronary Heart Disease. *Current cardiology reports*, **19**(11), 113. <https://doi.org/10.1007/s11886-017-0918-y>



[Home](#) / [Editorial Team](#)

Editorial Team

Editor in Chief

Prof Ian Bates, FIP Education, United Kingdom

Journal Editor

Dr Marwan El Akel, Pharmacy Education

Senior Associate Editors

Dr Andreia Bruno-Tomé, Monash University, Australia

Assoc Prof Jennifer Marriott, Monash University, Australia

Managing Editor

Dr Sherly Meilianti, Pharmacy Education

Associate Editors

Prof Joyce Addo-Atuah, Touro College of Pharmacy, USA

Prof Patricia Acuna-Johnson, University of Valparaiso, Chile

Dr Syed Imran Ahmed, University of Lincoln, United Kingdom

Prof Alba Mahmoud Albsoul-Younes, The University of Jordon, Jordan

Dr Ammar Almaaytah, Middle East University, Jordan

Dr Filipa Alves Da Costa, University of Lisbon, Portugal

Mr Chima Amadi, Pharmacists Council of Nigeria, Nigeria

Dr Mudassar Iqbal Arain, , University of Sindh, Pakistan.

Prof Lilian M. Azzopardi, University of Malta, Malta

Prof Rula Darwish, The University of Jordon, Jordan

Dr Ruth Edwards, Aston University, UK

Dr Divakar Goli, Acharya Institutes, India

Prof Yahdiana Harahap, University of Indonesia, Indonesia,

Prof Martin Henman, Trinity College Dublin, Ireland

Dr Shazia Jamshed, International Islamic University Malaysia, Malaysia

Dr Abby Kahaleh, Roosevelt University, USA

Prof Silvana Nair Leite, Federal University of Santa Catarina, Brazil

Dr Subhash Chandra Mandal, Directorate of Drugs Control, India

Mr Khalid Garba Mohammed, University of Milan, Italy

Dr Hana Morrissey, University of Wolverhampton, UK

Dr Christos Petrou, University of Nicosia, Cyprus

Dr Ukamaka Okafor, Pharmacists Council of Nigeria, Nigeria

Dr Carl Schneider, The University of Sydney, Australia

Prof Bruno Sepodes, University of Lisbon, Portugal

Dr James Scott, Western University of Health Sciences, USA

Prof M Chandra Sekar, University of Findlay, USA

Dr Rajani Shakya, Kathmandu University, Nepal

Dr Lixin Shu, Naval Medical University, China

Dr Judilynn Solidum, University of the Philippines, Philippines

Dr Kyle Wilby, University of Otago, New Zealand

Dr Sarah Willis, The University of Manchester, UK

Prof Shigeo Yamamura, Josai International University, Japan

Dr M. Nazli Sencan, Acibadem University, Istanbul, Turkey

Prof Abeer Al-Ghananeem, Sullivan University College of Pharmacy & Health Sciences
Kentucky, USA

[Open Journal Systems](#)

PKP Publishing
Services

Part of the
[PKP Publishing Services Network](#)



ISSN: 1477-2701



[Home](#) / [Archives](#) / Vol. 22 No. 2 (2022): IAI Special Edition

Vol. 22 No. 2 (2022): IAI Special Edition

Published: 2022-03-31

Special Edition

IAI SPECIAL EDITION: The effect of advertising on the decision to purchase facial wash during the COVID-19 pandemic

Anna Pradiningsih, Baiq Leny Nopitasari, Ida Ayu Melian, Resi Sukmaningsih, Mahacita Andanalusia (Author)

p. 41-44



IAI SPECIAL EDITION: Study of potential interactions of oral antidiabetic drugs in patients with type 2 diabetes mellitus with comorbidities: A retrospective study

Primanitha Ria Utami, Devi Ristian Octavia (Author)

p. 200-206



IAI SPECIAL EDITION: Cost of illness for COVID-19 inpatients in West Nusa Tenggara, Indonesia

