

## IGSCPS SPECIAL EDITION

### RESEARCH ARTICLE

# Healthcare collaboration intervention: Pre-post study

Zahrotul Hikmah<sup>1</sup> , Rika Yulia<sup>2</sup> , Setiasih<sup>3</sup> , Heru Wijono<sup>4</sup> , Fauna Herawati<sup>2</sup> 

<sup>1</sup> Master of Pharmacy Study Programme, Faculty of Pharmacy, University of Surabaya, Indonesia

<sup>2</sup> Department of Clinical and Community Pharmacy, Faculty of Pharmacy, University of Surabaya, Indonesia

<sup>3</sup> Laboratory for Developmental Psychology, Faculty of Psychology, University of Surabaya, Indonesia

<sup>4</sup> Medical Study Programme, University of Surabaya, Indonesia

#### Keywords

Antibiotic stewardship  
Interprofessional collaboration  
Knowledge  
Motivation

#### Correspondence

Fauna Herawati  
Department of Clinical and Community  
Pharmacy  
Faculty of Pharmacy  
University of Surabaya  
Indonesia  
fauna@staff.ubaya.ac.id

#### Abstract

**Background:** Effective interprofessional collaboration between health professionals is correlated with improving the quality of health services and patient safety, for example, Program Pengendalian Resistensi Antibiotik (PPRA). **Objective:** This research aims to determine the effect of educational PPRA on the knowledge and motivation of healthcare professionals in interprofessional collaboration practices. **Methods:** The research is quasi-experimental, with one group pre-post using a knowledge questionnaire (questionnaire 1) and a motivation questionnaire (questionnaire 2). The respondents were health professionals at Husada Utama Hospital. This research involved 74 respondents: two doctors, three pharmacists, 41 nurses, five midwives, ten pharmacist assistants, and 13 laboratory assistants. **Results:** The analysis of the effect of providing education on health professionals' knowledge level showed a significant improvement in good categories before and after education, with 55.4% before and 73% after (Sig. = 0.025,  $p < 0.05$ ). The analysis of the level of motivation showed that moderate categories grew insignificantly before and after education, with 39.19% before and 47.30% after (Sig = 0.599,  $p > 0.05$ ). **Conclusion:** This research concluded that PPRA education's effect on health workers' knowledge and motivation in interprofessional collaboration at Husada Utama Hospital has increased knowledge and motivation.

## Introduction

Antibiotic resistance is a global issue causing an increase in mortality, with Asia and Africa having the highest rates (World Health Organization, 2021). The Indonesian government supports the Global Action Plan, which includes the Antimicrobial Stewardship (AMS) initiative through Permenkes No. 8 of 2015.

The Antimicrobial Stewardship (AMS) policies in Asia have positive impacts, including reduced clinical deterioration scores, length of stay, mortality, and re-admission rates, while also reducing the discovery of resistant microorganisms (Setiawan *et al.*, 2019). In Beijing Chaoyang, China, the use of antibiotics also decreased in the outpatient ward, going from 19.28% to 13.21%, while inpatient wards decreased from 64.34% to 34.65% (Wang *et al.*, 2019). In Indonesia, a rational implementation of antibiotic use was undergone, moving from 31.25% to 62.5%, and total

antibiotic use per 100 patients per day decreased from a defined daily dose of 90.84% to 61.42% (Karuniawati *et al.*, 2021).

According to studies, interprofessional collaboration (IPC) decreases antibiotic use by 12.2% between 2015 and 2019 (Schmid *et al.*, 2022). Furthermore, collaboration with the Neonatal Intensive Care Unit (NICU) staff resulted in a 34% reduction in relative risk of median antibiotic use rate (Dukhovny *et al.*, 2019).

The capability, opportunity, motivation behavioural theory (COM-B) method helps healthcare practitioners understand and motivate successful IPC. Motivation is driven by capacity and opportunity, affecting knowledge, skills, and abilities. However, a knowledge and education gap across professions and behavioural treatments is needed for optimal collaboration (Michie, 2015).

The research shows education enhances healthcare workers' clinical pathway knowledge, AMS comprehension, and teamwork.

Limited intervention studies in Indonesia have examined antibiotic resistance reduction in interprofessional collaborative healthcare practices (IPC); IPC is crucial for effective management and prevention.

## Methods

### Design

This study investigates the impact of Program Pengendalian Resistensi Antibiotik (PPRA) education on health professionals' knowledge and motivation at Husada Utama Hospital Surabaya. A one-group pre-test post-test design was used to collect primary data, using a knowledge level questionnaire (questionnaire 1) and a motivation level questionnaire (questionnaire 2). The knowledge and belief questionnaire measures healthcare knowledge, while the self-evaluation capability, opportunity, and motivation (COM) questionnaire assesses motivation.

The educational implementation is packaged in the form of a one-hour seminar entitled "*Interprofessional collaboration practice in controlling antimicrobial-drug resistance in hospital*," delivered by the Chairman of the Medical Committee at Husada Utama Hospital. The seminar covers four discussion topics: PPRA implementation, antibiotic resistance, antibiotic rationalisation, and interprofessional collaborative practices.

### Instrument

This study uses total sampling to select healthcare personnel from Hospital Husada Utama Surabaya who attended the PPRA educational seminar on December 19th-20th, 2022. Data collection uses Google Forms, with inclusion criteria including informed consent, comprehensive questionnaire completion, and full participation.

### Data analysis

#### Questionnaire development

The study questionnaire was developed following comprehensive literature. Judgement from a clinical pharmacy and psychology lecturer was given, reviewing the questionnaire for structure and content validity to assess the constructed questionnaire's clarity, understandability and organisation. The knowledge questionnaire was adopted by the Knowledge and

Belief Questionnaire (KR-20 = 0.54) (Herawati *et al.*, 2022) and the motivation questionnaire was adopted by the COM self-evaluation 6-item questionnaire (ICC = 0.83, ICC > 0.75) (Keyworth *et al.*, 2020). There were 74 respondents in total, and this was used to establish the questionnaire's face validity. Thereafter, every item on the questionnaire will be used as a tool for education assessment.

