

Follow-Up Evaluation on Oral Antidiabetic Drug Use: A Study of Effectiveness, Safety and Patient Adherence in Surabaya Primary Health Care

Lisa Aditama^{1*}, Umi Athiyah², Wahyu Utami³, Abdul Rahem³

Faculty of Pharmacy University of Airlangga Surabaya

Received: 9th Nov, 18; Revised: 28th Nov, 18, Accepted: 3rd Dec, 18; Available Online: 25th Dec, 2018

ABSTRACT

Medication non-adherence is one of the biggest causes of leftover medicines. Up to 50% of patients worldwide do not take their prescribed medicines as recommended. Optimising the use of medication is beneficial to improving clinical outcomes for patients with chronic disease. Purpose: The aim of this study was to determine the effectiveness and safety of drug therapy, evaluate patient adherence, and identify of the patient's non-adherence behavior for oral antidiabetic drugs (OADs). Methods: This study using non-experimental design, with mixed-methods (explanatory sequential design). A total of 32 patients with type 2 diabetes mellitus in referral program of national health care security system (BPJS Kesehatan) were included in this study from Primary Health Care in the north region of Surabaya. There are 6 domains of adherence behavior developed in this study. Results: The effectiveness of drug therapy in this study was 56,25%. About 68,75% of patients experienced to hypoglycemia and 6,25% had gastrointestinal problems caused by drug therapy. The adherence assessment found that 43,75% patients non adherence to medication. Leftover medicines found in the patient's home comes from multiple visits to health care facilities (53,12%) and patient non-adherence (37,5%). Conclusion: Follow-up evaluation as the continuous process in medication management services, led pharmacist in the strategic position to evaluates the patient's response to drug therapies in terms of effectiveness, safety, adherence and also avoiding unnecessary leftover medicines.

Keywords: follow-up evaluation, oral antidiabetic drugs, primary health care.

INTRODUCTION

Diabetes prevalence in Indonesia was increased rapidly, multi-risk factor, prolonged progression, and if not managed properly, consequently becoming incurable and developing complications¹. The Indonesian Endocrinology Association states that currently Indonesia has entered an epidemic of type 2 Diabetes Mellitus (DM). There are about 50% of diabetics were undiagnosed and only two-thirds of those diagnosed underwent pharmacological or non-pharmacological treatment and only one-third were properly controlled². DM is the first target of four Non-communicable Diseases (NCDs) to be managed and prevented. The incidence and impact of DM including other NCDs can be prevented or reduced by approaches that include evidence-based interventions, affordable and cost-effective³. DM management is very important to emphasize optimal blood sugar levels through adherence behavior to medication. Preventing or resolve drug related problems may improve the achievement of clinical outcomes. Research conducted by Wertheimer and Santella in Cipolle et al. (2014) found that 60% of patients were unable to identify or recognize their own drug, 30-50% of patients ignored instructions for using the medication, 12-20% of patients used other people's drugs, and treatment rates in hospitals increases every year with

causes of non-adherence⁴. Patients with chronic diseases tend to consume more than 2 types of drugs, that will affect the level of adherence. Patients with complex drug therapy had low level of adherence, factors that could influence are the frequency of drug administration, the identity or brand name and number of drugs taken in a day⁵. Good adherence was important to determine the health outcomes of patients with chronic diseases. In Japan, all residents are protected by public health insurance and make payments at relatively low prices. Most patients with chronic diseases consult with their doctors regularly, and prescription drugs depend on the consultation schedule so that if treatment compliance was high enough, patients with chronic diseases should not have residual medication. However, from the results of non-compliance tests, it was found that leftover drugs, stored at home by patients, did not only occur in Japan but also in other countries⁶. The causes of drug leftover vary from inefficient prescription to drug stockpiles due to patient recovery and non-compliance⁷. Some factors that can impaired patient compliance are patients do not understand the instructions, cognitive factors, large medical costs, patients tend to have a poor understanding of the goals of therapy and patient beliefs⁴. A patient-centered communication style that uses person-

Table 1: The Domain of Adherence Behavior and Definitions.

No.	Domain (Item of Questionnaire)	Definition
1.	The patient does not understand the instructions (Q. 1-4)	Patients do not understand how to consume or use their medications appropriately
2.	The patient cannot afford the product (Q. 5-8)	The inability of the patient to buy prescription drugs because the price of the drug product is too expensive
3.	The patient prefers not to take the medication (Q. 9-13)	Patients understand the instructions to take medicine but prefer not to use drug therapy as intended
4.	The patient forgets to take the medication (Q. 14-17)	The patient does not remember to take sufficient doses of the drug
5.	The drug product is not available for the patient (Q. 18-20)	Drug products are not available to patients, because of insufficient supplies
6.	The patient cannot swallow or self-administer the drug product appropriately (Q. 21)	The patient cannot swallow or administer drug therapy as intended

Table 2: Patient's Demographic Data.