Cyntiya Rahmawati, Baiq Nurbaety, Nurul Qiyaam, Sul-ton Dini, Laelatul Maftuhah (Author)

p. 66-69



IAI SPECIAL EDITION: Regulatory compliance of skincare product advertisements on Instagram

Sinta Rachmawati, Afriza Amalia, Ema Rachmawati (Author)

p. 230-235



IAI SPECIAL EDITION: Plant tissue culture of cat whiskers (*Orthosiphon aristatus* Blume Miq): A review of secondary metabolite production and micropropagation

Fahrauk Faramayuda, Totik Sri Mariani, Elfahmi, Sukrasno (Author)

p. 92-97



IAI SPECIAL EDITION: Tocilizumab therapy in COVID-19 patients

Yulistiani, Humaira Izka A, Mareta Rindang A, Prastuti A W (Author)

p. 259-262



IAI SPECIAL EDITION: Comparison of antipyretic activities of ethanol and ethyl acetate extracts of Bandotan herb (*Ageratum conyzoides* L.) in hyperpyrexia mice

Fransiska Maria Christianty, Diana Holidah, Junita Haulani, Lady Refrina Fitriasarria, Fifteen Aprila Fajrin (Author)

p. 118-122



IAI SPECIAL EDITION: Evaluation of clinical pharmacy services in community health centres to support Indonesian health programme in West Java Indonesia

Zaenal Komar, Keri Lestari, Anna Meiliana, Ali Gufron Mukti (Author)

p. 278-283



IAI SPECIAL EDITION: Lung histopathological profile of male albino Wistar rats exposed to tobacco smoke administered ethanolic extract of red spinach

Keni Idacahyati, Rani Agustiani, Vera Nurviana, Winda Trisna Wulandari, Firman Gustaman (Author)

p. 142-146



IAI SPECIAL EDITION: α -Glucosidase inhibitory activities of *Loranthus ferrugineus* and *Peperomia pellucida* extracts

Hilwan Yuda Teruna, Rudi Hendra, Muhammad Almurdani (Author)

p. 5-8



PDF

IAI SPECIAL EDITION: Phytochemical screening and antidiabetic activities test of ethanol extract from *Syzygium cumini* L. seeds in male Wistar rats induced by alloxan

Lia Puspitasari, Made Asmarani Dira (Author)

p. 165-168



PDF

IAI SPECIAL EDITION: Effects of health supplement self-medication learning media on health student behaviours during the COVID-19 pandemic

Adin Hakim Kurniawan, Yusmaniar, Safitri, Alvi Nur (Author)

p. 30-35



PDF

IAI SPECIAL EDITION: Medication adherence of diabetes mellitus patients in Indonesia: A systematic review

Maria Vini Pertiwi, Riza Alfian, Yunita Nita, Umi Athiyah (Author)

p. 188-193



PDF

IAI SPECIAL EDITION: Effect of gelling agent and penetration enhancer on the release rate of ibuprofen-PEG 6000 solid dispersion from gel preparations

Budipratiwi Wisudyarningsih, Lidya Ameliana (Author)

p. 55-59



PDF

IAI SPECIAL EDITION: The potential of citronella grass to inhibit growth of *Escherichia coli* and *Staphylococcus aureus* bacteria

Reynelda Juliani Sagala, Pretty Falena Atmanda Kambira, Untung Gunawan, Grafty Pollin (Author)

p. 218-224



PDF

IAI SPECIAL EDITION: White Turmeric (*Kaempferia rotunda* L.) extract liquid soap preparation for feminine hygiene and effectiveness against *Candida albicans*

Sofi Nurmaya Stiani, Lila Ardiani Putri, Yusransyah, Dimas Danang Indriatmoko (Author)

p. 74-84



PDF

IAI SPECIAL EDITION: Effectiveness of telemedicine use to improve patient outcome in cancer patients: A narrative review

Angela Judhia Arkandhi, Woro Harjaningsih (Author)

p. 248-253



PDF

IAI SPECIAL EDITION: Formulation and effectivity testing of pining fruit extract gel (*Hornstedtia alliacea*) for healing burns