A high correlation coefficient indicates a good questionnaire's construct validity. Data is valid when the  $r$  count is greater than the  $r$  table. The study used internal consistency tests with KR-20 for Questionnaire 1 and Cronbach's alpha coefficient values > 0.7 for Questionnaire 2.

#### Questionnaire scoring

Questionnaire 1 has 12 questions. Each successful answer receives a score of one, while each erroneous response receives a zero: the maximum score is 12. The domain knowledge score is categorised into good, sufficient, and bad categories. While the percentage of accurate responses used to assess domain knowledge is divided into three categories: good categorisation (mean > 76 - 100%), sufficient categorisation (mean = 60 - 76%), and bad categorisation (mean < 60%).

Questionnaire 2 assesses instinctive and reflective motivation using a Likert scale with four statements. The questionnaire was created using a Likert scale in the form of a statement with four response options (4 = "strongly agree", 3 = "agree", 2 = "disagree", and 1 = "strongly disagree"). The assessment yields a score ranging from eight to thirty-two based on the scores from each subscale. The questionnaire was categorised as high, moderate, or low, with each being defined as such, with standard deviation being denoted by SD: high ( $x \geq \text{mean} + 1 \text{ SD}$ ), moderate ( $\text{mean} + 1 \text{ SD} > x > \text{mean} - 1 \text{ SD}$ ), and low ( $\text{mean} - 1 \text{ SD} \geq x$ ).

#### Statistical analysis

Data was analysed using the IBM Statistical Package for Social Science (SPSS) version 26. Checking for normality was carried out using the Kolmogorov-Smirnov test (with  $p > 0.05$  indicating a normally distributed). Wilcoxon sign rank test was used to evaluate pre-post education. A p-value of  $p \leq 0.05$  was considered statistically significant for all statistical analyses, and all tests were two-tailed.

#### Location

The study was done in Husada Utama Hospital Surabaya (Private hospital type B with a bed capacity 288).

**Ethical considerations**

The ethical committee of Husada Utama Hospital, Surabaya, authorised this study under Etichal reference number 37/KEP-RSHU/XII/2022.

**Results**

A questionnaire was distributed before and after PPRA education implementation to assess health workers' knowledge and motivation toward interprofessional collaboration at Husada Utama Hospital.

**Questionnaire validity and reliability test**

The validity and reliability of knowledge and motivation questionnaires include content and construct validity tests. Content validity involves expert feedback, while construct validity uses biserial point correlation calculation. Questionnaires were considered legitimate if the r count was greater than the r table.

The validity test shows eight questionnaire items in question one and eight in question two. The validity test of questionnaire 1 found eight of 12 question items valid, while four were invalid. These four invalid questions were the following statements about increasing antibiotic resistance understanding through effective communication, education, and training; and required pre-authorised antibiotics according to clinical practice guidelines and clinical pathway. Eight legitimate questions were used instead.

The questionnaire's reliability was tested using the Kuder and Richardson Formula (KR-20) and Cronbach's alpha. Questionnaire 1 had adequate reliability (KR-20 = 0.437), while questionnaire 2 had strong reliability (Cronbach's alpha = 0.802).

**Patient demographic characteristics**

Respondents were predominantly female (63, 85.1%), with nurses being the most common occupation. Most

had less than five years of working tenure and experienced interprofessional collaboration practices. Table I shows the data.

**Table I: Characteristics of research participants**

Characteristics	Total (n = 74)	Percentage (%)
<b>Gender</b>		
Male	11	14.9
Female	63	85.1
<b>Age</b>		
21-25 years old	16	21.6
26-30 years old	20	27.0
31-35 years old	19	25.7
> 35 years old	19	25.7
<b>Profession</b>		
Doctor	2	2.7
Pharmacist	3	4.1
Nurse	41	55.4
Midwife	5	6.8
Pharmacy assistant	10	13.5
Laboratory analyst	13	17.6
<b>Working period</b>		
< five years	27	36.5
Five to ten years	22	29.7
> ten years	24	32.4
<b>Experience in collaborative practice</b>		
Yes	61	82.4
No	13	17.6

**Respondent knowledge profile**

The study categorised respondents into good, sufficient, and low knowledge levels, showing significant improvement in good knowledge before and after education, with 55.4% pre-education and 73% post-education (Sig = 0.025, *p* < 0.05), as shown in Table II.

**Table II: Respondent knowledge level categorisation**

	Pre-education	Post-education	Chi-square
Good	41 (55.4%)	54 (73%)	0.025 (significance)
Sufficient	32 (43.2%)	17 (23%)	
Low	1 (1.6%)	3 (4.1%)	

Nursing has the highest percentage in knowledge among health workers, with a Sig. 0.000 before (254,

42.91%) and after education (263, 44.43%), as shown in Table III.

**Table III: Recapitulation of knowledge levels**

Health workers	Pre-education (Σ score = 592)	Post-education (Σ score = 592)	Distinction Δ	Significance
Doctor	14 (2.36%)	16 (2.70%)	2 (0.34%)	†0.046
Pharmacist	21 (3.55%)	22 (3.72%)	1 (0.17%)	†0.023
Nurse	254 (42.91%)	263 (44.43%)	9 (1.52%)	†0.000
Midwife	29 (4.9%)	31 (5.24%)	2 (0.34%)	†0.005
Pharmacy Asisstant	65 (10.98%)	70 (11.82%)	5 (0.84%)	†0.000
Laboratory Analyst	88 (14.86 %)	88 (14.86 %)	0 (0%)	†0.000

†  $p < 0.05$ ; significance

**Respondent motivation profile**

Respondents were categorised into high, moderate, and low motivation levels. Moderate motivation grew

insignificantly before and after education, with 39.19% before and 47.30% after (Sig.0.599,  $p > 0.05$ ), as shown in Table IV.

**Table IV: Respondent motivation levels categorisation**

	Motivation		Chi-square significance
	Pre-education	Post-education	
High	21 (28.38%)	19 (25.68%)	0.599 (Not significant)
Moderate	29 (39.19%)	35 (47.30%)	
Low	24 (32.43%)	20 (27.03%)	

Laboratory analysts with the highest motivation increase based on profession were in the moderate category before and after education but not

significantly different (Sig. 0.139,  $p > 0.05$ ). Table V displays the findings.

