

Systematic Reviews in Pharmacy

www.sysrevpharm.org



The Society for Systematic Reviews in Pharmacy (SSRP) is an international organization of researchers, clinicians, and students who are interested in the use of systematic reviews in pharmacy. The Society was founded in 1997 and has since then grown to include members from over 20 countries. The Society's primary focus is on the use of systematic reviews in the field of pharmacy, and it provides a forum for the exchange of ideas and information between its members. The Society also organizes annual meetings and publishes a journal, *Systematic Reviews in Pharmacy*.

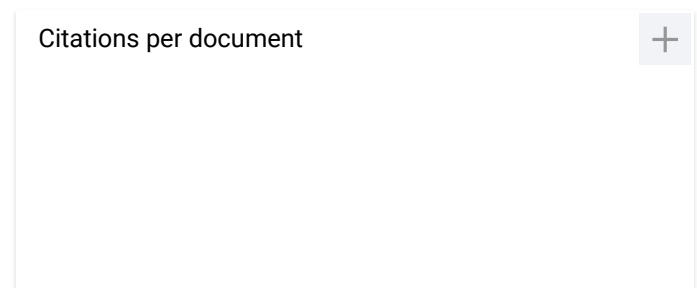
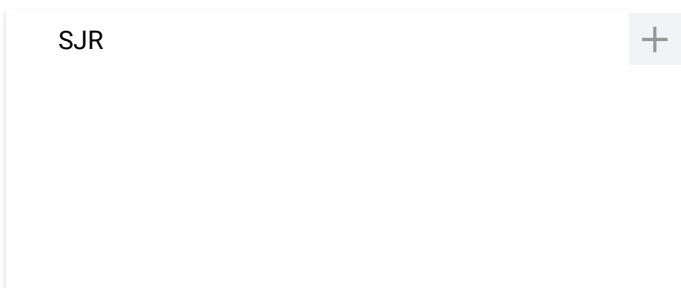
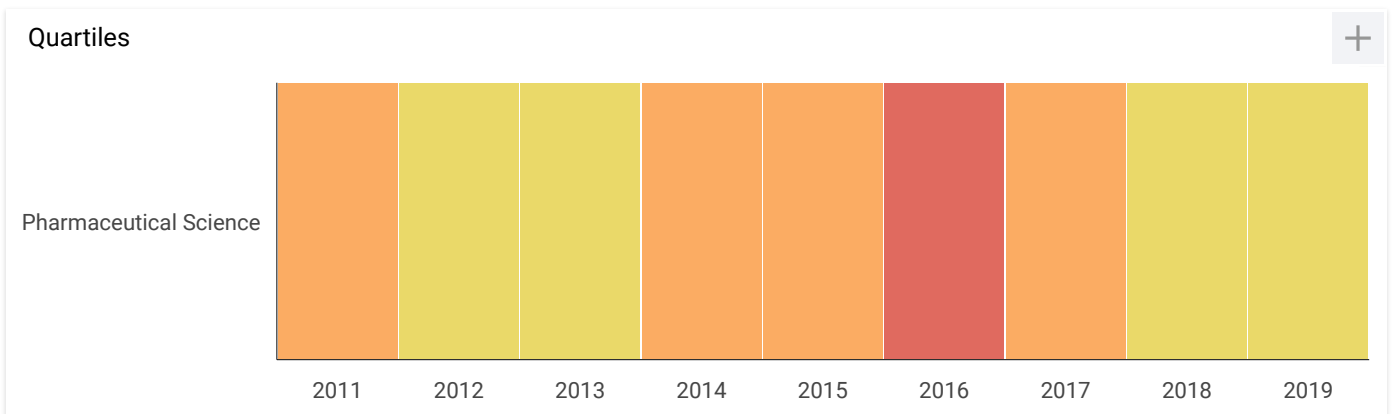


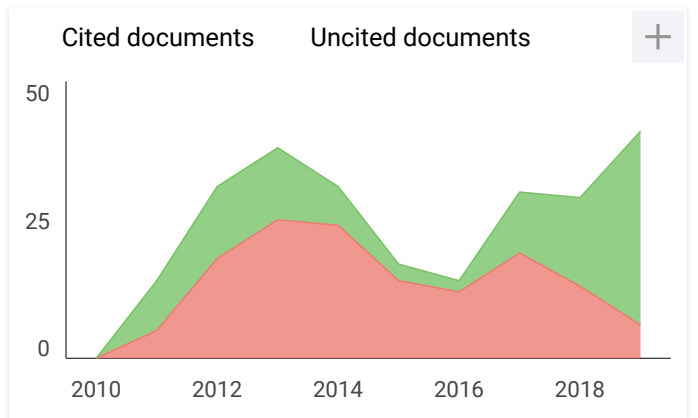
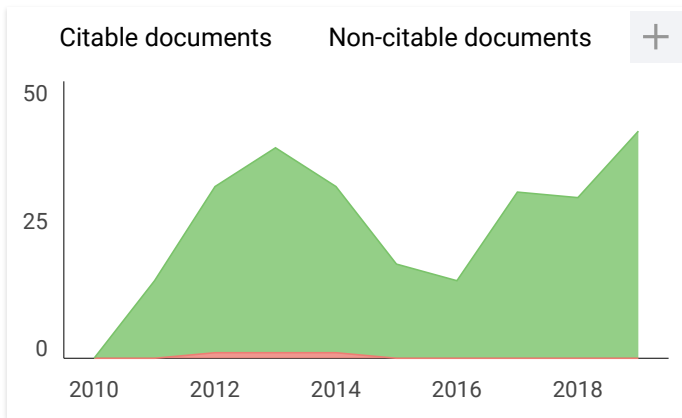
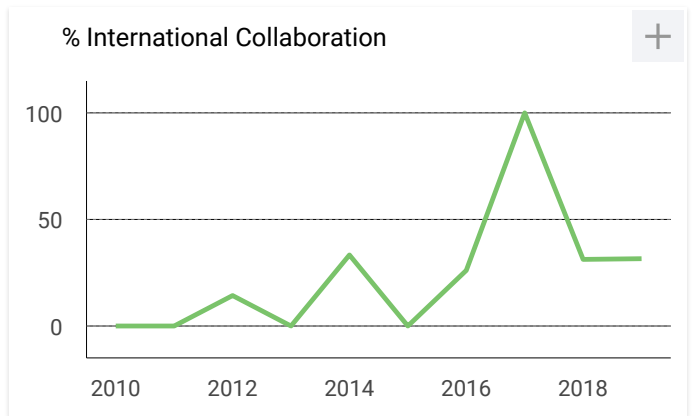
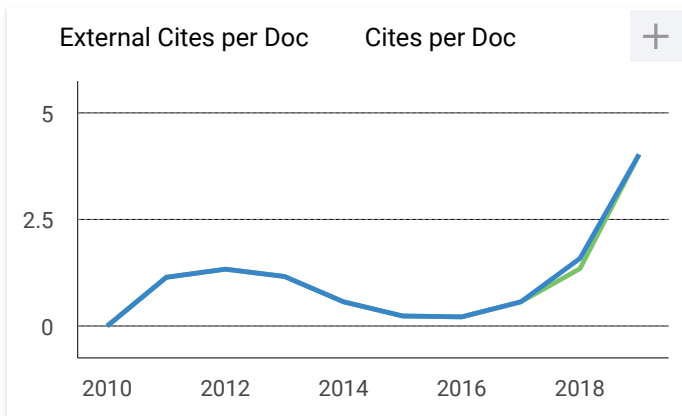
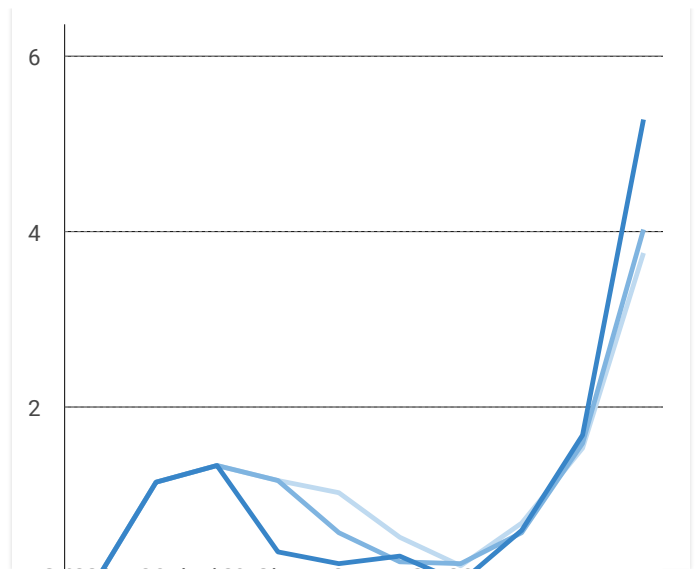
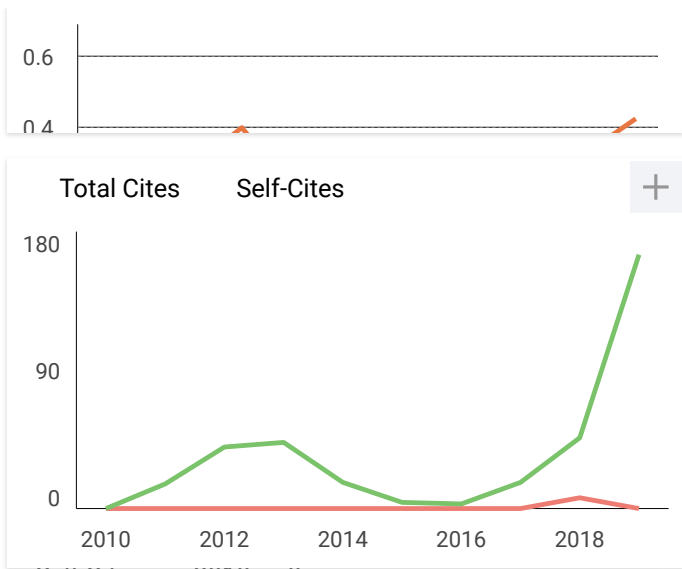
Systematic Reviews in Pharmacy

Country	India - IIII SJR Ranking of India
Subject Area and Category	Pharmacology, Toxicology and Pharmaceutics Pharmaceutical Science
Publisher	Wolters Kluwer Medknow Publications
Publication type	Journals
ISSN	09758453, 09762779
Coverage	2010-2020
Scope	The journal covers and publishes articles related to Pharmacy subjects including some of the allied subjects. Articles with timely interest and newer research concepts will be given more preference.