Demographic	Characteristic	∑Subject s (n)	Proportio n (%)
Gender	Female	22	68,75 %
	Male	10	31,25 %
Age	20 – 29 years	0	0%
	30 – 49 years	2	6,25 %
	50 – 69 years	18	56,25 %
	70 – 79 years	12	37,5 %
	>80 years	0	0%
Level of Education	Primary School	12	37,50
	Junior High School	15	46,88
	Senior High School	5	15,62
Occupation	Employee	4	12,5%
	Unemployment	28	87,5%
Period of Diabetes	1-5 years	6	18,75%
	6-10 years	14	43,75%
	>10 years	12	37,5%

Table 3: Characteristic of Patient's Diabetes Treatment.

Type of Therapy	∑Subjects (n)	Proportion (%)
Mono therapy	7	21,87
Dual therapy	22	68,75
Triple therapy	3	9,38

Table 4: The Effectiveness Profile of OAD.

Effectiveness	∑Subjects (n)	%
Blood glucose in the range	18	56.25
Blood glucose outside the range	14	43.75

centered and strength-based language, active listening, elicits patient preferences and beliefs, and assesses literacy, numeracy, and potential barriers to care should be used to optimize patient health outcomes and health-related quality of life⁸. The pharmacist role in

pharmaceutical care is to take a patient-oriented approach aimed to optimizing the patient's health outcomes and treatment. The most important thing that must be done is to establish the relationship between the patient and their pharmacist so that effective communication is established with the patient, family and nurse throughout the process. Pharmacists must be able to continue to collaborate, document, and communicate with doctors, other pharmacists, and other health care in the provision of safe, effective and coordinated care⁹. Medicines optimisation is an integral part of the health care system. Preventing medicines treat or manage many illnesses or conditions are the most common intervention in health services. Optimising the use of medicines is crucial to improving clinical outcomes for patients and providing financial benefits. It is becoming increasingly important to maximize the use of medicines. One vital area that needs extensive improvement is ensuring patients obtain optimal benefit from their prescribed medicines. This can be done by improving adherence and avoiding unnecessary wastage of medicines¹⁰. Pharmacists have unique training and expertise in the appropriate use of medications and provide a wide array of patient care services in many different practice settings. The pharmacist monitors and evaluates the effectiveness of the care plan and modifies the plan in collaboration with other health care professionals and the patient or caregiver as needed⁹. The evaluation step is where clinical experience and new knowledge are gained. In fact, most learning occurs during follow-up evaluations⁴.

The follow-up evaluation is the step in the process when the practitioner sees which medications and doses were most effective or caused the most harm. In a well conducted follow-up evaluation, the practitioner evaluates the patient's response to drug therapies in terms of effectiveness, safety, and adherence and also determines if any new problems have developed. The outcomes of drug therapies, drug therapy decisions, drug information, referrals, and other interventions are unknown until the practitioner conducts a follow-up evaluation with the patient⁴.

Novelty of the work

Developing a follow-up evaluation as the initiation of medication therapy management of chronic illness in

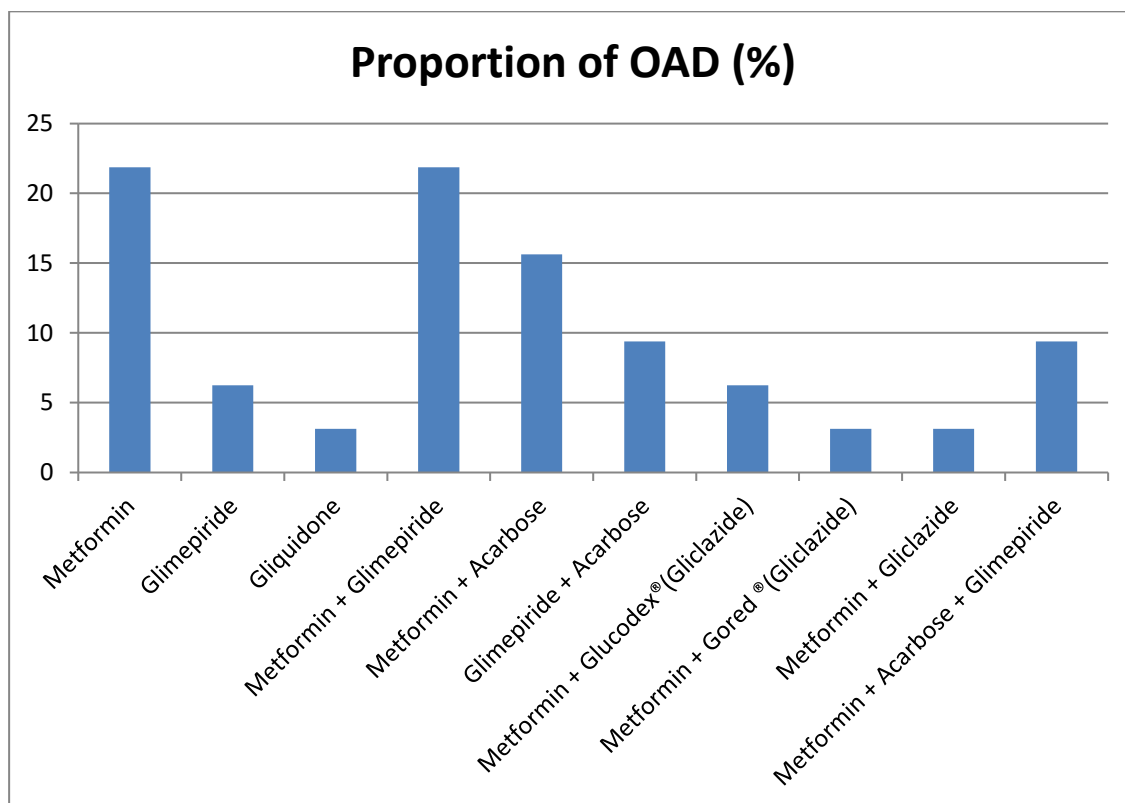


Figure 1: Profile of Oral Anti Diabetic Medication Used.