Firman Gustaman, Fajar Setiawan, Nida Nur Fadhilah, Keni Idacahyati, Winda Trisna Wulandari, Indra Indra (Author)

p. 109-112



PDF

IAI SPECIAL EDITION: Signal detection of adverse drug reaction to first line anti tuberculosis drugs using the Indonesian pharmacovigilance database

Setyo Utami, Umi Athiyah, Yunita Nita (Author)

p. 270-274



PDF

IAI SPECIAL EDITION: Development and validation of dissolution testing of Flunarizine dihydrochloride in tablet dosage form

Fitra Yelli, Harrizul Rivai, Henny Lucida (Author)

p. 132-137



PDF

IAI SPECIAL EDITION: The potential role of pharmacists in counteracting health misinformation in social media

Anila Impian Sukorini, Titik Puji Rahayu, Kandi Aryani Suwito, Andi Hermansyah (Author)

p. 292-296

[PDF](#)**IAI SPECIAL EDITION: Solubility improvement of gallic acid in water through cocrystal formation with the solvent-drop grinding method and tartaric acid as co-former**

Ledianasari, Sohadi Warya, Sri Nurjayanti (Author)

p. 156-159

[PDF](#)**IAI SPECIAL EDITION: Green synthesis of silver nanoparticles from Alpinia galanga extract with microwave irradiation and antibacterial activity against Escherichia coli**

Yuli Haryani , Yonatha Melanie, Maria Novita, Yuharmen, Rudi Hendra, Ganis Fia Kartika (Author)

p. 20-23

[PDF](#)**IAI SPECIAL EDITION: Drug therapy for COVID-19 inpatients in West Nusa Tenggara hospital**

Mahacita Andanalusia, Shah Iqbal Ikraman Akbar, Anna Pradiningsih (Author)

p. 180-183

[PDF](#)**IAI SPECIAL EDITION: Validity and reliability of the Indonesian version of the Self-Efficacy for Appropriate Medication use Scale (SEAMS-I)**

Antonius Nugraha Widhi Pratama, Fardina Aulia, Fransiska Maria Christianty (Author)

p. 45-49

[PDF](#)**IAI SPECIAL EDITION: Determinant factors of narcotics, psychotropic, and addictive substances abuse relapse in a drug rehabilitation centre in Indonesia**

Raharni Raharni, Siti Isfandari, Telly Purnamasari, Andi Leny Susianti, Mujiati Mujiati (Author)

p. 207-212

[PDF](#)**IAI SPECIAL EDITION: The development of a medication safety module for healthcare professionals: Results of a Delphi technique**

Desak Ketut Ernawati , Ika Widi Astuti, Luh Kadek Pande Ary Susilawati, I Wayan Sumardika (Author)

p. 70-73

[PDF](#)**IAI SPECIAL EDITION: Comparison and validation of EuroQol-5 Dimension level and Short Form-6 Dimension in cataract patients**

Tri Murti Andayani, Susi Ari Kristina, Rizky Hidayaturahmah (Author)

p. 236-241

[PDF](#)**IAI SPECIAL EDITION: Development of novel curcumin nanoemulgel: Optimisation, characterisation, and ex vivo permeation**

Ferdy Firmansyah, Wildan Khairi Muhtadi, Sepfira Indriani, Maulana Dziya Ulhaq, Suci Rizki Auliya, Benni Iskandar, Nesa Agistia, Lutfi Chabib (Author)

p. 98-103

[PDF](#)**IAI SPECIAL EDITION: Pharmaceutical care model for antituberculosis drug therapy in tuberculosis patients at a primary healthcare centre in Surabaya, East Java, Indonesia**

Yuni Priyandani, Abdul Rahem, Umi Athiyah, M. B. Qomaruddin, Kuntoro (Author)

p. 263-266

[PDF](#)**IAI SPECIAL EDITION: Medication adherence and quality of life among asthmatic patients in primary care in Indonesia**

Gesnita Nugraheni, Ayu N. A. Santoso, Dian Puspitasari, Catur D. Setiawan, Yunita Nita (Author)

p. 123-128

[PDF](#)**IAI SPECIAL EDITION: Molecular docking study of vemurafenib derivatives on melanoma inhibitory activity (MIA) as anti-melanoma**