	Homepage
	How to publish in this journal
	Contact
	Join the conversation about this journal

14

H Index





Systematic Reviews in Pharmacy

Q2
Pharmaceutical Science

best quartile

SJR 2019

0.42

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" style="color: #000; text-decoration: none;">

```

Systematic Reviews in Pharmacy (Sys Rev Pharm.), (SRP) (Print ISSN: 0975-8453, E-ISSN: 0976-2779) a half yearly publication, serves the need of different scientists and others involved in Pharmaceutical research and development. Each issue covers review articles on Drug discovery topics, and also publishes full length reviews related to different subjects in pharmacy and that are of broad readership interest to users in industry, academia, and government. The first issue was published online on December 2009.

All contribution to Sys. Rev Pharm are reviewed by peer review process and copyediting process with the understanding that they have not been published previously and are not under consideration for publication elsewhere. Author/s is/are responsible for all statements made in their work and obtaining necessary permission to republish any previously published illustrations and/or other relevant materials. The journal's full text is available online at www.sysrevpharm.org . The journal allows free access (Open Access) to its contents and permits authors to self-archive final accepted version of the articles on any OAI-compliant institutional / subject-based repository.

Scope of the journal

The journal covers and publishes **all articles** related to Pharmacy subjects including some of the allied subjects. Articles with timely interest and newer research concepts will be given more preference.

This journal also publishes manuscripts related to agriculture and agriculture sciences. Topics include all aspects of crop and animal physiology, modelling of crop and animal systems, the scientific underpinning of agronomy and husbandry, animal welfare and behaviour, soil science, plant and animal product quality, plant and animal nutrition, engineering solutions, decision support systems, land use, environmental impacts of agriculture and forestry, impacts of climate change, rural biodiversity, experimental design and statistical analysis, and the application of new analytical and study methods (including genetic diversity and molecular biology approaches).

EDITORIAL BOARD

Editor in Chief

Dr. Dhiren P Shah

info@ijpronline.com

Professor & Principal

Shree Naranjbhai Lalbhai Patel College of Pharmacy, Visit Profile

Board Members

Dr. Aygul Z. Ibatova,

Department of Natural Sciences ,

Tyumen Industrial University, Russia

Scopus Author ID: 57191110632  <http://orcid.org/0000-0003-0565-8533>

Dr. Ayad F. Alkaim

University of Babylon,

College of Science for Women,

Babylon, Iraq ,

Scopus Author ID: 55255310600

Dr Ahmad Faisal Ismail

Kulliyyah of Dentistry,

International Islamic University Malaysia,

Kuantan Campus,

25200 Kuantan,

Pahang, Malaysia

Scopus Author ID: 35388596700

VO QUANG TRUNG (PhD., MBA, BSc. Pharm, BSc. Law)

Department of Economic and Administrative Pharmacy

Faculty of Pharmacy,

University of Medicine Pham Ngoc Thach,
Ho Chi Minh city 700000, Vietnam.

Dr. Mohd Armi Abu Samah

International Islamic University Malaysia (IIUM) 25200 Kuantan Pahang

Juhriyansyah Dalle, Ph.D.

Universitas Lambung Mangkurat

Banjarmasin, Indonesia

E-mail: j.dalle@ulm.ac.id

Scopus Author ID: <https://www.scopus.com/authid/detail.uri?authorId=55010239500>

Past Editor :

S. Parasuraman, M.Pharm., Ph.D.,

AIMST University, Malaysia

BIBLIOGRAPHIC LISTINGS

Abstracted and Indexed in

- Academic Search Complete
- Baidu Scholar
- CNKI Scholar (China National Knowledge Infrastructure)
- Chemical Abstracts
- CABI Full Text
- Dimensions
- EBSCO (relevant databases)
- EBSCO Discovery Service
- Genamics JournalSeek
- Google Scholar
- Index Copernicus
- J-Gate
- JournalTOCs
- JournalGuide
- Microsoft Academic
- ProQuest (relevant databases)
- Publons
- PhcogBase
- ReadCube
- SCOPUS
- Scimago Journal Ranking
- SCILIT
- Sherpa/RoMEO
- Summon (Serials Solutions/ProQuest)
- Ulrich's Periodicals Directory/ulrichsweb
- WorldCat (OCLC)
- ROAD



CONTACT INFORMATION

Systematic Reviews in Pharmacy,

Building number 4H JK Paul Road,

New alipore , 700001,

Kolkata- West Bengal

Corporate office

Block No.3, Jalan bandar U 24,

bandar university seri iskandar,

tronoh 32610 Perak,

Malaysia

Email: editor@sysrevpharm.org, submissions.srp@gmail.com

SRP. YEAR: 2020, VOLUME: 11, ISSUE: 2

1. **Risk of Microbiological Contamination when Preparing Total Parenteral Nutrition for Pediatric Patients: A Pilot Study at a Regional Hospital in Southern Vietnam**
Hoang Thuy Linh, Trinh Xuan Tung, Trinh Huu Tung, Vo Quoc Bao, Le Thi Minh Hong, Pham Ngoc Thach, Nguyen Minh Ngoc, Luu Thanh Binh, Phan Trong Lan, Hoang Quoc Cuong, Nguyen Duc Hai, Nguyen Duy Long, Nguyen Thi Thu Phuong, Van Thi Thuy Linh, Pham Thi Mai Anh, Nguyen Thien Hai, Le Quan Nghiem, Nguyen Duc Tuan
SRP. 2020; 11(2): 1-5
» Abstract » PDF» doi: 10.5530/srp.2020.2.01
2. **Development, Validation, and Application for Simultaneous Assay of Metformin and Sitagliptin in Human Plasma by Liquid Chromatography–Tandem Mass Spectrometry**
Nguyen Ngoc Nha Thao, Nguyen Ngoc Hieu, Do Chau Minh Vinh Tho, Trinh Thi Thu Loan, Nguyen Duc Tuan
SRP. 2020; 11(2): 6-13
» Abstract » PDF» doi: 10.5530/srp.2020.2.02
3. **Anxiety and Depression According to the Hospital Anxiety Depression Scale in Patients with Acne Vulgaris at the Ho Chi Minh City Hospital of Dermato-Venereology, Vietnam**
Tro Chau Van, Quynh Nguyen Truc, Hao Nguyen Trong, Bac Pham Van, Trung Quang Vo
SRP. 2020; 11(2): 14-21
» Abstract » PDF» doi: 10.5530/srp.2020.2.03
4. **Organ Dysfunction in Severe Dengue among Children in a Vietnamese Hospital**
Nguyen The Nguyen Phung, Qui Nguyen Dinh, Tung Huu Trinh, Diep Tuan Tran
SRP. 2020; 11(2): 22-26
» Abstract » PDF» doi: 10.5530/srp.2020.2.04

5. **Anti-Neoplastic Role of the Triazole Analog TAN in Blocking Hedgehog Signaling Pathway Smoothed Receptors on the Human Colorectal Cancer Cell Line HCT116**
Seher A. Almedeny, Khalida K. Abbas Al-Kelaby, Hussein A. Abdul Hussein, Sarmad N. Gany, Najah Hadi
SRP. 2020; 11(2): 27-35
» Abstract » PDF» doi: 10.5530/srp.2020.2.05
6. **Impact of GNS on the Link between Family Satisfaction and JS**
Mohammad Nizam Sarkawi, Jauriyah Shamsuddin, Abd Rahman Jaafar, Noor Fareen Abd Rahim
SRP. 2020; 11(2): 36-39
» Abstract » PDF» doi: 10.5530/srp.2020.2.06
7. **Efficacy and Safety of Percutaneous Nephrolithotomy under Spinal Anesthesia**
Hayder Mahdi Alaridy
SRP. 2020; 11(2): 40-43
» Abstract » PDF» doi: 10.5530/srp.2020.2.07
8. **Strategy for the Development of Seaweed Industry in Indonesia**
Sutinah, Harsuko Riniwati, Adriana Monikca Sahidu, Suryani
SRP. 2020; 11(2): 44-50
» Abstract » PDF» doi: 10.5530/srp.2020.2.08
9. **The Relationship between Some Pro-inflammatory Markers and BODE Index in Patients with Chronic Obstructive Pulmonary Disease**
Yesar MH Al-Shamma, Najah R Hadi, Abdullah Elttayef Jasim, Ahmed Abdullah Ajrash Al-Khafaji, Ali M Janabi
SRP. 2020; 11(2): 51-56
» Abstract » PDF» doi: 10.5530/srp.2020.2.09
10. **Phytochemical, Antioxidant and Antitumor Studies of Coumarins Extracted from Granny Smith Apple Seeds by Different Methods**
Raghad Riyadh Khalil, Yasser Fakri Mustafa

SRP. 2020; 11(2): 57-63

» Abstract » PDF» doi: 10.5530/srp.2020.2.10

11. **Coumarins from Red Delicious Apple Seeds: Extraction, Phytochemical Analysis, and Evaluation as Antimicrobial Agents**
Eman Tareq Mohammed, Yasser Fakri Mustafa
SRP. 2020; 11(2): 64-70
» Abstract » PDF» doi: 10.5530/srp.2020.2.11
12. **New Virulence Factor of Normal Flora E. Coli**
Awatif H. Issa, Abdulelah A. Almayah, Hanaa k. Ibrahim
SRP. 2020; 11(2): 71-76