Table 5: The Safety Profile of OAD.

Adverse Drug Reactions	∑Subjects (n)	%
Hypoglycemia	22	68.75
GI problems	2	6.25
None	8	25

Table 6: Patient’s Adherence Characteristics All Domain.

Adherence Characteristics	∑Subjects (n)	Proportion (%)
Adherence	18	56.25%
Non Adherence	14	43.75%

primary health care facilities to assess the effectiveness, safety and patient adherence of oral antidiabetes drugs. The quantitative adherence assessment was developed in this study.

METHODS

This study was designed using non-experimental design, with mixed methods (explanatory sequential design). The specific activities performed at a follow-up evaluation are described as follows:

Observe the positive results the patient has experienced from drug therapies (*effectiveness*). Effectiveness is evaluated using secondary data of glucose rapid test results owned by the patient or by asking the person directly
 Observe any undesirable effects the patient has experienced that were caused by a drug therapy (*safety*). Safety data evaluated using interview of unintended pharmacological effects (side effects) of the patient's drug therapy.

Determine the actual dosage of medication the patient is taking that is producing the results observed (*adherence*). Data collection developed as questionnaires to identify patient adherence behavior and follow up with interview. Adherence is defined as the patient’s ability and willingness to carry out a therapeutic regimen that have been clinically assessed by practitioners that all drug therapy is appropriate, effective enough, and can produce the desired outcomes without any harmful effects based on all available evidence Adherence behavior domain adopted from the Pharmaceutical Care Practice: The Patient Centered Approach to Medication Management Services reference⁷. Following are the adherence behavior domain which to be the research variables and the definitions of each variable (Table 1).

There are 21 item questions of adherence behavior with yes or no answer. The scoring of adherence behavior is calculated by dividing total score with total item of questions answer. Score 1 for “yes” and 0 for “no”. If the mean score is 1 typically classified as adherence and if the mean score is < 1 typically classified as non adherence. The 21 item question of adherence behavior questionnaire can be seen on appendix 1.

The target population in this study were all type 2 diabetes mellitus patients who used Oral Anti Diabetic agents (OAD) in Primary Health Care (Puskesmas) in the east and south district area of Surabaya who met the inclusion and exclusion criteria.

Inclusion Criteria:

Have used OAD for at least 3 months

Patients referred back to primary health care (GP) from ambulatory chronic care

Table 7: Characteristic of Leftover Drugs.

Drug Source	∑Subjects (n)	Proportion (%)
Derived from the drug currently in use (the patient is not compliant)		
1. The drug is not used (because concern of drug safety)	12	37,5
2. Change the therapeutic regimen		
Prescribing excess (the amount of drug administered exceeds the total amount to use)	1	3.13
Multi doctor / health center (outside BPJS)*	17	53.12
Double drug delivery (health facilities I and II)**	2	6.25
TOTAL	32	100

* Patients get the same medicine (sometimes a different brand) from a doctor outside the BPJS, refill their own medication to the pharmacy because the medicine runs out or buy at the pharmacy when the medicine is not available at the puskesmas.

** Patients get double drugs when referred to secondary health facility and referred back to primary health facility.

Exclusion Criteria:

Unable to read and/or write

Multi medical conditions

The research sample size was determined based on the Slovin formula.

$$n = \frac{N}{1 + Ne^2}$$

Where are:

n = the minimum number of samples

N = total population (patients referred back to Puskesmas on OAD treatment in district area)

e = error tolerance limit

$$n = \frac{80}{1 + 80(0,15)^2}$$

$$n = 28,57 \sim 30$$

Based on the validity test, the developed adherence behavior questionnaire has a calculated r value > r table of each item, and in the reliability test this questionnaire shows reliable results with Cronbach's alpha ≥ 0.959.

RESULTS

A total of 32 patients with type 2 diabetes mellitus in referral program of national health care security system (BPJS Kesehatan), were observed in this study with purposive sampling from Primary Health Care in the north region of Surabaya. Patient's demographic shown in Table 2 and characteristic of patient's diabetes treatment shown in Table 3.

Quantitative Analysis Effectiveness

In this study, the effectiveness of the patient's treatment will be seen using secondary data of glucose rapid test results owned by the patient or by asking the person directly. Blood glucose level target based on Glycemic Targets (Standards of Medical Care in Diabetes 2018): preprandial capillary plasma glucose 80–130 mg/dL, peak postprandial capillary plasma glucose <180 mg/dL.

Safety

Safety data include the evaluation of unintended pharmacological effects (side effects) of the patient's drug therapy. Evaluation of safety data also includes whether laboratory tests/ glucose rapid test results/ symptoms have become dangerously abnormal due to the drug therapy.