Fauzan Zein Muttaqin , Anita Pramudya Ratna Sari, Fransiska Kurniawan (Author)

p. 284-288

[PDF](#)

IAI SPECIAL EDITION: Cytotoxic activity of Cantigi leaf extract (*Vaccinium varingaefolium* Blume Miq.) on HeLa cervical cancer cells and A549 lung cancer cells

Kosasih Kosasih, Hasna Nurfitriyati, Reza Hafidz (Author)

p. 147-150

**IAI SPECIAL EDITION: Effects of a combination of *Sauropus androgynus* L. leaf and *Zingiber Ottensii* rhizome on fatty acid profile and liver damage in rats**

Agus Sulaeman, Annisa Mardianni , Ary Yuniarto , Masteria Yunovilsa Putra, Bustanussalam, Asep Bayu (Author)

p. 9-15

**IAI SPECIAL EDITION: The effect of astaxanthin gel and zeaxanthin combination on wound healing in diabetic rats**

Lusi Nurdianti, Renaldi Eka Mufti Rosyidi, Keni Idacahyati, Fajar Setiawan (Author)

p. 169-173

**IAI SPECIAL EDITION: The impact of mobile application: "Friends of Heart" in knowledge and compliance of patients with coronary heart disease**

Riyan Pratama Putra, Ike Dhiah Rochmawati, Delta Ardy Prima (Author)

p. 36-40

**IAI SPECIAL EDITION: Evaluation of pharmacist-led structured counselling on glycemic control and clinical outcomes of Type 2 diabetes mellitus patients at a health centre in East Jakarta, Indonesia**

Muhammad Rahmat Masdin, Ratu Ayu Dewi Sartika, Rani Sauriasari (Author)

p. 194-199

**IAI SPECIAL EDITION: Mapping of pharmaceutical service facilities (pharmacy) based on geographic information in Surabaya**

Catur Dian Setiawan, Arief Wibowo, Umi Athiyah (Author)

p. 60-65

**IAI SPECIAL EDITION: An exploratory study of pharmacists' views on the development of a professional recognition system in Indonesia**

Sherly Meilianti, Felicity Smith, Roy Himawan, Franciscus Kristianto, Rasta Naya, Ian Bates (Author)

p. 225-229

**IAI SPECIAL EDITION: Optimal scenario of antihypertension's cost-effectiveness in Prolanis hypertension patients: A case study of Pandeglang District, Indonesia**

Yusransyah, Eli Halimah, Auliya A. Suwantika (Author)

p. 85-91

**IAI SPECIAL EDITION: Cost of illness analysis of diabetes mellitus with complications in one hospital in Surabaya**

Yohana Febriani Putri Peu Patty, Yunita Nita, Libriansyah (Author)

p. 254-258

**IAI SPECIAL EDITION: Meta-analysis of the effectiveness of histamine-2 receptor antagonists as prophylaxis for gastrointestinal bleeding in intensive care unit patients**

Fonny Cokro, Juliana Sumartono (Author)

p. 113-117

**IAI SPECIAL EDITION: Brotowali (*Tinospora crispa* L.) stem extract activity as an α -Amylase enzyme inhibitor**

Yustina Sri Hartini, Dewi Setyaningsih, Fetiana Chrismaurin, Fila Delpia (Author)

p. 275-277

**IAI SPECIAL EDITION: Effect of *Rosmarinus officinalis* L inhalation on reducing primary dysmenorrhoea in female students of the Bali International University**

Ida Ayu Manik Partha Sutema, I Gede Argham Mahardika (Author)

p. 138-141



IAI SPECIAL EDITION: The potential of *Mimosa pudica* L as an α -glucosidase inhibitor and antioxidant agent

Muhamad Afham, Hilwan Yuda Teruna, Rudi Hendra (Author)

p. 1-4



IAI SPECIAL EDITION: Infrared spectroscopy chemometric model for determination of phenolic content of plant leaf powder