» Abstract » PDF» doi: 10.5530/srp.2020.2.12
13. **Synthesis, Characterization, and Antibacterial Study of New Ligands Derived from Nalidixic acid**
Dunya AL-Duhaidahawi, Hanaa Jaffer AlKabee, Meison Abdulbary, Hayder H. AL-Ghuraibawi
SRP. 2020; 11(2): 77-81
» Abstract » PDF» doi: 10.5530/srp.2020.2.13
14. **Apixaban Ultrafine O/W Nano Emulsion Transdermal Drug Delivery System: Formulation, In Vitro and Ex Vivo Characterization**
Mustafa R. Abdulbaqi, N A Rajab
SRP. 2020; 11(2): 82-94
» Abstract » PDF» doi: 10.5530/srp.2020.2.14
15. **Effect of Some Plant Extracts on the Activity of Protease Enzyme from Staphylococcus aureus Which Isolated from Clinical Samples**
Farkad Hawas Musa , Mohammed abdul aziz ismail, Hanan Abdul Qader Abdulilah
SRP. 2020; 11(2): 95-99
» Abstract » PDF» doi: 10.5530/srp.2020.2.15
16. **The Effect of High Temperature on the Hematological Parameters of Bakery Workers**

Marwan Mahmood Saleh, Aysar Mahmood Mohammed, Nedhal Ibrahim Lateff,
Nabeel Fawzi Lattoofi, Eman Naji Saleh

SRP. 2020; 11(2): 100-103

» Abstract » PDF» doi: 10.5530/srp.2020.2.16

17. **Thymoquinone Protect Against Hepatotoxicity and Nephrotoxicity Induced by Carbon Tetrachloride in Mice**

Nahidah Ibrahim Hammadi, Shaimaa Hajalan, Thana I Mustafa, Marwan Mahmood Saleh, Eman Naji Saleh

SRP. 2020; 11(2): 104-108

» Abstract » PDF» doi: 10.5530/srp.2020.2.17

18. **Preparation Some of Hydroxamic Acid Derivatives from Honey Wax Compounds and Study the Biological Activity on Cancerous Tumors**

Saddaa Abed Abedullah Jamal, bilal Jaser, Walled Farg Hmadi, Omar Al – Obaidi

SRP. 2020; 11(2): 109-118

» Abstract » PDF» doi: 10.5530/srp.2020.2.18

19. **Association of PTEN (rs/1234213 rs/1234220) Gene Polymorphisms with Liver Cancer Risk in Iraqi Patients**

Reem K. Ibrahim

SRP. 2020; 11(2): 119-122

» Abstract » PDF» doi: 10.5530/srp.2020.2.19

20. **Gene Expression Analysis in MOTN-1 Cell Line after Treating with New Development Aptamer**

Basma Talib Al-Sudani, Baydaa Hameed, Ahmed T Alahmar

SRP. 2020; 11(2): 123-134

» Abstract » PDF» doi: 10.5530/srp.2020.2.20

21. **Healing of Apical Periodontitis after Minimally Invasive Endodontics therapy using Er,Cr:YSGG laser: A Prospective Clinical Study**

Ali A. Shaheed, Hussien A. Jawad, Basima M.A. Hussain, Ahmed M. Said

SRP. 2020; 11(2): 135-140

» Abstract » PDF» doi: 10.5530/srp.2020.2.21

22. **Hepato Pancreatic Protective Potentials of Iraqi Aqueous *Allium cepa* Extract against Low Double Doses of Alloxan Induced Oxidoreductive Stress Mediated Diabetes mellitus in Rats**
Ajwad Awad Muhammad Assumaidae, Nathera M. Ali, Zaid O Ibraheem, Abbas Jasim Mohammed
SRP. 2020; 11(2): 141-153
» Abstract » PDF» doi: 10.5530/srp.2020.2.22
23. **Study the Effect of Different Concentrations of *Cyperus Rotundus* Extract on Cellular Immunity on Cellular Immune Response in Mice**
Asmaa Abdulameer Bedn, Thamer Mehidi Badawi, Rajaa Fadhil Hamdi, Eman Naji Saleh
SRP. 2020; 11(2): 154-156
» Abstract » PDF» doi: 10.5530/srp.2020.2.23
24. **Antineoplastic Effect of Sulfanilamide Hybridized with Ciprofloxacin "In Vitro Study"**
Khalida K Abbas Al-Kelaby, Noor H. Naser, Azhar Jasim AL-Kaabi, Mohamed Hassan Mohammed
SRP. 2020; 11(2): 157-164
» Abstract » PDF» doi: 10.5530/srp.2020.2.24
25. **Tuberculosis: A Multi-Drug Risk Study in Al-Diwaniyah Governorate, Iraq**
Hadi Jebur Suhail, Saad Mashkooor Waleed, Yasmeeen Ali Hussien, Salim Fayez Kadhim
SRP. 2020; 11(2): 165-169
» Abstract » PDF» doi: 10.5530/srp.2020.2.25
26. **Poultry *Salmonella* Sensitivity to Antibiotics**
Ekaterina Lenchenko, Dmitryi Blumenkrants, Yury Vatnikov, Evgeny Kulikov, Van Khai, Nadezhda Sachivkina, Larisa Gnezdilova, Nikolay Sturov, Nikolay Sakhno, Vladimir Kuznetsov, Alexander Strizhakov, Tatiana Mansur
SRP. 2020; 11(2): 170-175
» Abstract » PDF» doi: 10.5530/srp.2020.2.26

27. **Assessing the Quality of Life of Patients with Symptomatic Uterine Fibroid**
Lazat Kenzhebekovna Smailova, Serik Sayatovich Iskakov, Ainur Serikbaevna Tuletova, Galym Amirzhanovich Shegenov, Dana Amantaevna Kasenova
SRP. 2020; 11(2): 176-182
» Abstract » PDF» doi: 10.5530/srp.2020.2.27
28. **Application TBL technology lectures on the discipline «Biostatistics» on «Sampling method»**
Zh.A. Kaliyeva, Zh.H. Sultanova, G.K. Ospanova, A.Sh. Kaipova, A.U. Altaeva
SRP. 2020; 11(2): 183-186
» Abstract » PDF» doi: 10.5530/srp.2020.2.28
29. **Coconut Husk Biochar Application on Increasing Growth and Yield of Maize Plant, and Improvement Fertility of Ultisol Dry Land**
Budiyati Ichwani, Mapegau, Marlina
SRP. 2020; 11(2): 187-192
» Abstract » PDF» doi: 10.5530/srp.2020.2.29
30. **Comparative Potential of Different Native Mycorrhizal and Cellulolytic Fungi in Recovering Soil Biological Quality under Water Deficit**
FIKRINDA FIKRINDA, SYAFRUDDIN SYAFRUDDIN, SUFARDI SUFARDI, RINA SRIWATI
SRP. 2020; 11(2): 193-200
» Abstract » PDF» doi: 10.5530/srp.2020.2.30
31. **Predictors of Student Performance in Foundation Year of Medical School**
Zain Mirgani, Nisha Shantakumari, Intisar Hassan
SRP. 2020; 11(2): 201-205
» Abstract » PDF» doi: 10.5530/srp.2020.2.31
32. **Mapping and Evaluation of Land Rice Paddy in T District Of Gajah Hilang Timang Gajah Kabupaten Bener Meriah**
Intan Rahayu, Halim Akbar, Muhammad Rafli
SRP. 2020; 11(2): 206-209
» Abstract » PDF» doi: 10.5530/srp.2020.2.32

33. **Promotion Pattern of Bureaucratic Official in the Direct Selection Era of Regional Head**
Hayat, Ngusmanto
SRP. 2020; 11(2): 210-218
» Abstract » PDF» doi: 10.5530/srp.2020.2.33
34. **Multimodal Strategies in Teaching Children with Autism: A Discourse Analysis**
Djatmika, Agus Hari Wibowo, Sugini, Haslina Halim, Bahtiar Mohamad
SRP. 2020; 11(2): 219-229
» Abstract » PDF» doi: 10.5530/srp.2020.2.34
35. **New X-bar Control Chart Using Skewness Correction Method for Skewed Distributions with Application in Healthcare**
Z. Zain, S.S.S. Yahaya, N. Ahmad, A.M.A. Atta
SRP. 2020; 11(2): 230-236
» Abstract » PDF» doi: 10.5530/srp.2020.2.35
36. **Peculiar Properties of Metabolism Women with Gestational Diabetes Mellitus**
Orazmuradov A.A., Savenkova I.V., Arakelyan G.A., Damirova S.F., Papyшева O.V., Lukanovskaya O.B.
SRP. 2020; 11(2): 237-241
» Abstract » PDF» doi: 10.5530/srp.2020.2.36
37. **Prospects for Specific Influenza Treatment**
Artem Odnovorov, Timur Garaev, Tatiana Grebennikova, Tatiana Pleteneva
SRP. 2020; 11(2): 242-248
» Abstract » PDF» doi: 10.5530/srp.2020.2.37
38. **The Molecular Mechanism of Corticosteroids for Systemic Lupus Erythematosus Patient's Treatment and Its Adverse Effects**
Ajeng Annamayra, Savira Ekawardhani, Andri Reza Rahmadi, Laniyati Hamijoyo, Nur Atik
SRP. 2020; 11(2): 249-254
» Abstract » PDF» doi: 10.5530/srp.2020.2.38

39. **The Morphometric Analysis of the Effects of Hydrogen Peroxide on the Off Springs of Helix Lymnaea Model**
Ekhlash Sabah Hassan, Fadhaa Abdulameer Ghafil, Sahar Abdulrudha, Hussein Abdulkadhim, Israa Ktab, Murooj Luai, Rana Talib
SRP. 2020; 11(2): 255-260
» Abstract » PDF» doi: 10.5530/srp.2020.2.39
40. **Modelling Infectious Disease in Dynamic Networks Considering Vaccine**
Ismail Husein, Herman Mawengkang, Saib Suwilo, Mardiningsih
SRP. 2020; 11(2): 261-266
» Abstract » PDF» doi: 10.5530/srp.2020.2.40
41. **A Cluster of Leading Commodities in the Plantation of Simeulu in 15 Years After the Tsunami**
Sri Handayani, Aswin Nasution, Halim Akbar
SRP. 2020; 11(2): 267-272
» Abstract » PDF» doi: 10.5530/srp.2020.2.41
42. **Production Technique of Bifido bacterium's Exo-metabolites with High Antimicrobial Activity towards Staphylococcus aureus**
Markov A.A, Timokhina T.H, Perunova N.B, Malyugina O.A
SRP. 2020; 11(2): 273-277
» Abstract » PDF» doi: 10.5530/srp.2020.2.42
43. **The Development of Dental Implant with the Bioactive Covering on the Basis of Synthetic Complex with Biogenic Elements**
Markov Alexander
SRP. 2020; 11(2): 278-283