**Table V: Recapitulation of motivation levels**

Categories	Health workers											
	Doctor		Pharmacist		Nurse		Midwife		Pharmacy assistant		Laboratory analyst	
	Pre	Post	Pre	Post	Pre	Post	Pre	Post	Pre	Post	Pre	Post
High	0	0	1	1	14	14	0	1	1	0	5	2
Moderate	2	2	2	2	15	16	2	2	3	4	5	10
Low	0	0	0	0	12	11	3	2	6	6	3	1
Significance	-		1		0.963		0.549		0.565		0.139	

**Correlation analysis of knowledge and motivation levels**

The study reveals a correlation between health professionals' knowledge and motivation before and after education, as shown above in Table VI:

1. There is a high correlation between knowledge strength and motivation before education as

opposed to a weak correlation following education.

2. Positive coefficients indicate a unidirectional, linear correlation between knowledge and motivation in interprofessional collaboration practices for health workers.

3. The significance value before education is less than 0.05, indicating a significant relationship

between knowledge and motivation, while after education, the value is greater than 0.05.

**Table VI: Spearman rank correlation analysis of health workers' knowledge and motivation level**

Level of knowledge and motivation	Correlation coefficient	Significance (two-tailed)	N
Pre-education	0.408	0.000	74
Post-education	0.140	0.233	74

**Discussion**

Research related to knowledge and motivation for interprofessional collaboration is limited in Indonesia. One of the successes of interprofessional collaboration is understanding the role and identity of each health worker. Lack of understanding between health workers causes inequality in interprofessional collaboration (Setiadi et al., 2017).

The study found a significant increase in knowledge between pre- and post-PPRA knowledge scores among health workers involved in interprofessional cooperation activities. Increased knowledge is expected to improve patient care as doctors, pharmacists, nurses, and laboratory analysts experience improved knowledge. Nurses, in particular, showed the highest percentage of knowledge compared to other health professionals.

In line with other research, it shows significant differences in perceptions between educational doctors, pharmacists, nurses, and nutritionists regarding the education level of health workers. Those with lower education tend to be less confident in their knowledge. Therefore, increasing the knowledge and training of health workers, as well as organisational support, is needed so that collaboration between health workers runs effectively (Wahyuni et al., 2023).

Other research on pharmacy students (n = 40) showed that learning about interprofessional collaboration between health workers was beneficial in roles in community services but failed to reduce health workers' hierarchical ideology (Rabani et al., 2021).

Patient knowledge development occurs through education conducted individually or in groups using appropriate techniques. The delivery of education affects a person's ability to improve their knowledge. The five senses impact a person's ability to absorb information, with more than one sense affecting learning. Workshops with focus group discussions are

more effective for responders, as they are more focused and practice directly (Tahoon et al., 2020).

Interprofessional collaboration involves complementary knowledge and abilities in communication and decision-making. However, barriers like social disparity in position and education hinder its success. Effective communication is crucial for success, as misunderstandings can occur. Differing opinions within professional teams can lead to poor communication and lack of respect and trust (Fox et al., 2021).

Motivational level scores increase interprofessional collaboration, with laboratory analysts showing the highest increase. However, the increase remained not statistically significant. Health professionals' motivation for interprofessional collaboration is low, influenced by factors like opportunity, capacity, psychological capability, physical capability, management assistance, hospital rules, age, and educational attainment. Associated degree education levels are more motivated, and laboratory analysis is the top reason for choosing a healthcare career (Ayu et al., 2020).

Before education, health professionals' knowledge and motivation were strongly linked; however, the correlation was weak after education. The COM-B hypothesis suggests that knowledge impacts motivation. Opportunities, resources, organisational support, and legal restrictions regarding the environment were also shown to impact motivation. This improved psychological competence could increase motivation and improve health professionals' conduct in interprofessional cooperation activities (Michie, S & Barat, R.M., 2020).

Controlling antibiotic resistance requires knowledge of PPRA, motivation, and interprofessional collaborative practices. Clinical guide inpatient treatment, and opportunities for collaboration are related to managerial support, priorities, infrastructure, and incentives. A motivated expert is essential, and motivational assessments and interprofessional collaboration strategies such as therapeutic pathway implementation should be conducted three months after education (Jabbour et al., 2018).

This research has several limitations, including some of the factors that were considered. The validation or accuracy of the motivation level questionnaire has not been seen in terms of the linearity of measuring changes in performance with the given motivation level questionnaire. In terms of the period for administering the motivation level questionnaire after education on the same day, it is best to measure the motivation questionnaire after education is given in the following days (for example, within a month) because motivation

requires a continual process of implementing educational material into practice. In terms of the characteristics of respondents, the number of respondents for each profession is disproportionate, so it does not describe the overall results at Husada Utama Hospital, and it is recommended that future research take respondents who have not been educated. Several factors influencing motivation were not researched, namely environmental influences such as hospital regulations, hospital management support, and supporting infrastructure.

## Conclusion

The effect of PPRA education on health workers' knowledge and motivation in interprofessional collaboration at Husada Utama Hospital increases knowledge and motivation. Husada Utama Hospital's healthcare professionals' knowledge and motivation in interprofessional cooperation are good and moderately increase with PPRA education.

## Conflict of interest

The authors declare no conflict of interest.

## Acknowledgement

Thank you to the Ministry of Education and Culture & Research and Technology Department for funding research grants under contract number 017/SPLit/LPPM01/KemendikbudRistek/Multi/FF/V/20 23.

## References

- Ayu, M., Suratri, L., Edwin, V. A., Ajeng, G., Ayu, K., Boulevard, J., Raya, B., & Gading, K. (2020). Faktor-faktor yang berhubungan dengan motivasi kerja tenaga di bidang kesehatan di rumah sakit (Risnakes 2017). *Jurnal Penelitian dan Pengembangan Pelayanan Kesehatan*, *4*(1), 23–30.
- Baadani, A. M., Baig, K., Alfahad, W. A., Aldalbahi, S., & Omrani, A. S. (2015). Physicians' knowledge, perceptions, and attitudes toward antimicrobial prescribing in Riyadh, Saudi Arabia. *Saudi Medical Journal*, *36*(5), 613–619.
- Dukhovny, D., Buus-Frank, M. E., Edwards, E. M., Ho, T., Morrow, K. A., Srinivasan, A., Pollock, D. A., Zupancic, J. A., Pursley, D. M., Goldmann, D., Puopolo, K. M., Soll, R. F., &

Horbar, J. D. (2019). A collaborative multicenter QI initiative to improve antibiotic stewardship in newborns. *Pediatrics*, *144*(6). <https://doi.org/10.1542/peds.2019-0589>

Femy Fatalina, Sunartini, Widyandana, M. S. (2015). Hubungan interprofesi perawat dengan profesi lainnya dalam mewujudkan patient safety. *Jurnal Pendidikan Kedokteran Indonesia*, *4*(1).