Lestyo Wulandari, Tyas Putri Rahmadania, Nia Kristiningrum (Author)

p. 160-164



IAI SPECIAL EDITION: Antioxidant activity assay of Agarwood leaf extract cream (*Aquilaria malaccensis* L.) using free radical scavenging method

Abdul Rahman Wahid, Yuli Fitriana, Alvi Kusuma Wardani, Lisa Apriana Heru Listari (Author)

p. 24-29



IAI SPECIAL EDITION: Prescription of medicine for outpatients of gynaecology obstetric poly at a private hospital in Semarang, Indonesia

Didik Apriyanto, Maria Caecilia Nanny Setiawati (Author)

p. 184-187



IAI SPECIAL EDITION: Development of Sumbawa honey as tonic to stimulate stamina during the COVID-19 pandemic in West Nusa Tenggara

Baiq Leny Nopitasari, Shah Iqbal Ikraman Akbar, Alvi Kusuma Wardani (Author)

p. 50-54



IAI SPECIAL EDITION: Pancreatic histological studies in mice induced by alloxan and steeping okra coffee (*Abelmoschus esculentus* [L.] Moench)

Indiana Gita Anggraeni, Rahmat A Hi Wahid, Nurul Marfu'ah (Author)

p. 213-217



IAI SPECIAL EDITION: Influence of dispersing solvent on curcumin dissolution from solid dispersions prepared using hydroxypropyl methylcellulose-polyvinylpyrrolidone K30

Dewi Setyaningsih, Dyah Roro Palupi, Yustina Sri Hartini (Author)

p. 74-78



IAI SPECIAL EDITION: Adverse drug reaction of antiepileptic monotherapy on epileptic paediatric patients in Dr Sardjito Hospital, Yogyakarta, Indonesia

Woro Harjaningsih, Emma Rahmania, Sheila Nabila Firdha (Author)

p. 242-247



IAI SPECIAL EDITION: *Theobroma cacao* L. (Cocoa) pod husk as a new therapy for transient receptor protein vanilloid-1 (TRPV1)-targeted diabetic neuropathy: An in silico study

Pungky Azarotul Nisa, Alviyani Mahdalina Adzani, Sintia Noor Amalia, Risa Maulidiana, Eka Yuniar, Fania Mufti Mufidah, Fifteen Aprilia Fajrin (Author)

p. 104-108



IAI SPECIAL EDITION: Relationship between family support and compliance in diabetes mellitus patients

Devi Nur Zafirah, Liza Pristianty, Abdul Rahem, Yuni Priyandani (Author)

p. 267-269



IAI SPECIAL EDITION: Validation of stress assessment instruments related to the COVID-19 pandemic in pregnant women

Mazhar Ardhina Silmi, Gusti Noorrizka Veronika Achmad, Hanni Prihastuti Puspitasari (Author)

p. 129-131

[PDF](#)**IAI SPECIAL EDITION: Relationship between knowledge and attitude towards COVID-19 prevention behaviour among west jakarta residents**

Đ...tĐµfĐ°nŌ½Ñ• LŌ½kĐ°Ñ•, Diana Laila Ramatillah, Nina Jusnita, Đ...Đ°İÑ•Đ° FĐ°dhÑ-İla, Yufri Aldi, Fatma Sri Wahyuni (Author)
p. 289-291

[PDF](#)**IAI SPECIAL EDITION: In vitro anti-ageing activity of ethanol extract of Cantigi (*Vaccinium varingiaefolium* Blume Miq.) leaf and the extract loaded gelatin nanoparticles**

Kosasih Kosasih, I Wayan Redja, Yunahara Farida (Author)
p. 151-155

[PDF](#)**IAI SPECIAL EDITION: Antioxidant and α -Glucosidase inhibition of *Pyrrhosia longifolia* extracts**

Rohimatul Khodijah, Hilwan Yuda Teruna, Rudi Hendra (Author)
p. 16-19

[PDF](#)**IAI SPECIAL EDITION: *Stevia rebaudiana* as a nutraceutical for COVID-19 patients with no sugar diet during recovery and its nanoparticle application**