» Abstract » PDF» doi: 10.5530/srp.2020.2.43
44. **Influence of High-Altitude Hypoxia on the Hemodynamics of the Small Circle of Blood Circulation and Indicators of Red Blood of Rats**
A. Kh. Shandaulov, K.M. Khamchiev, A.A. Astanin, S.S. Ibraeva, K.M. Khasenova
SRP. 2020; 11(2): 284-288
» Abstract » PDF» doi: 10.5530/srp.2020.2.44

45. **Sclerotium rolfsii Sacc Control Causes of Stem Rot Disease in Soybeans with Mycorrhizal Biological Agents**
Marlina, Lukman Hakim, Alfizar, Sufardi
SRP. 2020; 11(2): 289-291
» Abstract » PDF» doi: 10.5530/srp.2020.2.45
46. **The Evaluation of the Rice Crop Land of Gogo Using Automated Land Evaluation System (ALES) in the City of Samarinda Town Pampang Cultural Village East Kalimantan**
Mardiany, Zaenal Kusuma, Lukman Hakim, Mochtar Lutfi Rayes
SRP. 2020; 11(2): 292-297
» Abstract » PDF» doi: 10.5530/srp.2020.2.46
47. **Research of the Genotype Association by Locus Rs7903146 of the Tcf7l2 Gene and the Risk of Abdominal Obesity Development among Young Residents of the North**
Korneeva E.V, Voevoda M.I, Semaev S.E, Maksimov V.N
SRP. 2020; 11(2): 298-308
» Abstract » PDF» doi: 10.5530/srp.2020.2.47
48. **The Effect of Nitrogen, Phosphorus, and Potassium Fertilizer on the Yield and Quality of Sweet Potato (*Ipomoea batatas* L.) Clones in the Highlands of Indonesia**
Mardhiah Hayati, Sabaruddin Zakaria, Efendi, Ashabul Anhar
SRP. 2020; 11(2): 309-316
» Abstract » PDF» doi: 10.5530/srp.2020.2.48
49. **Higher Pharmaceutical Education in Russia: Economic Assessment of Accessibility and Regional Specifics**
Danil Alekseevich Zyukin, Tatyana Anatolievna Oleinikova, Alexander Vladimirovich Evstratov, Natalya Mitrofanovna Sergeeva, Elena Vasilievna Reprintseva, Vladimir Olegovich Ulyanov
SRP. 2020; 11(2): 317-328
» Abstract » PDF» doi: 10.5530/srp.2020.2.49

50. **Impact of Trimetazidine on Incidence of Contrast Induced Nephropathy in Diabetic Patients with Renal Insufficiency Undergoing Percutaneous Coronary Intervention**
Najah R. Hadi, Khalid I. Amber, Hussein A. Alsalkhi, Bashaer M. Muhammad-Baqir, Mustafa H. Ahmed
SRP. 2020; 11(2): 329-341
» Abstract » PDF» doi: 10.5530/srp.2020.2.50
51. **The Relationship between Expressions of Toll-Like Receptor 4 and BODE Index Score in Patients with Chronic Obstruction Pulmonary Disease**
Ahmed Abdullah Ajrash Al-Khafaji, Yesar MH Al-Shamma, Najah R Hadi, Ali M Janabi
SRP. 2020; 11(2): 342-346
» Abstract » PDF» doi: 10.5530/srp.2020.2.51
52. **Atorvastatin Reload Down Regulates TLR-2 Expression and Reduces the Acute Inflammatory Response in Patients Undergoing Percutaneous Coronary Intervention**
Abdullah Elttayef Jasim, Sahar A. Majeed, Najah R. Hadi, Khalid I. Amber, Hidhab Jawad
SRP. 2020; 11(2): 347-355
» Abstract » PDF» doi: 10.5530/srp.2020.2.52
53. **Expression of Toll – Like Receptor (TLR4) Gene in Type 2 Diabetic Normal Albuminuria, Micro Albuminuria and Macro Albuminuria Patients in Najaf Governorate – Iraq**
Rawaa Behlul Al-Fatlawi, Abdullah Elttayef Jasim, Munther Abosaooda, Kifah Jabbar Al-Yaqoobi, Najah R. Hadi, Wasan Sami Hamid Shukur, Kareem Ghaly
SRP. 2020; 11(2): 356-362
» Abstract » PDF» doi: 10.5530/srp.2020.2.53
54. **Paeoniflorin Attenuates Myocardial Ischemia / Reperfusion Injury via Up-Regulation of Notch 1 – Mediated Jagged1 Signaling**
Nasser Ghaly Yousif, Zahraa Younis, Fadhil G. Al-Amran, Maitham G. Yousif, Ahmed Altimim, Najah R. Hadi

SRP. 2020; 11(2): 363-371

» Abstract » PDF» doi: 10.5530/srp.2020.2.54

55. **Etoposide-Loaded Gold Nanoparticles: Preparation, Characterization, Optimization and Cytotoxicity Assay**

Maha M. Ali, Nawal A. Rajab, Alaa A. Abdulrasool

SRP. 2020; 11(2): 372-381

» Abstract » PDF» doi: 10.5530/srp.2020.2.55

56. **Antimicrobial Activity of Aqueous Extracts Acquired from the Seeds of Two Apples' Cultivars**

Yasser Fakri Mustafa, Raghad Riyadh Khalil, Eman Tareq Mohammed

SRP. 2020; 11(2): 382-387

» Abstract » PDF» doi: 10.5530/srp.2020.2.56

57. **Development of ZIC-HILIC Methods Using Ultraviolet Detection for determining 2-deoxyuridine in Human Serum**

Ashraf Saad Rasheed, Farah A. Rashid

SRP. 2020; 11(2): 388-394

» Abstract » PDF» doi: 10.5530/srp.2020.2.57

58. **New Mode for the Determination of Ketotifen Fumarate Using Low Pressure Mercury Lamp via Continuous Flow Injection Analysis**

Marwah A. Kadhim Al-banaa

SRP. 2020; 11(2): 395-401

» Abstract » PDF» doi: 10.5530/srp.2020.2.58

59. **The Protective Role of Vitamins E, A, D3 against the Toxicity Induced by Lambdacyhalothrin Pesticide in Testosterone Hormone and the Testes of Laboratory Male Rat**

Rafid Mohammed Ali Hassan Wasfi, Yarob Saad Abdil-Jaleel AL Kabi, Hanaa Jaffer Jabbar AL-Kabee

SRP. 2020; 11(2): 402-407

» Abstract » PDF» doi: 10.5530/srp.2020.2.59

60. **A Study on the Effect of Phenazine 1- Carboxylic Acid Extracted from Rhizosphoric Pseudomonas putida on the DNA of Some MDR Bacteria Causing UTI**
Amel H. Mussa, Afrah Fahad Abdulkareem, Hanaa Farhan Abbas
SRP. 2020; 11(2): 408-413
» Abstract » PDF» doi: 10.5530/srp.2020.2.60
61. **Study in Silico:Interaction between AGE Compounds and Constituent Components of Vascular Endothelium Glycocalyx**
Dewi I.N. Pratiwi, M. A. Widodo, Kusworini, Nia Kania
SRP. 2020; 11(2): 414-421
» Abstract » PDF» doi: 10.5530/srp.2020.2.61
62. **Perceptions of Managerial Competency Among Pharmacy Department Heads in Vietnamese Hospitals**
Bay Van Vo, Montaya Sunantiwat, Somying Pumtong, Trung Quang Vo, Luerat Anuratpanich
SRP. 2020; 11(2): 422-426
» Abstract » PDF» doi: 10.5530/srp.2020.2.62
63. **An Optimization and Common Troubleshooting Solving in Polymerase Chain Reaction Technique**
Shaden M. H. Mubarak, Dhafer A. F. Al-Koofee, Ohood A Radhi, Jawad Mohammed Ismael, Zubaida Falih Al-Zubaidi
SRP. 2020; 11(2): 427-436
» Abstract » PDF» doi: 10.5530/srp.2020.2.63
64. **Serological and Hormonal Changes Study Associated With Toxoplasmosis in Pregnant Women**
Hussein A. Kadhum, Dr.Shaimaa A. Shlash
SRP. 2020; 11(2): 437-439
» Abstract » PDF» doi: 10.5530/srp.2020.2.64
65. **Effect of Increased Fluoride Contents on Fluoride Release from Glass Ionomer Cements.**
Monadle R. Hadi

SRP. 2020; 11(2): 440-443

» Abstract » PDF» doi: 10.5530/srp.2020.2.65

66. **Assessment of Psychosocial Status of the Displaced Students**

Rajha A. Hamza, Mansour Abdullah Falah

SRP. 2020; 11(2): 444-450

» Abstract » PDF» doi: 10.5530/srp.2020.2.66

67. **The Effect of Some Enzymes on the Formation of Biofilm from Bacterial *Pseudomonas aeruginosa* Isolated from Pathological Samples**

Mayada Abdullah Shehan, Shaimaa Noori Mahal, Omar I. Aljumaili

SRP. 2020; 11(2): 451-453

68. **Relationship between Blood Homocystein Level and Acute Stroke in Patients of Al-Muthanna ProvinceIraq**

Asaad Adil Mnaather, Haider Ali Hussien, Ali Abdulkarim Talib

SRP. 2020; 11(2): 454-457

» Abstract » PDF» doi: 10.5530/srp.2020.2.68

69. **Phytochemical and Biological of *Anthemis nobilis* (Asteraceae family) a Native Herbs of Iraq**

Iman Husam Mohammed, Ashwaq Talib Hameed, Hanan Fawzi Salman

SRP. 2020; 11(2): 458-461

» Abstract » PDF» doi: 10.5530/srp.2020.2.69

70. **Green Synthesis of Gold Nanoparticles using Pineapple Extract and Study their Analytical Characterization and Antibacterial Activity**

Dhelal Abdul Ghafoor, Wahran M. Saod, Nazhan Mohammed

SRP. 2020; 11(2): 462-465

» Abstract » PDF» doi: 10.5530/srp.2020.2.70

71. **The Effect of Anti-tuberculosis Drugs on Liver Enzymes in Iraqi Patients**

Ali Adnan Jabbar, Sarah Ali Abed, Enas Yassen Jasim, Thoalfiqar khudhair

Shamkhi

SRP. 2020; 11(2): 466-470

» Abstract » PDF» doi: 10.5530/srp.2020.2.71

72. **Identification the Effect of Inhibin β A/Activin A Genes Polymorphism on Superovulation (Calving Rate) in Holstein Friesian Cows**
Laith Sofian Younis, Saad Tawfik Rasheed, Qusay Mohammed Aboud, Mustafa Salah Hasan, Ali Aziz Abid.