Herawati, F., Irawati, A. D., Viani, E., Sugianto, N. A., Rahmatin, N. L., Artika, M. P., Sahputri, S. E. B., Setiasih, Kantono, K., Yulia, R., Andrajati, R., & Soemantri, D. (2022). Effective clinical pathway improves interprofessional collaboration and reduces antibiotics prophylaxis use in orthopedic surgery in hospitals in Indonesia. *Multidisciplinary Digital Publishing Institute*, *11*(3). <https://doi.org/10.3390/antibiotics11030399>

Jabbour, M., Newton, A. S., Johnson, D., & Curran, J. A. (2018). Defining barriers and enablers for clinical pathway implementation in complex clinical settings. *Implementation Science*, *13*(1), 1–13.

Karuniawati, H., Yulianti, T., Aini, D. K., & Nurwienda, F. I. (2021). Impact of antimicrobial stewardship program on the use of antibiotics in pneumonia patients at a teaching hospital in Surakarta Indonesia. *International Journal of Applied Pharmaceutics*, *13*(1), 20–23.

Kementerian Kesehatan Indonesia. (2015). *Peraturan Menteri Kesehatan Republik Indonesia Nomor 8 Tahun 2015 tentang Program Pengendalian Resistensi Antimikroba di Rumah Sakit*. Permenkes No. 8 Tahun 2015 (bpk.go.id).

Keyworth, C., Epton, T., Goldthorpe, J., Calam, R., & Armitage, C. J. (2020). Acceptability, reliability, and validity of a brief measure of capabilities, opportunities, and motivations ("COM-B"). *British Journal of Health Psychology*, *25*(3), 474–501.

World Health Organization. (2019, October 22). *Antimicrobial stewardship programs in health-care facilities in low- and middle-income countries: A WHO practical toolkit*. Antimicrobial stewardship programmes in health-care facilities in low- and middle-income countries (who.int).

World Health Organization. (2021, June 9). *Global Anti Microbial Resistance and Use Surveillance System (GLASS) Report: 2021*. Global Antimicrobial Resistance and Use Surveillance System (GLASS) Report: 2021 (who.int).

Roopa, S., & Rani, M. (2012). Questionnaire designing for a survey. *Journal of Indian Orthodontic Society*, *46*(4), 273–277.

Saleh, D., Farha, R. A., & Alefishat, E. (2021). Impact of an educational intervention to promote Jordanian community pharmacists' knowledge and perception towards antimicrobial stewardship: Pre-post interventional study. *Infection and Drug Resistance*, *14*(7), 3019–3027.

Schmid, S., Schlosser, S., Gülow, K., Pavel, V., Müller, M., & Kratzer, A. (2022). Interprofessional collaboration between ICU physicians, staff nurses, and hospital pharmacists

optimizes antimicrobial treatment and improves the quality of care and economic outcomes. *Antibiotics*, **11**(381).

Setiawan, E., Wibowo, Y. I., Setiadi, A. P., Nurpatra, Y., Sosilya, H., Wardhani, D. K., Cotta, M. O., Abdul-Aziz, M.-H., & Roberts, J. (2019). Implementasi antimicrobial stewardship program di kawasan Asia: Sebuah kajian sistematis. *Indonesian Journal of Clinical Pharmacy*, **8**(2), 141–156.

Tahoon, M. A., Khalil, M. M., Hammad, E., Morad, W. S., Awad, S. M., & Ezzat, S. (2020). The effect of educational intervention on healthcare providers' knowledge, attitude, & practice towards antimicrobial stewardship program at National Liver Institute, Egypt. *Egyptian Liver Journal*, **10**(1).

Wang, H., Wang, H., Yu, X., Zhou, H., Li, B., Chen, G., Ye, Z., Wang, Y., Cui, X., Zheng, Y., Zhao, R., Yang, H., Wang, Z., Wang, P., Yang, C., & Liu, L. (2019). Impact of antimicrobial stewardship managed by clinical pharmacists on antibiotic use and drug resistance in a Chinese hospital, 2010–2016: A retrospective observational study. *BMJ Open*, **9**(8), e026072.

Michie, S & West, R. M. (2020). A brief introduction to the COM-B Model of behavior and the PRIME Theory of motivation. *Qeios*, 2–7.

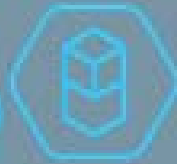
Fox, S., Gaboury, I., Chiochio, F., & Vachon, B. (2021). Communication and interprofessional collaboration in primary care: From ideal to reality in practice. *Health communication*, **36**(2), 125–135. <https://doi.org/10.1080/10410236.2019.1666499>

Rabani, R., Key, M., Morrissey, H., & Ball, P.A. (2021). Exploring students' perceptions and opinions about an institutional hierarchy of healthcare professionals and its impact on their inter-professional learning outcomes. *Pharmacy Education*, **21**, 19–28. <https://doi.org/10.46542/pe.2021.211.1928v>

Wahyuni, K.I., Nita, Y., & Zairina, E. (2023). Perception of healthcare personnel in interprofessional collaborations: A study in two "type c" hospitals in East Java. *Pharmacy Education*, **23**(4), 344–348. <https://doi.org/10.46542/pe.2023.234.344348>

fip

Pharmacy  
Education



[Current](#)

[Archives](#)

[Announcements](#)

[About](#) ▼



## Editorial Team

### Editor in Chief

Prof Ian Bates, FIP Global Pharmaceutical Observatory and Hub Director, United Kingdom