Adherence Behavior

Adherence assessment are carried out using adherence behavior questionnaire developed in this study. The following is a description of the results of the adherence assessment (Table 6), characteristic of leftover drugs (Table 7) and proportion of adherence behavior of each domain (Table 8). The most highly non adherence behavior which score <1 is the patient does not understand the instructions, followed with the other non adherence behavior as the patient forgets to take the medication, patient cannot afford the product and prefers not to take the medication.

Qualitative Analysis

After a quantitative survey, patients followed with structured interview at patient's home. Some observations were made to see drugs being used, instructions on labeling and drug monitoring records to see the suitability of all drugs received and used by the patients. The results of interviews using recording devices were then transcribed manually and coded then analyzed into themes to find out the root of patient's nonadherence behavior, as seen on Table 8.

Structured interview results displayed in quotes on the highest non-compliance domain

The domain patient does not understand the instructions.

Patients need help from others to understand the instructions to use the medication and the limitation of vision because of the disease or age. Lack of patient knowledge regarding the purpose of drug therapy encourages patients to use their own rules.

Theme 1: Need help from other people to read the instruction to use

" yeahh... my lack of understanding, often forgetting, afraid of something to forget, afraid of missed understanding " (Subject 6)

" yeahh... the problem is that I can't read as well, sometimes I wrong.. which are used during the day are sometimes used at night, so... if there is my daughter in the house I'll use my medication, and don't if there are no help " (Subject 20)

Theme 2: Using own instruction

"it feels like I'm not sure, because sometimes it feels uncomfortable. Sometimes I feel that if I had taken medicine five times, it feels more painful, more uncomfortable, if it feels like that, then I try to stop ... and after that it feels better, later if I'm sick again I used again" (Subject 20)

Table 8: Patient's Adherence Behavior Each Domain.

No	Adherence Behavior Domain	Adherence (mean score =1)		Non Adherence (mean score <1)	
		∑Subjects (n)	Proportion (%)	∑Subjects (n)	Proportion (%)
1	The patient does not understand the instructions	21	65.6	11	34.38
2	The patient cannot afford the product	27	84.3	5	15.63
3	The patient prefers not to take the medication	27	84.38	5	15.63
4	The patient forgets to take the medication	23	71.88	9	28.13
5	The drug product is not available for the patient	29	90.63	3	9.38
6	The patient cannot swallow or self-administer the drug product appropriately	32	100.00	0	0.00

"Yes, I use the rules myself, because the rules are not written ... so basically I don't know if I take it after eating or before eating, morning or night, so I make my own rules, sometimes taking at night or morning. So the principle is that there are no rules, so all I take is what I like ... ha ... ha ... usually it should have a rule before eating, after " (Subject 17)

"Yes, I was wrong because I did not fulfill the rules ... Well, sometimes it was.. if I feel bad, then I stop first" (Subject 18)

Theme 3: Not timely to take medication

" Yes, yeah, just like that three times, sometimes I miss it once or twice " (Subject 9)

The domain patient forgets to take the medication

In this domain, patients were nonadherence because of intentions for classically reasons.

Theme 1: Unintentional because it has become a habit

" yes sometimes forget Miss he..he.., but I don't double it, still one"(Subject 9)

"if there is a drug taken after a meal, I don't take it immediately ... usually I wait a few minutes, sometimes it is missed so I don't take the drug" (Subject 25)

The domain patient prefers not to take the medication

The patient feels that the drug is causing negative changes so decides not to use it.

Theme 1: Reducing the frequency of taking medication because of worry

"Look ... I was once given this drug (metformin) and aborte (acarbose)... Which is used when eating (acarbose), it causes nausea, so I don't use it. I told the doctor... doc ... every time I took this medicine, I felt sick... so.. I was told to stop it. And if I use this (metformin), I take 3 times, if I take on Saturday and Sunday, I feel on here..(holding the kidney area) it hurts.." (Subject 18)

"Here I am ...not only 1 or 2 times experiencing too high drug dosing .. If the dose is high I only taking half of it, sometimes it becomes cold sweat. I felt the dosage was too much, then I told the doctor, said the doctor ... yes, just

reduced ... the metformin was reduced by 1 tablet if cold sweat appearing" (Subject 9)

Theme 2: Affected by family and other people's opinions

"Yes, my mother said, if most people take the medicine, they can be addicted, they'll resistance to the drugs, so I follow the advice of my mother, don't take too much medicine because then be resistance to the drugs. So if you get sick later... there will be no reaction, so if I feel better so I stopped the medication, don't focus too much on the medicine, better to manage the food consumption ... Now my mother has died so no one has advised me anymore" (Subject 20)

"Yes, I was given gliclazide for just 3 days. For the next, I bought it myself" (Subject 20)

The patient cannot afford the product

Reconciliation is needed when the patient cannot afford the medication because of the drug is not available.