SRP. 2020; 11(2): 471-481
» Abstract » PDF» doi: 10.5530/srp.2020.2.72
73. **The Role of Immunopathology: As Predictor Factors in Patients with Inflammatory Bowel Diseases**
Kemelbekov Kanatzhan, Kozhakhmetova Ulzhan, Kuzenbayeva Aisulu, Tazhedinova Aigerim, Nurkeshova Elmira
SRP. 2020; 11(2): 482-486
» Abstract » PDF» doi: 10.5530/srp.2020.2.73
74. **Synthesis, Characterization and Antibacterial Evaluation of Oxoazetidid – Benzene Sulfonamide Derivatives as a Hybrid Antimicrobial Agents**
Ahmed T. Ali, Mazin N. Mosa, Zuhair G. Alshaheen, Munther A. Muhammad-Ali
SRP. 2020; 11(2): 487-494
» Abstract » PDF» doi: 10.5530/srp.2020.2.74
75. **Impacts of the Alcoholic Extract and Essential Oil of *Thymus vulgaris* L. Against the Causative Agent of Acne Formation (*Staphylococcus aureus*)**
Rasha Kareem Mohammed, Farkad Hawas Musa, Bashaer Yasein Mehdi, Ali Mohammed Al-Rawe
SRP. 2020; 11(2): 495-498
» Abstract » PDF» doi: 10.5530/srp.2020.2.75
76. **The Pharmaceutical Cooperatives Performance Indicators, Based on Balance Scorecard**
Surachman Surjaatmadja, Aini Kusniawati
SRP. 2020; 11(2): 499-506
» Abstract » PDF» doi: 10.5530/srp.2020.2.76
77. **The Role of Interleukin-6 (IL-6), Interleukin-10 (IL- 10), Plasminogen Activator (PAA), and Plasminogen Activator Inhibitor (PAI) Towards the Occurence of Peritoneal Adhesions in Post-Laparotomic Patients**

- M. Alsen Arlan, Ponpon S Idjradinata, Suwandi Sugandi, Tri Hanggono Achmad
SRP. 2020; 11(2): 507-509
» Abstract » PDF» doi: 10.5530/srp.2020.2.77
78. **The Correlation between Hematological Parameters and Transcranial Color Doppler (TCD) with Severity of Acute Ischemic Stroke – A Cross-Sectional Study**
Kiking Ritarwan, Iswandi Erwin, Muhammad Yusuf, Oke Rina Ramayani
SRP. 2020; 11(2): 510-515
» Abstract » PDF» doi: 10.5530/srp.2020.2.78
79. **Warranting Increased Operational Performance of Pharmaceutical Firms of Indonesia through Collaborative and Calculative HRM Practices: Mediating Role of Employee Engagement**
Basuki, Rizka Zulfikar, Khuzaini, Rahmi Widyanti
SRP. 2020; 11(2): 516-524
» Abstract » PDF» doi: 10.5530/srp.2020.2.79
80. **Hindrance of Quality of Knowledge Sharing Due to Workplace Incivility in Indonesian Pharmacies: Mediating Role of Co-Worker and Organizational Support**
Adi Santoso, Andi Makkulawu Panyiwi Kessi, Fadjar Setiyo Anggraeni
SRP. 2020; 11(2): 525-534
» Abstract » PDF» doi: 10.5530/srp.2020.2.80
81. **Can Corporate Character Dimensions Act as Bridge between Leader-Member Exchange and Employee Organization Relationship: An Empirical Study of Indonesian Pharmaceutical Firms**
Acim Heri Iswanto, Faisal Marzuki
SRP. 2020; 11(2): 535-544
» Abstract » PDF» doi: 10.5530/srp.2020.2.81
82. **Can Organizational Justice Dimensions Mediate Between Leader Mindfulness and Leader-Member Exchange Quality: An Empirical Study in Indonesia Pharmaceutical Firms**
Jopinus Saragih, Ikbar Pratama, Jumadiah Wardati, Elba Frida Silalahi, Adrian

Tarigan

SRP. 2020; 11(2): 545-554

» Abstract » PDF» doi: 10.5530/srp.2020.2.82

83. **The Effects of Environmental Management and HRM Practices on the Operational Performance in Thai Pharmaceutical Industry**

Chayanan Kerdpitak

SRP. 2020; 11(2): 555-565

» Abstract » PDF» doi: 10.5530/srp.2020.2.83

84. **The Mediation Effects of Organizational Engagement between HRM Practices and Employee Job Satisfaction in the Pharmaceutical Industry in Thailand**

Ratirath Na Songkhla, Oraphan Decha, Suwita Prugsaarporn, Ronnakorn

Vaiyavuth

SRP. 2020; 11(2): 566-575

» Abstract » PDF» doi: 10.5530/srp.2020.2.84

85. **The Influence of Work-Related Supports on Employee Engagement in the Pharmaceutical Industry in Thailand**

Pimploi Tirastittam, Patsara Sirikamonsin, Hang Li, Aongart Aun-a-nan

SRP. 2020; 11(2): 576-585

» Abstract » PDF» doi: 10.5530/srp.2020.2.85

86. **The Effects of Workplace Stress, Work-Life Balance on Turnover Intention: An Empirical Evidence from Pharmaceutical Industry in Thailand**

Chayanan Kerdpitak, Kittisak Jermsittiparsert

SRP. 2020; 11(2): 586-594

» Abstract » PDF» doi: 10.5530/srp.2020.2.86

87. **The Relationship between Cross-Cultural Competency and Employee Performance in the Organization: A Case of Thailand's Pharmaceutical Industry**

Thammarak Srimarut, Witthaya Mekhum

SRP. 2020; 11(2): 595-602

» Abstract » PDF» doi: 10.5530/srp.2020.2.87

88. **The Influence of Workload and Co-Worker Attitude on Job Satisfaction among Employees of Pharmaceutical Industry in Bangkok, Thailand: The Mediating Role of Training**
Thammarak Srimarut, Witthaya Mekhum
SRP. 2020; 11(2): 603-611
» Abstract » PDF» doi: 10.5530/srp.2020.2.88
89. **Impact of Gender-Based, Age-Based, and Race-Based Discrimination on Satisfaction and Performance of Employees**
Chayanan Kerdpitak, Kittisak Jermsittiparsert
SRP. 2020; 11(2): 612-620
» Abstract » PDF» doi: 10.5530/srp.2020.2.89
90. **Impact of Effective Implementation of HR Practices on Employee Performance in Pharmacy Business in Thailand**
Bundit Pungnirund
SRP. 2020; 11(2): 621-630
» Abstract » PDF» doi: 10.5530/srp.2020.2.90
91. **Role of Customer Loyalty on Employee Performance and Productivity in Pharmacy Business in Thailand**
Kevin Wongleedee
SRP. 2020; 11(2): 631-641
» Abstract » PDF» doi: 10.5530/srp.2020.2.91
92. **Detection Mapping of Women with High-Risk Pregnancy in Antenatal Care in Kamonji Public Health Center, Palu City, Indonesia**
Rosmala Nur, Renata Gita Cahyani Sese, Nurhaya S. Patui, Rasyka Nurul Fajriah
SRP. 2020; 11(2): 642-647
» Abstract » PDF» doi: 10.5530/srp.2020.2.92
93. **International and National Obligations to Protect from the Risks of Pharmaceutical Crime: The Crime of Counterfeit Pharmaceutical Products in the COVID -19 Crisis**
Ouarda Belkacem Layachi

SRP. 2020; 11(2): 648-657

» Abstract » PDF» doi: 10.5530/srp.2020.2.93

94. **Revitalizing School Dental Health Effort through “Model 222” as a Strategy to Achieve Caries-Free Indonesia 2030**

Bedjo Santoso, Edi Susanto, Melyana Nurul Widyawati, Rasipin, Waljuni Astu Rahman, Ismi Rajiani

SRP. 2020; 11(2): 658-662

» Abstract » PDF» doi: 10.5530/srp.2020.2.94

95. **Effectiveness of Autoclave Combination Treatment with Andosol Soil to Decrease the Number of Bacillus Cereus**

Marsum, Anies, Bagoes Widjanarko, Nur Endah Wahyuningsih

SRP. 2020; 11(2): 663-668

» Abstract » PDF» doi: 10.5530/srp.2020.2.95

96. **Islamic Bank Performance Improvement through the Value Added Intellectual Creation Strategy**

D. Supriyadi

SRP. 2020; 11(2): 669-672

» Abstract » PDF» doi: 10.5530/srp.2020.2.96

97. **Technology as Liquidity Risk of Banks in Indonesia**

I. Waspada

SRP. 2020; 11(2): 673-678

» Abstract » PDF» doi: 10.5530/srp.2020.2.97

98. **Pharmaceutical and Biological Application of New Synthetic Compounds of Pyranone, Pyridine, Pyrimidine, Pyrazole and Isoxazole Incorporating on 2-Flouroquinoline Moieties**

Muqdad Irhaem Kadhim, Ismail Husein

SRP. 2020; 11(2): 679-684

» Abstract » PDF» doi: 10.5530/srp.2020.2.98

99. **Model of Spread of Infectious Diseases**

Hamidah Nasution, Herlina Jusuf, Evi Ramadhani, Ismail Husein

SRP. 2020; 11(2): 685-689

» Abstract » PDF» doi: 10.5530/srp.2020.2.99

100. **Maternal Obesity: Impact in Pregnancy Outcome at Tertiary Referral Hospital**

Hermanto Tri Joewono, Agus Sulistyono, Naura Ega Kahayani, Aditiawarman

SRP. 2020; 11(2): 695-698

» Abstract » PDF» doi: 10.31838/srp.2020.2.101

101. **Effect of Zingiber Officinale Extract and Insulin Administration towards Soluble FMS Like Types of Tyrosine Kinase 1 in Diabetes Mellitus Pregestasional Rattus Norvegicus Models**

Hermanto Tri Joewono, Agus Sulistyono, Alif Zahrotin, Aditiawarman

SRP. 2020; 11(2): 699-702

» Abstract » PDF» doi: 10.31838/srp.2020.2.102

102. **EMOTIONAL LABOR IN THE INDONESIAN PHARMACEUTICAL SECTOR AND ORGANIZATIONAL DEVIANCE BY EMPLOYEES: ROLE OF SURFACE ACTING, EMOTIONAL EXHAUSTION, AND JOB BURNOUT**

Faroman Syarief, Selviana Rizky Pramitha

SRP. 2020; 11(2): 714-724

» Abstract » PDF» doi: 10.31838/srp.2020.2.104

103. **INNOVATIVE WORK BEHAVIORS IN PHARMACIES OF INDONESIA: ROLE OF EMPLOYEE VOICE, GENERATIONAL DIVERSITY MANAGEMENT AND EMPLOYEE ENGAGEMENT**

Wa Ode Sifatu, Herman Sjahrudin, Yana Fajriah, Ngakan Ketut Acwin

Dwijendra, Adi Santoso

SRP. 2020; 11(2): 725-734

» Abstract » PDF» doi: 10.31838/srp.2020.2.105

104. **INFLUENCE OF SUPPLY CHAIN UNCERTAINTY ON THE AGILITY PERFORMANCE OF MALAYSIAN COMPANIES: A MEDIATING EFFECT OF SUPPLY CHAIN INTEGRATION**

Quyên Ha Tran

SRP. 2020; 11(2): 754-762

» Abstract » PDF» doi: 10.31838/srp.2020.2.107

105. **INFORMATION TECHNOLOGY COMPETENCE, PROCESS MANAGEMENT AND KNOWLEDGE MANAGEMENT: A CASE OF MANUFACTURING FIRMS OF VIETNAM**

Quyên Ha Tran

SRP. 2020; 11(2): 763-773

» Abstract » PDF» doi: 10.31838/srp.2020.2.108

106. **Study of neuropathological effect of Triortho Cresyl Phosphate in Midbrain of Hen**

Methaq A. Abd Alsamad, Batool Salim Hamza, Salma Saeed Abbas, Mohammed A. Hasan

SRP. 2020; 11(2): 774-778

» Abstract » PDF» doi: 10.31838/srp.2020.2.109

107. **MATERNAL AND PERINATAL OUTCOME OF WOMEN WITH OBESITY IN PREGNANCY**

Hermanto Tri Joewono, Agus Sulistyono, Yulisa Haslinda, Aditiawarman

SRP. 2020; 11(2): 690-694

» Abstract » PDF» doi: 10.31838/srp.2020.2.100

108. **THE HIDDEN VULNERABILITY OF COVID-19 OBSERVED FROM ASYMPTOMATIC CASES IN INDONESIA**

Muhammad Miftahussurur

SRP. 2020; 11(2): 703-713

» Abstract » PDF» doi: 10.31838/srp.2020.2.103

Model of Spread of Infectious Diseases

Hamidah Nasution^{1*}, Herlina Jusuf², Evi Ramadhani³, Ismail Husein⁴^{1*}Department of Mathematics, Universitas Negeri Medan, North Sumatera, Indonesia²Department of Public Health, Faculty of Sports and Health, Universitas Negeri Gorontalo³Department of Statistic, Universitas Syiah Kuala, Aceh, Indonesia⁴Department of Mathematics, Universitas Islam Negeri Sumatera Utara, Medan, Indonesia

Article History:

Submitted: 20.02.2020

Revised: 18.03.2020

Accepted: 02.05.2020

ABSTRACT

The Model of infectious diseases continues to develop along with the development of the disease. With the dynamic spread of disease, ongoing research is needed. This study developed the SIR model by taking into account the spread of disease in the presence of Reproductive Number or R_0 . This study proposes an epidemic model of infectious diseases in dynamic networks for SIRS types, the standard mean-field model is used as a basic framework.