Lutfi Chabib, Arman Suryani, Sherina Nabila Putri Hakim, Muhammad Ikhwan Rizki, Ferdy Firmansyah, Yulianto, Fitra Romadhonsyah (Author)
p. 174-179

[PDF](#)

Open Journal Systems

PKP Publishing
Services

Part of the
[PKP Publishing Services Network](#)



ISSN: 1477-2701



Pharmacy Education



COUNTRY

Netherlands

Universities and research
institutions in Netherlands

SUBJECT AREA AND CATEGORY

Health Professions
PharmacyPharmacology, Toxicology and
Pharmaceutics
Pharmaceutical ScienceSocial Sciences
Education

PUBLISHER

H-INDEX

18

PUBLICATION TYPE

Journals

ISSN

14772701, 15602214

COVERAGE

1973-1978,
2002-2021


INFORMATION

[Homepage](#)[How to publish in this
journal](#)pej@fip.org

SCOPE

Pharmacy Education journal provides a research, development and evaluation forum for communication between academic teachers, researchers and practitioners in professional and pharmacy education, with an emphasis on new and established teaching and learning methods, new curriculum and syllabus directions, educational outcomes, guidance on structuring courses and assessing achievement, and workforce development. It is a peer-reviewed online open access platform for the dissemination of new ideas in professional pharmacy education and workforce development. Pharmacy Education supports Open Access (OA): free, unrestricted online access to research outputs. Readers are able to access the Journal and individual published articles for free - there are no subscription fees or 'pay per view' charges. Authors wishing to publish their work in Pharmacy Education do so without incurring any financial costs.

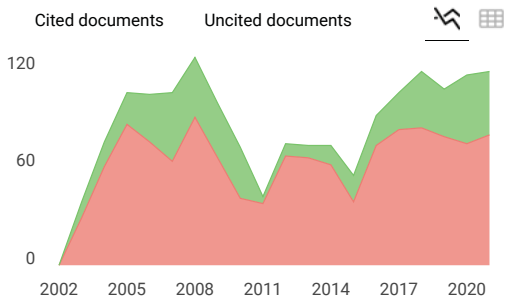
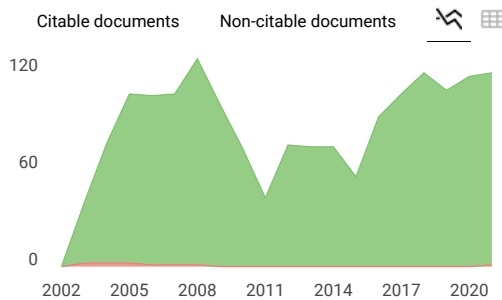
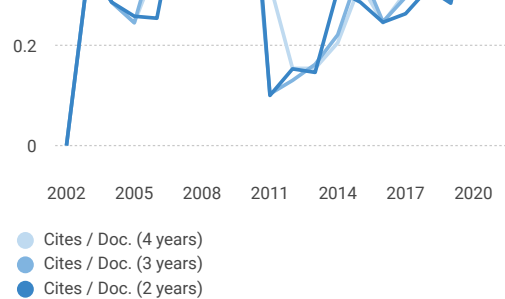
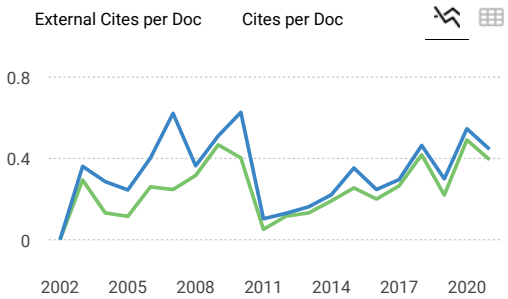
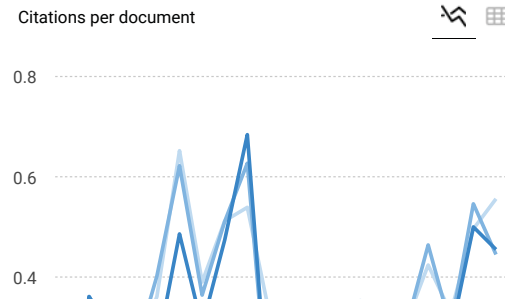
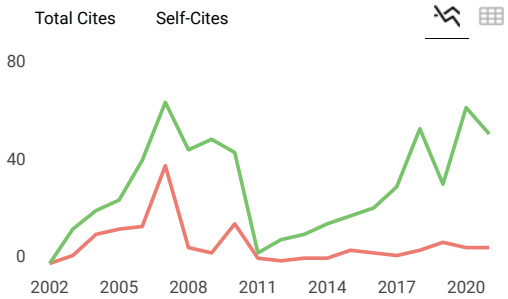
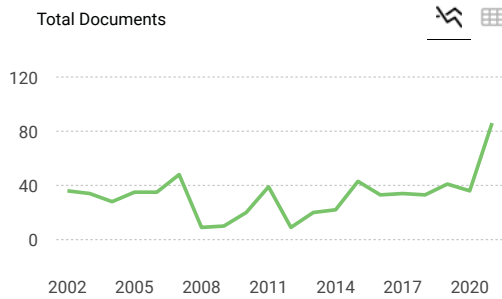
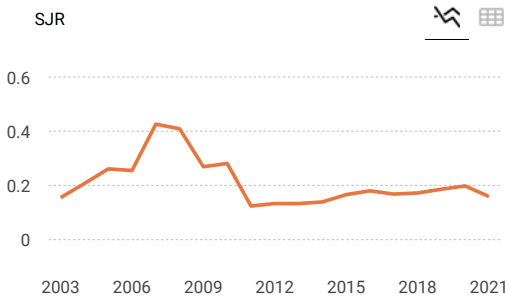
 Join the conversation about this journal