### Journal Editor

Dr Sherly Meilianti, FIP Data and Intelligence Specialist, United Kingdom

### Senior Associate Editors

Dr Marwan Akel, United States

Assoc Prof Jennifer Marriott, Monash University, Australia

### Managing Editor

Ms Nisa Masyitah, FIP Data and Projects Coordinator, Indonesia

### Associate Editors

Dr Mark Hewitt, University of Wolverhampton, United Kingdom

Prof Joyce Addo-Atuah, Touro College of Pharmacy, United States

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 Jordan, Jordan

Prof. Ammar Almaaytah, Jordan University of Science and Technology, 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 Jordan, Jordan

Dr Divakar Goli, Acharya Institutes, India

Prof Yahdiana Harahap, University of Indonesia, Indonesia

Prof Martin Henman, Trinity College Dublin, Ireland

Dr Shazia Jamshed, International Medical University Malaysia, Malaysia

Dr Abby Kahaleh, Roosevelt University, United States

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 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

Prof M Chandra Sekar, University of Findlay, United States

Dr Rajani Shakya, Kathmandu University, Nepal

Dr Judilynn Solidum, University of the Philippines, Philippines

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, United States

Dr. Pravinkumar Vishwanath Ingle, International Medical University, Malaysia

## Vol. 24 No. 3 (2024): IGSCPS Special Edition

International Graduate Student Conference on Pharmaceutical Sciences

**Published:** 01-05-2024

### Special Edition

#### **The role of IL-1, IL-6 and TNF- $\alpha$ in breast cancer development and progression**

Ahmed A Al-Qubati, Mahardian Rahmadi, Tri Widiandani, Jamal N Al-Maamari, Junaidi Khotib (Author)  
p. 32-38

 PDF

#### **Formulation of self-nanoemulsifying drug delivery system (SNEDDS) of combined 70% ethanolic of *Begonia medicinalis* herbs and *Moringa oleifera* leaves**

Nur Asita, Muhammad Sulaiman Zubair, Yandi Syukri, Evi Sulastri (Author)  
p. 304-309

 PDF

#### **Practice module training to increase pharmacist knowledge and skills in identifying drug therapy problems in hypertensive patients**

I Nyoman Wijaya, Umi Athiyah, Fasich, Andi Hermansyah (Author)  
p. 82-87

 PDF

#### **Cost-effectiveness analysis of amlodipine and candesartan in the inpatient setting at Mataram University Hospital in Indonesia, 2021**

Nunung Uswatun Hasanah, Ni Made Amelia Ratnata Dewi, Yoga Dwi Saputra (Author)  
p. 228-233

 PDF

#### **Effect of montmorillonite K-10 catalyst on the synthesis of (E)-1-phenyl-3-(2-methoxyphenyl)-2-propen-1-one using the microwave irradiation method**

Suzana, Evieta Rohana, Tutuk Budiati (Author)

p. 69-74



### **Immunotherapies for food allergy: Exploring new targets and innovative strategies for enhanced efficacy**

Jamal Nasser Saleh Al-Maamari, Ahmed Al-Qubati, Junaidi Khotib, Mahardian Rahmadi (Author)

p. 266-272



### **Analysis of cost of illness and diagnosis-related group payment system in breast cancer patients with chemotherapy in Indonesia**

Dinda Monika Nusantara Ratri, Annisa Arifatul Fitriyah, Midfa'ul Haawan Fitayaatin Mawaddah, Budi Suprpti, Pradana Zaky Romadhon, Samirah (Author)

p. 147-152



### **Impact of different NaOH treatments on biocellulose properties from coconut water fermented by Lentilactobacillus parafarraginis**

Indah Yulia Ningsih, Mochammad Amrun Hidayat, Tristiana Erawati, Bambang Kuswandi (Author)

p. 75-81



### **Development of natural polymers-based inhaled microspheres for tuberculosis**

Yotomi Desia Eka Rani, Mahardian Rahmadi, Dewi Melani Hariyadi (Author)

p. 123-128



### **Zebrafish as a model for the study of wound healing in hyperglycemia**

Lia Nurkhasanah, Farida Hayati, Rochmy Istikharah (Author)

p. 111-115



### **Pinostrobin and its derivatives as novel anti-breast cancer agents against human oestrogen receptor alpha: In silico studies of ADMET, docking, and molecular dynamics**

Delis Susilawati, Tri Widiandani, Siswandono Siswodihardjo, Suzana Suzana, Bambang Tri Purwanto (Author)

p. 51-56



### **Effect of heating temperature on citric acid-locust bean gum synthesis**

Wuryanto Hadinugroho, Stephanie Florencia Winarko, Echa Imanuela Sinta, Senny Yesery Esar, Jefri Prasetyo (Author)

p. 216-221



### **Evaluation of phagocytic index and haematological parameters of *Sida rhombifolia* extracts in mice as immunomodulator**

Tutik Sri Wahyuni, Widya Wasityastuti, Dwi Aris Agung Nugrahaningsih, Suratno Lulut Ratnoglik, Laura Navika Yamani, Ahmad El-Shamy, Aty Widyawaruyanti (Author)

p. 95-100



### **Analysis of drug-related problems in the home medication review practice by the master of pharmacy students**

Vitarani Dwi Ananda Ningrum, Adib Samudra Putra, Lusiana Rahmadiyah Panggabean, Martania Pratiwi, M. Yusuf Zainudin, Sarah Kulsum Toyyibah, Ulyatul Khoiroh, Andika Dwi Mahendra, Mitha Dwi Puspitasari, Rusmina Iswanti Kumala Dewi (Author)

p. 222-227



### **Anthelmintic mass drug administration in the Kusan Hilir subdistrict, Tanah Bumbu Regency, South Borneo 2021**

Nita Rahayu, Yuniarti Suryatinah (Author)

p. 39-44



### **Competency analysis of health workers: Interprofessional collaboration practices in a tertiary referral hospital in Surabaya**