Theme 1: Cannot access the drug product because it is not available at the health center

"I decide to stop the medicine. If I take the medicine from my GP and my specialist .. I think there are any interaction or contraindication. I feel bad like dizzy, shaking, weak.. If I can, I'll take medicine on my GP (PKM), but the drug often doesn't exist, then the doctor look anger, so I ask to a reference" (Subject 20)

DISCUSSION

The majority of patients in this study are female (68,75%) and classified as elderly, not at work at all, the level of education was secondary school, and taking dual therapy OAD (68,75%). The average subject has diabetes more than 5 years (81,25%). If the monotherapy cannot reach the HbA1C target (<7%) within 3 months then the therapy can be increased to dual therapy, consisting of drugs given in the first line plus other drugs that have different working mechanisms¹¹. There are two branded of gliclazide, potentially not as easy to access and impact to patient adherence and finally impaired the therapeutic outcome.

Table 9: Themes of Patient's Nonadherence Behavior.

Domain	The Nonadherence Behavior Themes
The patient does not understand the instructions	Need help from other people to read the instruction to use Using own instruction Not timely to take medication
The patient cannot afford the product	Cannot access the drug product because it is not available at the health center
The patient prefers not to take the medication	Reducing the frequency of taking medication because of worry Affected by family and other people's opinions
The patient forgets to take the medication	1. Unintentional because it has become a habit
The drug product is not available for the patient	The medicine not available so the patient does not use prescription drug Patients have leftover medication due to non adherence
The patient cannot swallow or self-administer the drug product appropriately	-

The effectiveness of the patient's treatment will be evaluate using secondary data of glucose rapid test results owned by the patient or by asking the patient directly. There is only 56,25% of patients in this study on the target level based on Glycemic Targets on ADA 2018¹². Clinical parameters often used to determine the effectiveness of drug therapy. Changes in these parameters was determined by asking the patient at the follow-up evaluation as presenting complaint/ subjective finding, then comparing the patient's response to what observed and documented during the initial follow-up as objective finding⁴.

Several factors can contribute to the effectiveness of drug therapy, there are pharmaceutical and clinical factors. Pharmaceutical factors was the intervention factors given to the patients. Patient knowledge of indications, dosage forms and regiment of drug use may relate to patient perceptions and beliefs when using the drug. The clinical factor was the patient's medication experience. Confirmation of both factors can be measured through assessment of symptoms and results of clinical/ laboratory values⁴. From follow-up interview in this study, found that patient factors contribute for the effectiveness of drug therapy. Patients tend to reduce the regiment therapy that are used even decide to stop it when experiencing symptoms that raise concerns about health and organ disorders. As seen on the domain the patient prefers not to take the medication on the theme reducing the frequency of taking medication because of worry.

Beside of that reason, about 43,75% of patients in this study non-adherence with medication given. The most highly non-adherence behavior is the patient does not understand the instructions, followed with the other non adherence behavior as the patient forgets to take the medication, patient cannot afford the product and prefers not to take the medication. Patient with long term disease such as diabetes with poor control and non-adherence which use high risk medication are classified as patient at-risk and need to comprehensive medication management¹³. Promoting Medication Therapy Management (MTM) for at-risk populations recognized that clinicians in ambulatory care settings face challenges in providing care to patients with low socioeconomic status who have chronic conditions. These patients often face challenges in understanding how to take their medications appropriately and being actively engaged in self-managing their health

conditions. The MTM focused on addressing these challenges by incorporating pharmacists within the primary care team to provide comprehensive medication therapy management to patients^{14,15}.

The domain patient forgets to take the medication, frequently express what they want in terms of concerns about the medication or how it must be taken. Common concerns include risks of taking certain medication, confusion over how to take a medication and lack of support from the patient's relatives to remind them to take. These unintentional nonadherence is a passive process whereby patients fail to adhere to prescribing instructions through forgetfulness, carelessness, or circumstances out of their control (e.g., health literacy)¹⁶. Medication adherence is an important part of improving clinical outcomes for patients with diabetes. Barriers to medication adherence are complex and individualized, reflecting the fact that each patient manages his or her medications in the context of is or her own life¹⁷.

The domain patient cannot afford the product, reconciliation is needed when the patient cannot afford the medication because of the drug is not available. Patient cannot access the drug product because it is not available at the health center and decide to stop the medicine. State reasons why taking the medication or improving their health will help them feel better in the short term, become better able to handle stresses associated with current situations. Help the patient with some objective measures, home monitoring to allow her to see the numbers¹⁸. Pharmacist may the strategic position to collaborate with patients to manage medications, health care professionals must acknowledge patients' unique experiences to be authentically patient-centered medication experience as a part of patients' lifeworlds with chronic conditions and medications¹⁹.

Based on this study, there are found that patients tend to non-adherence which modify the regiment of medications and have considerable reluctance to take medications because of do not have a good understanding of the medicine and impacted to the effectiveness and safety of drug therapy in referral program of national health care security system (BPJS Kesehatan). MTM services have been an integral part of bridging the gap between the old and the new approach to patient care. Interestingly, a recent perspective article discussed factors for why

patients were not receiving optimal care. Patient adherence and health outcomes could be improved by focusing on optimizing and reconciling medications, coordinating care and sharing electronic data, and engaging and supporting patients on an individual level²⁰.