Keywords: Model of Spread, Infectious Disease, Modeling**Correspondence:**

Hamidah Nasution

Department of Mathematics,

Universitas Negeri Medan, North Sumatera, Indonesia

Email id : hamidahnst@unimed.ac.idDOI: [10.5530/srp.2020.2.99](https://doi.org/10.5530/srp.2020.2.99)

©Advanced Scientific Research. All rights reserved

INTRODUCTION

Indonesia as a developing country, health issues are still important to get serious attention. In particular, the problem of infectious diseases because in Indonesia alone infectious diseases that occur until the end of 2017 and are still a hot topic of discussion are diphtheria. Although it sounds like a common cold or fever, diphtheria in fact has a high mortality rate and can be transmitted quickly. Until now, the vaccination program is still believed to be the most effective way in suppressing the spread of diphtheria. One branch of modern mathematics which is important and has a wide scope of research areas is differential equations.

Differential equations are branches of mathematics that are quite strategic because they relate to the central parts of Algebra, Analysis, Geometry, and others that will play a major role in the introduction of concepts and problem solving relating to the real world (Waluya, 2006).

This study aims to build a model of the spread of infectious diseases in dynamic SIRS type networks for heterogeneous populations. The model will be built using the basic framework of a mathematical model to investigate a parameter known as a basic reproductive number in detail, especially if the basic assumption of the model, mixing homogeneous populations, does not apply. In the SIRS model, this parameter has a very important role as a notification of a disease outbreak. The model that will be investigated in this study is based on a standard mean-field model. The main parameters that serve as measures for controlling epidemics, known as basic reproductive numbers with the mean-field model, will be investigated in more detail in the context of developing the model. The mean-field modification model produced essentially contains implicitly some important effects of heterogeneous mixing in contact tissue in the epidemic for vaccine allocation.

METHOD

SI epidemic model

The simplest mathematical model in epidemiology is known as the Ross Epidemic Model or SI, which was developed in 1911. In the SI model, the population is divided into two parts (subgroups), namely susceptible = S populations against disease transmission and infectious populations = I) against a disease. The assumptions used in this model are: that the

vulnerable population remains in close contact with the infected population all the time $t \geq 0$, the number of populations is constant as N with $N = (S(t) + I(t))$ where S and I are mutually exclusive and mixing the population homogeneously so that each individual has an equal chance of infection. If $\beta \geq 0$ is the average constant (the proportion) of subgroup contact that results in a new infection the unity of time from the original state is susceptible (or also called the transmission rate constant).

SIS epidemic model

The assumptions used in this model are: that the vulnerable population remains in close contact with the infected population throughout the time $t \geq 0$, the number of populations is constant as N with $N = (S(t) + I(t))$ where S and I are mutually exclusive and homogeneous mixing of the population so that each individual has an equal chance of infection. However, the number or size of the infected population can decrease as the movement of infected individuals changes status to be susceptible to reuniting time with proportions σ .

SIR epidemic model

The SIR model is the basis for most of the deterministic models that are still used today. This model was first developed by Kermack and McKendrick in 1927. The SIR model has the same structure and assumptions as the SI model, the extension is that in the SIR model it is possible for the infected population / community members to recover and the total population of N to be divided into three subgroups mutually exclusive; susceptible subgroups (Susceptibles) symbolized $S(t)$, infectious / infected subgroups $I(t)$ and moved (Removed) subgroups symbolized $R(t)$. $R(t)$ represents individuals who died of illness, recovered from infection and now have permanent immunity or individuals who have been exiled from the rest of the population. So in this last subgroup, it no longer contributes to the spread of disease / epidemic. However, it is still maintained as a member of a total population of N , although there is a possibility that some of them have died.

In this model I also assume that individuals who enter $R(t)$ cannot be re-infected. Assuming that α is a constant proportion of the condition of the infected individual subsequently is removed unity of time. Then the differential

equation model that represents the rate of change of the population that is susceptible to constant unity of time as in the SI model, as in equation (3). This is because there is no direct transfer of individuals from subgroups vulnerable to moving subgroups. However, the differential equation model of the infected subgroup needs to be modified to take into account the number of infected people and recover.

RESULT

Model Epidemi SI

The simplest mathematical model in epidemiology is known as the Ross' Epidemic Model or SI, which was developed in 1911. In the SI model, the population is divided into two parts (subgroups), namely susceptible (S) populations to disease transmission and infected populations (infected) infectious = I) to a disease. In Figure 1 this model is the same as SIR but without the R compartment.

The assumptions used in this model are: that the vulnerable population remains in close contact with the infected population all the time $t \geq 0$, the number of populations is constant as N with $N = (S(t) + I(t))$ where S and I are mutually exclusive and mixing the population homogeneously so that each individual has an equal chance of infection.

If $\beta \geq 0$ is the average constant (the proportion) of subgroup contact that results in a new infection the time unity from the original state that is vulnerable (or also called the transmission rate constant). Furthermore, by using the law of Mass action, the SI Model can be described as:

$$\frac{dS(t)}{dt} = -\beta S(t)I(t) \tag{1} \quad \text{and}$$

$$\frac{dI(t)}{dt} = \beta S(t)I(t) \tag{2}$$

hereafter written:

$$\frac{dS}{dt} = -\beta S I \tag{3}$$

$$\frac{dI}{dt} = \beta S I \tag{4}$$

with initial conditions $S(0) = S_0$ and $I(0) = I_0$.

In the SI model it can be said that the rate of change of contracting is positive, so the number of infected individuals will continue to increase until $S(t) = 0$.

The completion of this SI model, by changing equation (4) to:

$$\frac{dI}{dt} = \beta(N - I)I$$

Furthermore, with the separation of variables and integrated with a limit from 0 to t as follows: $\int_{I(0)}^{I(t)} \frac{1}{I(N-I)} dI = \int_0^t \beta dt$

was obtained: $I(t) = \frac{I(0)N}{I(0) + (N-I(0))e^{-\beta Nt}}$

or written: $I(t) = \frac{I_0 N}{I_0 + (N - I_0)e^{-\beta Nt}}$

observe that I (t) increases with increasing t and for $t \rightarrow \infty$, $e^{-\beta Nt} \rightarrow 0$

so that $I(t) \rightarrow \frac{I_0 N}{I_0} = N$

This last model states that as time goes by, the number of infected populations will increase, eventually all populations will become infected.

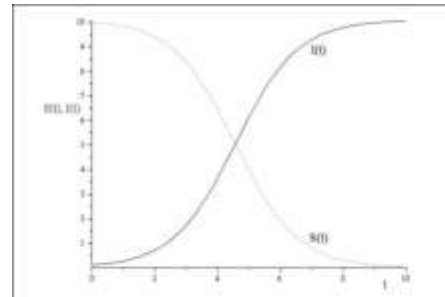


Figure 1: Model SI with $\beta = 0,1$ and initial value $S(0) = 10$, $I(0) = 0,1$

Classic Model (SIR Model)

The SIR model is the basis for most of the deterministic models that are still used today. This model was first developed by Kermack and McKendrick in 1927. The SIR model has the same structure and assumptions as the SI model, the extension is that in the SIR model it is possible for the infected population / community members to recover and the total population of N to be divided into three subgroups mutually exclusive; susceptible subgroups (Susceptibles) are symbolized S (t), infectious / infected subgroups are symbolized I (t) and recovered subgroups are symbolized R (t). R (t) represents individuals who died of illness, recovered from infection and now have permanent immunity or individuals who have been exiled from the rest of the population. So in this last subgroup, they no longer contribute to the spread of disease / epidemic. However, it is still maintained as a member of a total population of N even though there is a possibility that some of them have died. In this model it is also assumed that individuals who enter R (t) cannot be re-infected. Assuming that α is a constant proportion of the condition of the infected individual subsequently is removed unity of time.

Then the differential equation model that represents the rate of change of the population that is susceptible to constant unity of time as in the SI model, as in equation (3). This is because there is no direct transfer of individuals from subgroups vulnerable to moving subgroups. However, the differential equation model of the infected subgroup needs to be modified to take into account the number of individuals infected and recovered. When the amount moved is proportional to the amount that is infected with each unit of time, then the differential equation model becomes:

$$dI/dt = \beta SI - \alpha I$$

While the rate of change in the number of removals per unit time is:

$$\frac{dR}{dt} = \alpha I$$

with initial conditions: $R(0) = R_0$, so that the complete differential equation model which is the SIR model is:

$$\frac{dS}{dt} = -\beta SI$$

$$\frac{dI}{dt} = \beta SI - \alpha I \tag{5}$$

$$\frac{dR}{dt} = \alpha I$$

with initial conditions: $S(0) = S_0$, $I(0) = I_0$, $R(0) = R_0$ dan $S(t) + I(t) + R(t) = N$.