Hanum Firda Tsabitalya, Fauna Herawati, Halim Priyahau Jaya, Rika Yulia, Setiasih (Author)

p. 280-285



### **An evaluation of the validity and reliability of the tuberculosis patient knowledge questionnaire**

Syaripah Ulandari, Abdul Rahem, Yuni Priyandani (Author)

p. 173-177



### **Evaluation of the four mg warfarin initiation dose in patients with cardiovascular disease**

Eunice Marlene Sicilia Kundiman, Zahrah Tatta Ramadhanty, Budi Suprapti, Mochamad Yusuf Alsagaff, Bambang Subakti Zulkarnain, Wenny Putri Nilamsari (Author)

p. 292-297



### **Evaluation of antipsychotic side effects on schizophrenia patients at Dr Radjiman Wediodiningrat Hospital, Indonesia**

Divaz Hedy Putri, Julaeha Julaeaha, Agus Sugianto (Author)

p. 191-196



### **Formulation, physicochemical characterisation, and in vitro evaluation of quercetin-alginate microsphere system**

Dewi Melani Hariyadi, Shafa Azaria, Lintang Arum Cindravani, Annisa Dayu Syifa Ramadhani, Yotomi Desia Eka Rani, I Nengah Budi Sumartha, Ahmad Dzulfikri Nurhan, Toetik Aryani, Mahardian Rahmadi, Yashwant V Pathak, Chrismawan Ardianto (Author)

p. 19-24



### **The efficacy of combining ondansetron with dexamethasone in delayed chemotherapy-induced nausea and vomiting**

Ratih Pratiwi Sari, Muhammad Darwin Prenggono, Aditya Maulana Perdana Putra, Dewi Susanti Atmaja, Mahardian Rahmadi, Suharjo (Author)

p. 211-215



### **A comparative study of real hospital costs and INA-CBG rates for stroke in Indonesia**

I Gusti Agung Putu Deddy Mahardika, Yunita Nita, Yuni Priyandani (Author)

p. 166-172



### **Drug utilisation study of parenteral nutrition in neonate patients**

Arina Dery Puspitasari, Satya Andiva, Hargus Haraudi Barkah, Mahendra Tri Arif Sampurna, Budi Suprapti, Mariah Ulfa, Diah Sukmawati Pangarsih, Widia Yuniarti (Author)

p. 310-314



### **Evaluation of the effect of aminophylline on inflammatory parameters in COVID-19 patients with acute respiratory distress syndrome**

Arina Dery Puspitasari, Erika Astanti, Novika Selvia Putri, Anna Surgean Veterini (Author)

p. 135-140



### **Identification of factors causing stunting in Lamper Tengah primary healthcare centre, Semarang City**

Firdha Fauzia, Gusti Noorrizka Veronika Achmad, Ana Yuda (Author)

p. 273-279



### **Role of acyl-homoserine lactone quorum-sensing system in oral biofilm formation: A review**

Ala'a Saif Alqhtani, Baher Al-Tayar, Titiek Berniyanti, Indah Lisitania Kriswandini (Author)

p. 129-134



### **Use of anticoagulant drugs for hospitalised patients: A multicentre study**

Lily Annisa, Nurfina Dian Kartikawati, Vitarani Dwi Ananda Ningrum (Author)

p. 286-291



### **Docking study of ferulic acid derivates on FGFR1, ADME prediction, and QSPR analysis**

Darwin Riyan Ramadhan, Juni Ekowati, Denayu Pebrianti, Farrah Yulian Listyandi, Nuzul Wahyuning Diah, Muhammad Faris Adrianto, Deepakkumar Mishra (Author)

p. 178-184



### **In silico approach of Garcinia mangostana and Ortosiphon stamineus to restore adipokines level as drug candidate for metabolic syndrome**

Danti Nur Indiasuti, Nada Salsabila, Bellinda Zalzabillah Tazkira, Arifa Mustika, Suharjo, Sukardiman (Author)

p. 159-165



### **Implementation of a pharmacovigilance system to detect adverse events and improve medication appropriateness in a hospital in Indonesia**

Dewi Susanti Atmaja, Yulistiani Yulistiani, Suharjo Suharjo, Elida Zairina (Author)

p. 7-11



### **Development and physicochemical characterization of nanostructured lipid carriers for entrapment of vitamin D3 prepared at different lipid ratios**

Ida Kristianingsih, Esti Hendradi, Siswandono Siswodihardjo, Mochammad Yuwono (Author)

p. 204-210



### **Prevalence and predictors of polypharmacy in elderly patients discharged from a tertiary care teaching hospital in Swat, Pakistan: A retrospective cross-sectional study**

Shah Faisal, Junaidi khotib, Elida Zairina (Author)

p. 1-6



### **Correlation between knowledge and characteristics of patients with type 2 diabetes mellitus in controlling blood glucose**

Ninik Mas Ulfa, Suharjono, Andi Hermansyah (Author)

p. 298-303



### **Design of acyl salicylic acid derivates as COX-1 inhibitors using QSAR approach, molecular docking and QSPR analysis**

Nuzul Wahyuning Diyah, Dhea Ananda Ainurrizma, Denayu Pebrianti (Author)

p. 88-94



### **Evaluation of drug related problems among hospitalised elderly patients at a secondary hospital in East Borneo**

Welinda Dyah Ayu, Elida Zairina, Umi Athiyah (Author)

p. 240-243



### **Hydrogen bond analysis of the p-coumaric acid-nicotinamide cocrystal using the DFT and AIM method**

Fery Eko Pujiono, Dwi Setyawan, Juni Ekowati (Author)

p. 57-62



### **Assessing knowledge and practice of online medication purchasing: A pilot study**

Gita Nola Sri Haestuti, Nanda Puspita, Khairun Nida (Author)

p. 260-265





### **Optimisation of the extraction process of pectin polymer from red dragon skin (*Hylocereus polyrhizus*)**

Muhammad Fariez Kurniawan, Dewi Melani Hariyadi, Dwi Setyawan (Author)

p. 116-122



### **Molecular docking of ferulic acid analogue compounds against epidermal growth factor receptor as a potential therapy for breast cancer**