CONCLUSION

This study found that, the effectiveness of the patient's treatment based on secondary data of blood glucose level with rapid test are not the optimum target. While the safety of drug therapy must be take a highly pharmacist responsibility to determine if drug therapies are safe for the patients, and the best way to ensure safety is to determine whether the patient is experiencing any negative effects. Furthermore, the most highly non-adherence behavior are the patient does not understand the instructions, followed with the other non adherence behavior as the patient forgets to take the medication, patient cannot afford the product and prefers not to take the medication. Patients have the ultimate choice in their health and utilization of medication. Discuss with patient to achieve health goals, set follow-up and hold them accountable are valuable.

The follow-up evaluation requires proactive practitioner involvement. It is the best method available to determine patient outcomes, what the patient experiences as a result of specific drug therapies and related drug information, advice, and other interventions. Follow-up evaluations are the critical points at which the effectiveness and safety of the patient's care plan and associated drug therapies are determined and balanced against one another, and where decisions concerning further adjustments in drug therapy are made.

Implementation to Pharmacy Practice

This adherence assessment tool might be use as an follow up instrument of MTM, to determine patient's adherence and re-assess as needed.

CONFLICTS OF INTEREST

The authors declare no conflicts of interest or financial interests in any product or service mentioned in this article, including grants, gifts, or honoraria.

ACKNOWLEDGEMENTS

The author would like to thank The Ministry of Research, Technology & Higher Education of Indonesia for providing grants for the implementation of this research and for The Heads of Surabaya City Health Offices who have given permission to carry out this research.

REFERENCES

1. Republic Indonesia Ministry of Health. Basic Health Research. Jakarta: Indonesian Ministry of Health's. Health Research and Development Agency. 2013.
2. The Indonesian endocrinologist association. Consensus on the Management and Prevention of Type 2 Diabetes Mellitus in Indonesia. Jakarta: PB. PERKENI. 2015.
3. World Health Organization. Global Report on Diabetes. WHO Library Cataloguing-in-Publication Data. 2016.
4. Cipolle RJ, Strand LM, Morley PC. *Pharmaceutical Care Practice: The Patient Centered Approach to Medication Management*, 3rd ed. New York: McGraw-Hill. 2012.
5. Hugtenburg et al. Definitions, variants, and causes of nonadherence with medication: a challenge for tailored interventions. *Patient Preference and Adherence Journal* 2013;7 675–682. 2013.
6. Koyanagi K, Kubota T, Kobayashi D. *Prescription Factors Associated with Medication Non-Adherence in Japan Assesed from Letover Drugs in the SETSUYAKU-BAG Campaign : Focus on Oral Antidiabetic Drugs*, Volume 7, p 2. 2016.
7. Hazel B., Robson R. *Pharmaceutical waste reduction in the NHS*. Commissioned by NHS England. 2015.
8. American Diabetes Association. *Comprehensive Medical Evaluation and Assessment of Comorbidities: Standards of Medical Care in Diabetes*. *Diabetes Care* 2018; 41 (Suppl. 1):S28–S37 | <https://doi.org/10.2337/dc18-S003>
9. The Joint Commission of Pharmacy Practitioners. *Pharmacists' Patient Care Process*. 2014.
10. PresQIPP. *Medicines adherence and waste*. Community Interest Company. 2016. <https://www.presqipp.info/info/maw>
11. American Diabetes Association. *Pharmacologic Approaches to Glycemic Treatment: Standards of Medical Care in Diabetes*. *Diabetes Care* 2018; 41(Suppl.1):S73–S85 | <https://doi.org/10.2337/dc18-S008>
12. American Diabetes Association. *Glycemic Targets: Standards of Medical Care in Diabetes*. *Diabetes Care* 2018; 41(Suppl. 1):S55–S64 | <https://doi.org/10.2337/dc18-S006>.
13. Butler A, Dehner M, Gates RJ, et.al. *Comprehensive Medication Management Programs : Description, Impacts and Status in Southern California*. 2017.
14. The AHRQ Implementation of a Medication Therapy Management Intervention in Ambulatory Care Settings: Experiences and Lessons Learned From the MyRx PilotHealth Care Innovations Exchange. *Medication Therapy Management Learning Community*. 2016.
15. A joint initiative of the American Pharmacists Association and the National Association of Chain Drug Stores Foundation. *Medication Therapy Management in Pharmacy Practice: Core Elements of an MTM Service Model Version 2.0*. 2008.
16. Gadkari A.S., McHorney C.A. *Unintentional non-adherence to chronic prescription medications: How unintentional is it really?. USA: BioMedCentral*. 2012.
17. Brundisini et al. *Patient Experiences of Medication Adherence: A Systematic Review and Qualitative Meta-Synthesis*. CHEPA Working Paper Series. 2014.
18. Shoemaker SJ, et al. (2011). *The medication experience: Preliminary evidence of its value for patient education and counseling on chronic medications*. *Patient Education and Counseling* 83 (2011) 443–450

19. Shoemaker SJ, Ramalho de Oliveira D. The meaning of medications for patients: the medication experience. *Pharm World Sci* 2008;30:86–91.
20. Maracle HL, Oliveira DR, Brummel A. Primary Care Providers' experiences with Pharmaceutical Care-based Medication Therapy Management Services. *Inov Pharm.* 2012; 3 (1): Article 72. <http://pubs.lib.umn.edu/innovations/vol3/iss1/9>