The SIR model above has two parameters α and β which are determined from the results of the analysis of the observed data. The average of cure is related to the exponential waiting time "waiting time" $e^{-\alpha t}$ and $\frac{1}{\alpha}$ = average period of contracting.

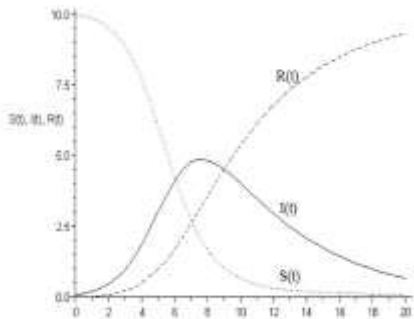


Figure 2: SIR model with $\gamma = 0,2$ $\beta = 0,1$ dan nilai awal $S(0) = 10, I(0) = 0,1$ and $R(0) = 0$

SIRS Model

Not all diseases result in permanent immunity or death. Some diseases have a healing period and after time the recovered individual can be re-infected. Mathematically this means that a proportion of the subgroups that move the union of time ($\lambda \geq 0$) are again vulnerable. So the SIR model is modified to model SIRS as follows:

$$\frac{dS}{dt} = -\beta SI + \lambda R$$

$$\frac{dI}{dt} = \beta SI - \alpha I$$

(6)

$$\frac{dR}{dt} = \alpha I - \lambda R$$

with initial conditions: $S(0) = S_0, I(0) = I_0, R(0) = R_0$ dan $S(t) + I(t) + R(t) = N$.

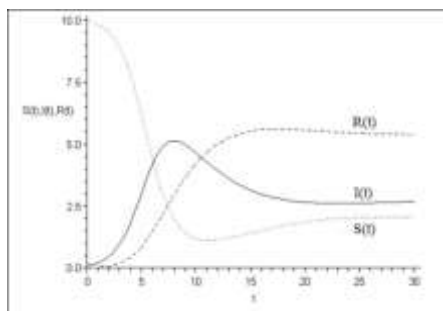


Figure 3: SIRS model with $\alpha = 0,2, \beta = 0,1, \lambda = 0,2$ and initial value $S(0) = 10, I(0) = 0,1$ and $R(0) = 0$

CONSTRUCTION R0

Basic Reproduction Number (R0)

R0 which is usually called the Basic Reproduction Number is the average number of secondary infections produced when an infected individual is entered into the host population where each individual is in a susceptible condition. In most deterministic models, an infection begins fully if and only if $R0 > 1$, and otherwise if $R0 < 1$ then the number of infections will decrease and eventually become extinct. So the basic reproduction number is often seen as a threshold quantity

that determines when an infection can attack and survive in a new host population.

If it is assumed that all pairs of individuals have contact at the same time so as to produce a new infected individual ie , The average rate of infected individuals has contact with susceptible individuals and then susceptible individuals become infected with time unity ie $\alpha, \alpha \geq 0$.

R0 construction in the SIRS model, i.e.:

$$\frac{dI}{dt} = \beta SI - \alpha I$$

Growth of infection will take place if $\beta SI - \alpha I > 0$ or $\beta SI > \alpha I$ $\beta S > \alpha$ with $S(0) = N$ so $(\beta N / \alpha) > 1$. Then thus $R_0 = \beta N / \alpha$

Logistics Equations in Epidemiology

Logistics equations are most often discussed when we study population dynamics with densities dependent on birth and death.

CONCLUSION

This study proposes an epidemic model of infectious diseases in dynamic networks for SIRS types, the standard mean-field model is used as a basic framework. In this SIRS epidemic model, a very basic parameter in discussing a disease epidemic is R0 (basic reproductive number). R0 has the main role as a threshold of an outbreak, on the relevance of testing control measures.

REFERENCES

1. Albert, R., Jeong, H. & Barabási, A.-L. 1999 Diameter of the world-wide web. Nature 401, 130-131.
2. Albert, R., Jeong, H. & Barabási, A.-L. 2000 Error and attack tolerance of complex networks. Nature 406, 378-381.
3. Bailey, N. T. J. 1957 The mathematical theory of epidemics. London: Griffin.
4. Bak, P., Chen, K. & Tang, C. 1990 A forest-fire model and some thoughts on turbulence. Phys. Lett. A 147, 297-300.
5. Barabási, A. L. & Albert, R. 1999 Emergence of scaling in random networks. Science 286, 509-512.
6. Barbour, A. & Mollison, D. 1990 Epidemics and random graphs. In Stochastic processes in epidemic theory (ed. J.-P. Gabriel, C. Lefeuvre & P. Picard), pp. 86-89. New York: Springer.
7. Bearman, P. S., Moody, J. & Stovel, K. 2004 Chains of affection: the structure of adolescent romantic and sexual networks. Am. J. Sociol. 110, 44-91.
8. Bollobás, B. 1979 Graph theory. New York: Springer.
9. Bollobás, B. 1985 Random graphs. London: Academic Press.
10. Boots, M. & Sasaki, A. 1999 'Small worlds' and the evolution of virulence: infection occurs locally and at a distance. Proc. R. Soc. B 266, 1933-1938. (doi:10.1098/rspb.1999.0869.)
9. Diekmann, O., Heesterbeek, J. A. P. & Metz, J. A. J. 1998 A deterministic epidemic model taking account of repeated contacts between the same individuals. J. Appl. Prob. 35, 462-468.
10. Dietz, K. & Hadeler, K. P. 1988 Epidemiological models for sexually transmitted diseases. J. Math. Biol. 26, 1-25.

11. Doherty, I. A., Padian, N. S., Marlow, C. & Aral, S. O. 2005 Determinants and consequences of sexual networks as they affect the spread of sexually transmitted infections. *J. Infect. Dis.* 191, S42-S54.
12. Eames, K. T. D. & Keeling, M. J. 2002 Modeling dynamic and network
13. heterogeneities in the spread of sexually transmitted diseases. *Proc. Natl Acad. Sci. USA* 99, 13330-13335.
14. Eames, K. T. D. & Keeling, M. J. 2003 Contact tracing and disease control. *Proc.*
15. *R. Soc. B* 270, 2565-2571. (doi:10.1098/rspb.2003.2554.)
16. Eames, K. T. D. & Keeling, M. J. 2004 Monogamous networks and the spread of sexually transmitted diseases. *Math. Biosci.* 189, 115-130.
17. Eichner, M. 2003 Case isolation and contact tracing can prevent the spread of
18. smallpox. *Am. J. Epidemiol.* 158, 118-128.
19. Eubank, S., Guclu, H., Kumar, V. S. A., Marathe, M. V., Srinivasan, A., Toroczkai,
20. Z. & Wang, N. 2004 Modelling disease outbreaks in realistic urban social networks. *Nature* 429, 180-184.
21. Ferguson, N. M. & Garnett, G. P. 2000 More realistic models of sexually transmitted disease transmission dynamics: sexual partnership networks, pair models, and moment closure. *Sex. Transm. Dis.* 27, 600-609.
22. Ferguson, N. M., Donnelly, C. A. & Anderson, R. M. 2001 The foot-and-mouth epidemic in Great Britain: pattern of spread and impact of interventions. *Science* 292, 1155-1160.
23. Frank, O. & Strauss, D. 1986 Markov Graphs. *J. Am. Stat. Soc.* 81, 832-842.
24. Fraser, C., Riley, S., Anderson, R. M. & Ferguson, N. M. 2004 Factors that make an infectious disease outbreak controllable. *Proc. Natl Acad. Sci. USA* 101, 6146-6151.
25. Garnett, G. P. & Anderson, R. M. 1996 Sexually transmitted diseases and sexual behavior: insights from mathematical models. *J. Infect. Dis.* 174, S150-S161.
26. Ghani, A. C. & Garnett, G. P. 1998 Measuring sexual partner networks for transmission of sexually transmitted diseases. *J. R. Stat. Soc. A* 161, 227-238.
27. Ghani, A. C. & Garnett, G. P. 2000 Risks of acquiring and transmitting sexually transmitted diseases in sexual partner networks. *Sex. Transm. Dis.* 27, 579-587.
28. Ghani, A. C., Swinton, J. & Garnett, G. P. 1997 The role of sexual partnership networks in the epidemiology of gonorrhoea. *Sex. Transm. Dis.* 24, 45-56.
29. Gilbert, M., Mitchell, A., Bourn, D., Mawdsley, J., Clifton-Hadley, R. & Wint, W. 2005 Cattle movements and bovine tuberculosis in Great Britain. *Nature* 435, 491-496.
30. Grassberger, P. 1983 On the critical behaviour of the general epidemic process and dynamical percolation. *Math. Biosci.* 63, 157-172.
31. Grenfell, B. T. 1992 Chance and chaos in measles dynamics. *J. R. Stat. Soc. B* 54, 383-398.
32. Grenfell, B. T., Bjornstad, O. N. & Kappey, J. 2001 Travelling waves and spatial hierarchies in measles epidemics. *Nature* 414, 716-723.
33. Grimmett, G. 1989 Percolation. Berlin: Springer.
34. Halloran, M. E., Longini Jr. I. M., Nizam, A. & Yang, Y. 2002 Containing bioterrorist smallpox. *Science* 298, 1428-1432.
35. Handcock, M. S. & Jones, J. H. 2004 Likelihood-based inference for stochastic models of sexual network formation. *Theor. Popul. Biol.* 65, 413-422. Harary, F. 1969 Graph theory. Reading, MA: Addison-Wesley.
36. Harris, T. E. 1974 Contact interactions on a lattice. *Ann. Probab.* 2, 969-988. Haydon, D. T., Chase-Topping, M., Shaw, D. J., Matthews, L., Friar, J. K., Wilesmith, J. & Woolhouse, M. E. J. 2003 The construction and analysis of epidemic trees with reference to the 2001 UK foot-and-mouth outbreak. *Proc. R. Soc. B* 270, 121-127. (doi:10.1098/rspb.2002.2191.)
37. Hethcote, H. W. & Yorke, J. A. 1984 Gonorrhoea transmission dynamics and control. Springer Lecture Notes in Biomathematics. Berlin: Springer.
38. Husein, Ismail H Mawengkang, S Suwilo "Modeling the Transmission of Infectious Disease in a Dynamic Network" *Journal of Physics: Conference Series* 1255 (1), 012052, 2019.
39. Husein, Ismail, Herman Mawengkang, Saib Suwilo, and Mardiningsih. "Modelling Infectious Disease in Dynamic Networks Considering Vaccine." *Systematic Reviews in Pharmacy* 11.2, pp. 261-266, 2020.