Dhea Ananda Ainurrizma, Juni Ekowati, Denayu Pebrianti, Nuzul Wahyuning Diyah, Muhammad Faris Adrianto, Ravi Kiran Deevi, Iwan Sahrial Hamid (Author)

p. 185-190



### **Andrographolide exerts an anxiolytic-like effect possibly via regulation of the hypothalamic-orexinergic system**

I Nengah Budi Sumartha, Pingkan Aprilia, Muhammad Hilal Salim, Linda Wiwid Kurniasari, Ghaliya Afra Yasmine, Mahardian Rahmadi, Muhammad Zaki Bin Ramli, Amar Daud Iskandar Abdullah, Junaidi khotib, Chrismawan Ardianto (Author)

p. 12-18



### **Vancomycin bioanalysis for TDM services by using immunoassay and HPLC: A scoping review**

Vitarani Dwi Ananda Ningrum, Senya Puteri Amalia, Ari Wibowo (Author)

p. 197-203



### **Chronic intake of energy drinks affects changes in kidney function biomarkers in a diabetes mellitus animal model**

Mahardian Rahmadi, Zamrotul Izzah, Ahmad Dzulfikri Nurhan, Suharjono Suharjono (Author)

p. 25-31



### **The readiness and acceptance of patients with tuberculosis to use telecare**

Devi Ristian Octavia, Andi Hermansyah, Yunita Nita (Author)

p. 251-255



### **ABC-VEN analysis of drug use in outpatients at a neurology department in Indonesia**

Dewi Damayanti, Budi Suprpti, Mareta Rindang Andarsari, Abdulloh Machin, Lukman Nul Hakim

(Author)

p. 63-68



### **Utilisation study of antipyretic drugs in paediatric patients**

Arina Dery Puspitasari, Anita Nur Azizah, Wenny Putri Nilamsari, Robby Nurhariansyah, Ika Nursetyo

Palupi (Author)

p. 234-239



### **Mechanical characterisation of polylactic acid-alendronate bioscrew in different concentrations of glutaraldehyde**

Samirah, Nadea Kalila Yasmin, Aniek Setiya Budiatin, Dinda Monika Nusantara Ratri, Ani Nurul Fauziyah, Toetik Aryani, Dewi Wara Shinta (Author)

p. 101-104



### **Knowledge and uses of iron supplements to treat anaemia among adolescent girls in Surabaya**

Nafiladiniaulia Jihanwasila, Gusti Noorrizka Veronika Achmad, Mareta Rindang Andarsari, Ana Yuda

(Author)

p. 256-259



### **Molecular docking of gingerol and shogaol for immunomodulatory effect in lupus disease**

Herni Setyawati, Oeke Yunita, Achmad Syahrani (Author)

p. 141-146



### **The pH-solubility profiles of levofloxacin hemihydrate and ciprofloxacin lactate**

Dewi Isadiartuti, Retno Sari, Dini Retnowati, Risma Dama Yanti, Violyta Ade Gunawan, Oki Yudiswara

(Author)

p. 105-110



### **An in silico study of the effects of chemical compounds in Petiveria alliacea leaf extract on inflammatory mediators**

Nurmawati Fatimah, Arifa Mustika, Sri Agus Sudjarwo, Ahmad Cholifa Fahrudin, Lutfiah Anjarwati

(Author)

p. 153-158

 PDF

### **Perception of online interprofessional education among pharmacy and medical students in tertiary university**

Ganesh Sritheran Paneerselvam, Muhammad Junaid Farrukh, Long Chiau Ming, Andi Hermansyah

(Author)

p. 45-50

 PDF

### **5-O-Acetylpinostrobin derivatives inhibit estrogen alpha and progesterone receptors through a molecular docking approach**

Anita Puspa Widiyana, Tri Widiandani, Siswandono Siswodihardjo (Author)

p. 244-250

 PDF

Open Journal Systems

**PKP** Publishing  
Services

Part of the

PKP Publishing Services Network



**unesco**

Network Member



ADVANCING  
PHARMACY  
WORLDWIDE

ISSN: 1477-2701

## Pharmacy Education

COUNTRY	SUBJECT AREA AND CATEGORY	PUBLISHER	H-INDEX
<p>Netherlands</p> <ul style="list-style-type: none"> <li>Universities and research institutions in Netherlands</li> <li>Media Ranking in Netherlands</li> </ul>	<p>Health Professions Pharmacy</p> <p>Pharmacology, Toxicology and Pharmaceutics Pharmaceutical Science</p> <p>Social Sciences Education</p>	International Pharmaceutical Federation	<b>20</b>
PUBLICATION TYPE	ISSN	COVERAGE	INFORMATION
Journals	14772701, 15602214	1973-1978, 2002-2023	<p><a href="#">Homepage</a></p> <p><a href="#">How to publish in this journal</a></p> <p><a href="mailto:pej@fip.org">pej@fip.org</a></p>