International Journal of Pharmaceutical Quality Assurance

ISSN: 0975 9506
Peer Review
Journal

doi prefix:
10.25258/ijpqa

[ARCHIVES](#) ▾

[HOME](#)

[EDITORIAL BOARD](#)

[CONTACT/JOIN](#) ▾

[INSTRUCTIONS](#)

[SUBMIT MANUSCRIPT](#)

International Journal of Pharmaceutical Quality Assurance

ISSN: 0975 9506
Peer Review Journal

doi prefix: 10.25258/ijpqa

[ARCHIVES ▾](#)[HOME](#)[EDITORIAL BOARD](#)[CONTACT/JOIN ▾](#)[INSTRUCTIONS](#)[SUBMIT MANUSCRIPT](#)

Editor in Chief

Dr. Jitender Bariwal

Department of Pharmaceutical Sciences
College of Pharmacy
University of Nebraska Medical Center
985965 Nebraska Medical Center
Omaha, NE

*Past: Principal & Professor, Shiva Institute of B. Pharmacy,
Chandpur, Bilaspur, Himachal Pradesh-174004, India*

*Past: Department of Chemistry, Katholieke Universiteit,
Celestijnenlaan, Leuven, BELGIUM*

Scopus ID: [Visit scopus ID link](#)

Google Scholar Profile: [Visit google scholar ID](#)

Board Members

Dr. Jawed Akhtar

School of Pharmaceutical Sciences,
Jaipur National University, Jaipur, Rajasthan, India

Prof. Dr. Ayad Alkaim, MACS

Dr. Physical Chemistry (Applications of Nano-Materials, Antibacterial treatment, biological synthesis of nanomaterials)
Babylon University/ Chemistry Department

Dr. Ajay K. Gaur

Lachoo Memorial College of Pharmacy,
Jodhpur, Rajasthan, INDIA

Dr. Vijay K Sharma

Team Member, Cipla Pharmaceuticals,
Mumbai, INDIA

Dr Rakesh Yadav

Department of Pharmacy, Banasthali University
Banasthali, Rajasthan 304022, India

Dr. Lakshmi T

No.162 Saveetha Dental College & Hospitals ,Chennai
P.H Road ,Velappanchavady Chennai, India

Dr.Malladi Srinivasreddy

Vaageswari College of Pharmacy, Karimnagar,
TS (505481)-India.

Dr. Jineet kumar Gawad

St. John Institute of Pharmacy & Research, Manor Road
Palghar (East), Maharashtra Palghar, India

Dr. Yasir Mehmood

University of Central Punjab
lahore, punjab 54000, Pakistan

Dr. Vaseeha Banu T.S

M.M.U.College of Pharmacy, Ramadevara Betta Road
K.K.Doddi Ramnagara-562159, India

Dr.Shanmugam Ramaswamy

Department Of Pharmaceutical Analysis, Sree Vidyanikethan College of Pharmacy
Sai nagar, Rangapet Tirupati, India

Dr. Kalpana Nagpal

Assistant Professor
Amity University, Noida, India

Dr. Ashish Suttee

Assistant Professor
Lovely Professional University, Phagwara, India

Impact Factor: 1.041



UGC approved Journal



This journal is present in UGC approved List of Journals for the purpose of Career Advancement Scheme (CAS) and Direct Recruitment of Teachers and other academic staff as required under the UGC (Minimum Qualifications for Appointment of Teachers and other Academic Staff in Universities and Colleges)

Other Journals published by International Society for Science and Nature



WWW.IJDDT.COM

International Journal of Drug Delivery Technology



WWW.IJPCR.COM

International Journal of Pharmaceutical and Clinical Research



WWW.IJPPR.COM

International Journal of Pharmacognosy and Phytochemical Research



WWW.IJCPR.COM

International Journal of Current Pharmaceutical Review and Research



WWW.IJTPR.COM

International Journal of Toxicological and Pharmacological Research

The publication is licensed under Creative Commons License  View Legal Published by Dr. Yashwant Research Labs Pvt. Ltd. on behalf of [International Society for Science and Nature](https://www.issn.org/)

International Journal of Pharmaceutical Quality Assurance

ISSN: 0975 9506
Peer Review Journal

doi prefix: 10.25258/ijpqa

[ARCHIVES ▾](#)[HOME](#)[EDITORIAL BOARD](#)[CONTACT/JOIN ▾](#)[INSTRUCTIONS](#)[SUBMIT MANUSCRIPT](#)

 Volume 9, Issue 4, October 2018 – December 2018

1. Method Development and Validation for the Simultaneous Analysis of Duloxetine HCL and Methylcobalamine by RP-HPLC

Gouthami Thumma, Narender Boggula, Vasudha B, Anand Kumar Chettupalli

Abstract

2. Development and Validation of UV Spectroscopic Method for Simultaneous Estimation of Pantoprazole and Cinitapride in Bulk and in Capsule Dosage Form

Gaur A, Yashwant

Abstract

3. Evaluation of Auto-antibodies Levels in Miscarriages Women with Phospholipid Syndrome

Raad Ajam Sayal, Ahmed Abbas Hasan, Humam Kasem Hussein³, Murtadha M Jawad Kadhim

Abstract

4. Liver, Kidney Function Tests and Oxidative Damage During and after Treatment of *Salmonella typhimurium* Infection in Experimental Local Rabbits