40. Husein, Ismail, YD Prasetyo, S Suwilo "Upper generalized exponents of two-colored primitive extremal ministrong digraphs" *AIP Conference Proceedings* 1635 (1), 430-439, 2014
41. S Sitepu, H Mawengkang, I Husein "Optimization model for capacity management and bed scheduling for hospital" *IOP Conference Series: Materials Science and Engineering* 300 (1), 01,2016.
42. Jeong, H., Tombar, B., Albert, R., Oltvai, Z. N. & Barabási, A.-L. 2000 The large-scale organization of metabolic networks. *Nature* 407, 651-654.
43. Jolly, A. M. & Wylie, J. L. 2002 Gonorrhoea and Chlamydia core groups and sexual networks in Manitoba. *Sex. Transm. Infect.* 78, i45-i51.
44. Karlberg, M. 1997 Testing transitivity in graphs. *Soc. Networks* 19, 325-343. Keeling, M. J. 1997 Modelling the persistence of measles. *Trends Microbiol.* 5, 513-518.
45. Keeling, M. J. 1999 The effects of local spatial structure on epidemiological invasions. *Proc. R. Soc. B* 266, 859-867. (doi:10.1098/rspb.1999.0716.)
46. Keeling, M. J. 2005 Implications of network structure for epidemic dynamics. *Theor. Popul. Biol.* 67, 1-8.
47. Keeling, M. J., Rohani, P. & Grenfell, B. T. 2001 Seasonally forced disease dynamics explored as switching between attractors. *Physica D* 148, 317-335.

48. Kermack, W. O. & McKendrick, A. G. 1927 A contribution to the mathematical theory of epidemics. Proc. R. Soc. A 115, 700-721.
49. Klondahl, A. S. 1985 Social networks and the spread of infectious diseases: the AIDS example. Soc. Sci. Med. 21, 1203-1216.
50. Klondahl, A. S. 2001 Networks and pathogens. Sex. Transm. Dis. 28, 25-28.
51. Klondahl, A. S., Dhofier, Z., Oddy, G., O'Hara, J., Stoutjesdijk, S. & Whish, A. 1977 Social networks in an urban area: first Canberra study Aust. N. Z. J. Sociol. 13, 169-172.
52. Kretzschmar, M., van Duynhoven, Y. T. H. P. & Severijnen, A. J. 1996 Modeling prevention strategies for gonorrhea and chlamydia using stochastic network simulations. Am. J. Epidem. 144, 306-317.
53. Kuperman, M. & Abramson, G. 2001 Small world effects in an epidemiological model. Phys. Rev. Lett. 86, 2909-2912.
54. Leinhardt, S. (ed.) 1977 Social networks: a developing paradigm. New York: 2002 Thomas Parran Award Lecture. Sex. Transm. Dis. 30, 478-482.
55. Rothenberg, R. B., Potterat, J. J., Woodhouse, D. E., Muth, S. Q., Darrow, W. W. & Klondahl, A. S. 1998 Social network dynamics and HIV transmission. AIDS 12, 1529-1536.
56. Rozenfeld, A. F., Cohen, R., ben-Avraham, D. & Havlin, S. 2002 Scale-free networks on lattices. Phys. Rev. Lett. 89, 218701.
57. Syah Rahmad, M K M Nasution, Ismail Husein, Marischa Elveny, "Optimization Tree Based Inference to Customer Behaviors in Dynamic Control System", International Journal of Advanced Science and Technology, pp. 1102 – 1109, 2020.
58. Husein Ismail, Rahmad Syah, "Model of Increasing Experiences Mathematics Learning with Group Method Project", International Journal of Advanced Science and Technology, pp. 1133-1138, 2020.
59. Syah Rahmad, Mahyuddin K.M Nasution, Ismail Husein, "Dynamic Control Financial Supervision (OJK) for Growth Customer Behavior using KYC System", International Journal of Advanced Science and Technology, pp. 1110 – 1119, 2020.
60. Schwartz, I. B. 1985 Multiple recurrent outbreaks and predictability in seasonally forced nonlinear epidemic models. J. Math. Biol. 18, 233-253.
61. Scott, J. 1991 Social network analysis: a handbook. London: SAGE Publications. Snijders, T. A. B. 2001 The statistical evaluation of social network dynamics. Sociol. Methodol. 31, 361-395.
62. Szendrofi, B. & Csanyi, G. 2004 Polynomial epidemics and clustering in contact networks. Proc. R. Soc. B 271, S364-S366. (doi:10.1098/rsbl.2004.0188.) Travers, J. & Milgram, S. 1969 An experimental study of the small world problem. Sociometry 32, 425-443.
63. Wallinga, J., Edmunds, W. J. & Kretzschmar, M. 1999 Perspective: human contact patterns and the spread of airborne infectious diseases. Trends Microbiol. 7, 372-377.
64. Warren, C. P., Sander, L. M. & Sokolov, I. M. 2002 Geography in a scale-free network model. Phys. Rev. E 66, 056105.
65. Wasserman, S. & Faust, K. 1994 Social network analysis. Cambridge: Cambridge University Press.
66. Watts, D. J. 1999 Small worlds: the dynamics of networks between order and randomness. Princeton: Princeton University

Model of Spread of Infectious Diseases

Hamidah Nasution, Herlina Jusuf, Evi Ramadhani, Ismail Husein.


ABSTRACT


Abstract

The Model of infectious diseases continues to develop along with the development of the disease. With the dynamic spread of disease, ongoing research is needed. This study developed the SIR model by taking into account the spread of disease in the presence of Reproductive Number or R_0 . This study proposes an epidemic model of infectious diseases in dynamic networks for SIRS types, the standard mean-field model is used as a basic framework.


Key words: Model of Spread, Infectious Disease, Modeling

ARTICLE TOOLS

 [Abstract \(?mno=117672\)](#)

 [PDF Fulltext \(index.php?fulltxt=117672&fulltxtj=196&fulltxtp=196-1592827663.pdf\)](#)

 [How to cite this article](#)

 [Citation Tools](#)

Related Records

Articles by Hamidah Nasution ([http://www.bibliomed.org/?term=Hamidah Nasution&sarea=author&b1=Search+ScopeMed](http://www.bibliomed.org/?term=Hamidah+Nasution&sarea=author&b1=Search+ScopeMed))

Articles by Herlina Jusuf ([http://www.bibliomed.org/?term=Herlina Jusuf&sarea=author&b1=Search+ScopeMed](http://www.bibliomed.org/?term=Herlina+Jusuf&sarea=author&b1=Search+ScopeMed))

Articles by Evi Ramadhani ([http://www.bibliomed.org/?term=Evi Ramadhani&sarea=author&b1=Search+ScopeMed](http://www.bibliomed.org/?term=Evi+Ramadhani&sarea=author&b1=Search+ScopeMed))

Articles by Ismail Husein ([http://www.bibliomed.org/?term=Ismail Husein&sarea=author&b1=Search+ScopeMed](http://www.bibliomed.org/?term=Ismail+Husein&sarea=author&b1=Search+ScopeMed))

 [on Google \(<http://www.google.com/search?hl=en&q=related:http://www.bibliomed.org/?mno=117672>\)](http://www.google.com/search?hl=en&q=related:http://www.bibliomed.org/?mno=117672)

 [on Google Scholar \(\[http://scholar.google.com/scholar?q=related:Model of Spread of Infectious Diseases\]\(http://scholar.google.com/scholar?q=related:Model+of+Spread+of+Infectious+Diseases\)\)](http://scholar.google.com/scholar?q=related:Model+of+Spread+of+Infectious+Diseases)



(<https://plu.mx/plum/a/?>

[doi=10.5530/srp.2020.2.99](https://plu.mx/plum/a/?doi=10.5530/srp.2020.2.99))

How to Cite this Article

Pubmed Style

Hamidah Nasution, Herlina Jusuf, Evi Ramadhani, Ismail Husein. Model of Spread of Infectious Diseases. SRP. 2020; 11(2): 685-689. doi:10.5530/srp.2020.2.99 (<http://dx.doi.org/10.5530/srp.2020.2.99>)

Web Style

Hamidah Nasution, Herlina Jusuf, Evi Ramadhani, Ismail Husein. Model of Spread of Infectious Diseases. <http://www.sysrevpharm.org/?mno=117672> [Access: June 22, 2020]. doi:10.5530/srp.2020.2.99 (<http://dx.doi.org/10.5530/srp.2020.2.99>)

AMA (American Medical Association) Style

Hamidah Nasution, Herlina Jusuf, Evi Ramadhani, Ismail Husein. Model of Spread of Infectious Diseases. *SRP*. 2020; 11(2): 685-689. doi:10.5530/srp.2020.2.99 (<http://dx.doi.org/10.5530/srp.2020.2.99>)

Vancouver/ICMJE Style

Hamidah Nasution, Herlina Jusuf, Evi Ramadhani, Ismail Husein. Model of Spread of Infectious Diseases. *SRP*. (2020), [cited June 22, 2020]; 11(2): 685-689. doi:10.5530/srp.2020.2.99 (<http://dx.doi.org/10.5530/srp.2020.2.99>)

Harvard Style

Hamidah Nasution, Herlina Jusuf, Evi Ramadhani, Ismail Husein (2020) Model of Spread of Infectious Diseases. *SRP*, 11 (2), 685-689. doi:10.5530/srp.2020.2.99 (<http://dx.doi.org/10.5530/srp.2020.2.99>)

Turabian Style

Hamidah Nasution, Herlina Jusuf, Evi Ramadhani, Ismail Husein. 2020. Model of Spread of Infectious Diseases. *Systematic Reviews in Pharmacy*, 11 (2), 685-689. doi:10.5530/srp.2020.2.99 (<http://dx.doi.org/10.5530/srp.2020.2.99>)

Chicago Style

Hamidah Nasution, Herlina Jusuf, Evi Ramadhani, Ismail Husein. "Model of Spread of Infectious Diseases." *Systematic Reviews in Pharmacy* 11 (2020), 685-689. doi:10.5530/srp.2020.2.99 (<http://dx.doi.org/10.5530/srp.2020.2.99>)

MLA (The Modern Language Association) Style

Hamidah Nasution, Herlina Jusuf, Evi Ramadhani, Ismail Husein. "Model of Spread of Infectious Diseases." *Systematic Reviews in Pharmacy* 11.2 (2020), 685-689. Print. doi:10.5530/srp.2020.2.99 (<http://dx.doi.org/10.5530/srp.2020.2.99>)

APA (American Psychological Association) Style

Hamidah Nasution, Herlina Jusuf, Evi Ramadhani, Ismail Husein (2020) Model of Spread of Infectious Diseases. *Systematic Reviews in Pharmacy*, 11 (2), 685-689. doi:10.5530/srp.2020.2.99 (<http://dx.doi.org/10.5530/srp.2020.2.99>)