### 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.

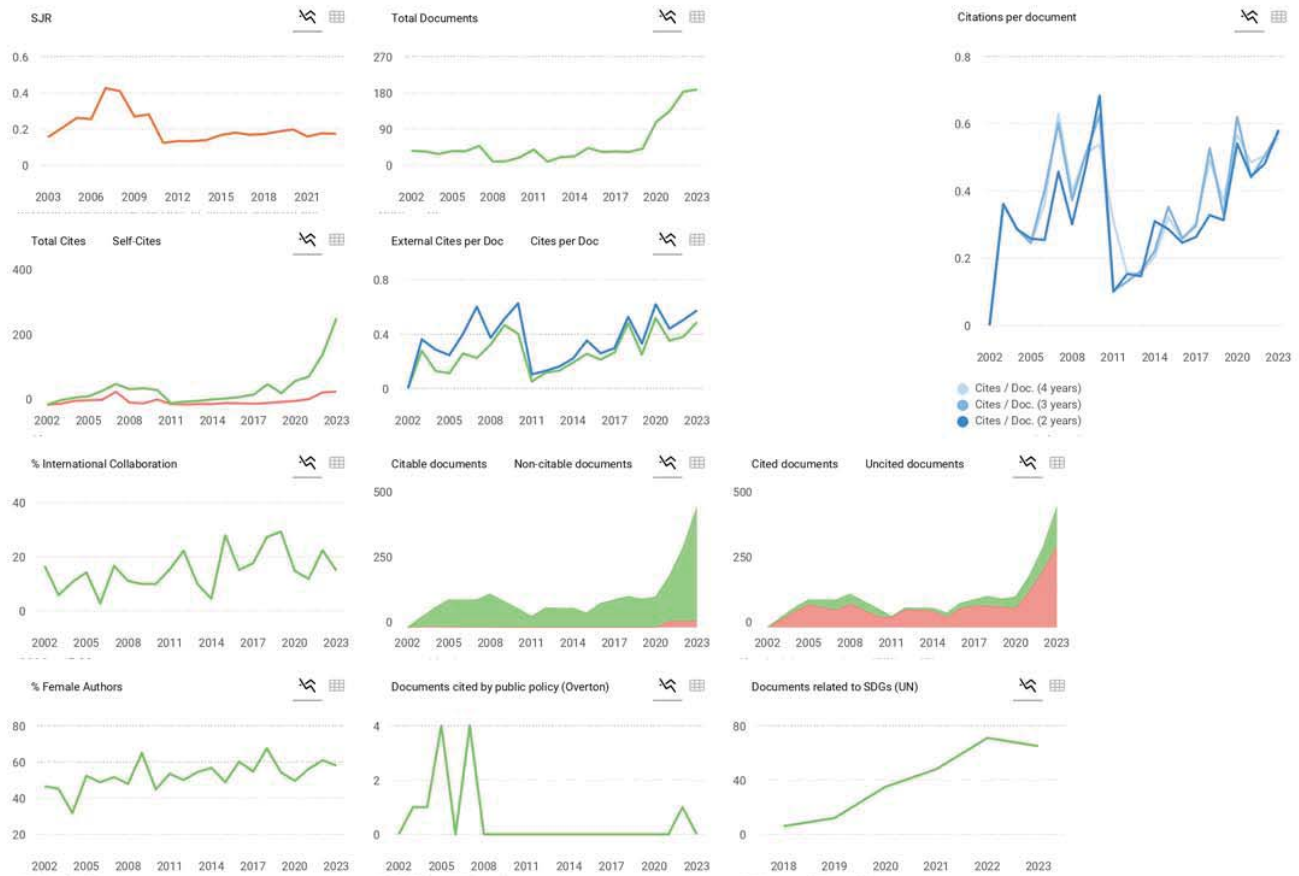
Join the conversation about this journal

Quartiles

### FIND SIMILAR JOURNALS

options

- |   |   |   |  |   |
|---|---|---|--|---|
| <p>1<br/><b>American Journal of Pharmaceutical Education</b><br/>USA</p> <p><b>83%</b><br/>similarity</p> | <p>2<br/><b>Currents in Pharmacy Teaching and Learning</b><br/>USA</p> <p><b>82%</b><br/>similarity</p> | <p>3<br/><b>Journal of Educational Evaluation for Health</b><br/>KOR</p> <p><b>30%</b><br/>similarity</p> | <p>4<br/><b>Pharmacy Practice</b><br/>ESP</p> <p><b>20%</b><br/>similarity</p> | <p>5<br/><b>International Journal of Pharmacy Practice</b><br/>GBR</p> <p><b>16%</b><br/>similarity</p> |
|---|---|---|--|---|



← Show this widget in your own website

**Pharmacy Education**

Q3 Pharmaceutical Science  
best quartile

SJR 2023 0.17

powered by scimagojr.com

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

`<a href="https://www.scim-`

**SCImago Graphica**

Explore, visually communicate and make sense of data with our new data visualization tool.

Metrics based on Scopus® data as of March 2024

**A** **Adaobi** 4 years ago

Good day,

I observed some discrepancies while attempting to submit an article at the Pharmacy Education journal. the information on this website states that the publisher of the journal is Taylor and Francis while on the journal website it states the International Pharmaceutical Federation (FIP).

Secondly, after clicking on the button for submission, I was redirected to the home page which has nothing to do with the submission portal. I really wonder if the journal is still active.

Please could you help me clarify my doubts?

I have registered and I am afraid I have given out my personal information.

Thank you.

reply

**K** **Kully Rennie** 4 years ago

Hi there, I can confirm that the journal Pharmacy Education is still active and our website homepage is: <https://pharmacyeducation.fip.org/pharmacyeducation/>

Since 2007 we have been published by FIP who took over publishing from T



**Melanie Ortiz** 4 years ago

SCImago Team

Dear Adaobi,

Thank you for contacting us.

As you probably know, SJR is a portal with scientometric indicators of journals indexed in Scopus. All the data (like the Publisher's name) have been provided By Scopus /Elsevier and SCImago doesn't have the authority over this data which are property of Scopus/ Elsevier. SCImago has a signed agreement that limits our performance to the generation of scientometric indicators derived from the metadata sent in the last update. Referring this issue, please contact with Scopus support: [https://service.elsevier.com/app/answers/detail/a\\_id/14883/kw/scimago/supporthub/scopus/](https://service.elsevier.com/app/answers/detail/a_id/14883/kw/scimago/supporthub/scopus/) for reporting the corresponding inconsistencies or modifications.

Referring the Submission system of this journal, if you click on "How to Publish" above, you will be redirected to the Submission section indicated in the journal's website: <http://pharmacyeducation.fip.org/pharmacyeducation/about/submissions#onlineSubmissions>

If you have some troubles to submit or access the platform, please contact the editorial's staff directly, so they can help you with this matter.

Best Regards, SCImago Team

**Joydip Das** 4 years ago

Hi,

I am writing to inquire about the journal Pharmacy Education for submitting a manuscript. Do you have a website for this journal? Please send the author's guidelines.

Thank you,

Joydip Das  
Professor of Medicinal Chemistry  
University of Houston

reply



**Melanie Ortiz** 4 years ago

SCImago Team

Dear Joydip, thank you very much for your comment, we suggest you to look for author's instructions/submission guidelines in the journal's website or click on "How to Publish" just above. Best Regards, SCImago Team

#### Leave a comment

Name

Email

(will not be published)

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 journal, experiences and other issues derived from the publication of papers are resolved. For topics on particular articles, maintain the dialogue through the usual channels with your editor.

Developed by:



Powered by:



Follow us on @ScimagoJR

Scimago Lab, Copyright 2007-2024. Data Source: Scopus®

EST MODUS IN REBUS  
Version 1.0.0 (2024)

[Legal Notice](#)

[Privacy Policy](#)

---