 Quartiles

FIND SIMILAR JOURNALS 

<p>1 American Journal of Pharmaceutical Education USA</p> <p>83% similarity</p>	<p>2 Currents in Pharmacy Teaching and Learning USA</p> <p>82% similarity</p>	<p>3 Journal of Educational Evaluation for Health KOR</p> <p>30% similarity</p>	<p>4 Pharmacy Practice ESP</p> <p>20% similarity</p>
---	---	---	--





Pharmacy Education

Q3 Pharmaceutical Science
best quartile

SJR 2021
0.16

powered by scimagojr.com

← Show this widget in your own website

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

```
<a href="https://www.scimagojr.com/journalsearch.php?q=21211&tip=sid&clean=0">
```



Source details

Pharmacy Education

Scopus coverage years: from 1973 to 1978, from 2002 to Present

Publisher: Taylor & Francis

ISSN: 1560-2214 E-ISSN: 1477-2701

Subject area: [Health Professions: Pharmacy](#) [Pharmacology, Toxicology and Pharmaceutics: Pharmaceutical Science](#) [Social Sciences: Education](#)

Source type: Journal

[View all documents >](#)

[Set document alert](#)

[Save to source list](#)

CiteScore 2021

0.5



SJR 2021

0.159



SNIP 2021

0.315



[CiteScore](#) [CiteScore rank & trend](#) [Scopus content coverage](#)

CiteScore 2021 ▼

$$0.5 = \frac{107 \text{ Citations } 2018 - 2021}{195 \text{ Documents } 2018 - 2021}$$

Calculated on 05 May, 2022

CiteScoreTracker 2022 ⓘ

$$0.4 = \frac{116 \text{ Citations to date}}{291 \text{ Documents to date}}$$

Last updated on 05 August, 2022 • Updated monthly

CiteScore rank 2021 ⓘ

Category	Rank	Percentile
Health Professions		
└ Pharmacy	#26/36	29th
Pharmacology, Toxicology and Pharmaceutics		
└ Pharmaceutical Science	#125/171	27th
Social Sciences		
└ Education	#1126/1406	19th

[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](#)

ELSEVIER

[Terms and conditions](#) ↗ [Privacy policy](#) ↗

Copyright © [Elsevier B.V](#) ↗. All rights reserved. Scopus® is a registered trademark of Elsevier B.V.

We use cookies to help provide and enhance our service and tailor content. By continuing, you agree to the [use of cookies](#) ↗.

 RELX