Ayman Barzan Abdulgafor, Maher Saber Owain, Mustafa Salah Hasan, Mohammed Ali Hussein, Qusay Mohammed Aboud, Anmar J Al-Zobaie

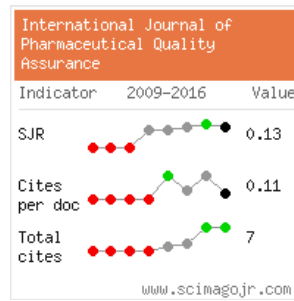
Abstract

5. Follow-Up Evaluation on Oral Antidiabetic Drug Use: A Study of Effectiveness, Safety and Patient Adherence in Surabaya Primary Health Care

Lisa Aditama, Umi Athiyah, Wahyu Utami, Abdul Rahem

Abstract

6. Assessment of Nurses' Knowledge about Nosocomial Infection at Burns Units in the Middle Euphrates Teaching Hospitals*Sadiq Salam H AL-Salih, Fakhria Jaber Muhbes, Nada Khazaal K Hindi***Abstract****7. Premalignant and Malignant Changes in Symptomatic Endometrial Polyps in Women Aged 20-70 years***Susan Abed Zaidan, Alaa Abdulqader Abdulrazaq, Eaman Marouf Muhammed.***Abstract****8. Effects of X-Ray Exposure on Some CMI Regulatory Cytokines in Technicians Serum Samples***Weam S Al-Hamadany***Abstract****9. The Effect of Seasonal Variation on Thyroid Hormones in Iraqi Patients***Seeham Ali Qasim, Abeer Salih Ali, Alia Essam Alubadi, Hadeel Radawi Hussein Al-Newani***Abstract****11. Age of Menarche in Females of Al-Ramadi City/Iraq***Rafal Mustafa Murshid***Abstract****12. Incidence of multiple myeloma in Iraqi people***Farhan A Risan***Abstract****13. Sidrophore Production and Phosphate Solubilization by *Bacillus cereus* and *Pseudomonas fluorescens* Isolated from Iraqi Soils and Soil Characterization***Zaid Raad Abbas, Aqeel Mohammed Majeed Al-Ezee, Sawsan H***Abstract****14. Study the Level of Certain Biochemical Parameters in Iraqi Patients with Thyroid Disorder***Shatha H Jwaid, Ahmed G Sabbar, Amani M Touma***Abstract****15. Knowledge and Attitudes About the Human Papilloma Virus and Cervical Cancer Among A Sample of Paramedical Students in Baghdad Teaching Hospital***Atta Ah Mousa Al-Sarray***Abstract**



UGC approved Journal



This journal is present in UGC approved List of Journals for the purpose of Career Advancement Scheme (CAS) and Direct Recruitment of Teachers and other academic staff as required under the UGC (Minimum Qualifications for Appointment of Teachers and other Academic Staff in Universities and Colleges)

Other Journals published by International Society for Science and Nature



WWW.IJDDT.COM

International Journal of Drug Delivery Technology



WWW.IJPCR.COM

International Journal of Pharmaceutical and Clinical Research



WWW.IJPPR.COM

International Journal of Pharmacognosy and Phytochemical Research



WWW.IJCPR.COM

International Journal of Current Pharmaceutical Review and Research



WWW.IJTPR.COM

International Journal of Toxicological and Pharmacological Research

The publication is licensed under Creative Commons License  [View Legal](#) Published by [Dr. Yashwant Research Labs Pvt. Ltd.](#) on behalf of [International Society for Science and Nature](#)

also developed by scimago:



SCIMAGO INSTITUTIONS RANKINGS

SJR

Scimago Journal & Country Rank

Enter Journal Title, ISSN or Publisher Name

[Home](#)[Journal Rankings](#)[Country Rankings](#)[Viz Tools](#)[Help](#)[About Us](#)

International Journal of Pharmaceutical Quality Assurance

COUNTRY[India](#)Universities and
research
institutions in India**SUBJECT AREA AND
CATEGORY**[Pharmacology,
Toxicology and
Pharmaceutics](#)
[Pharmacology,
Toxicology and
Pharmaceutics
\(miscellaneous\)](#)**PUBLISHER**[Dr. Yashwant Research
Labs Pvt. Ltd.](#)**H-INDEX****7****PUBLICATION TYPE**[Journals](#)**ISSN**


09759506


COVERAGE

2011, 2013-2021

SCOPE

Information not localized

 Join the conversation about this journal

 Quartiles



FIND SIMILAR JOURNALS 

1
**International Journal of
Research in Pharmaceutical
IND**

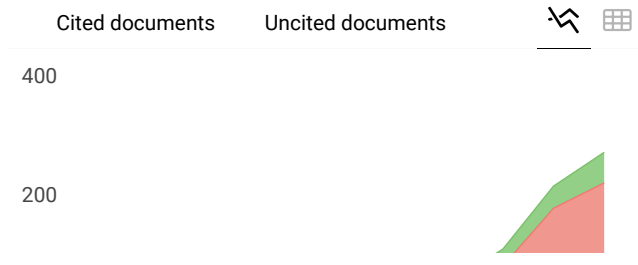
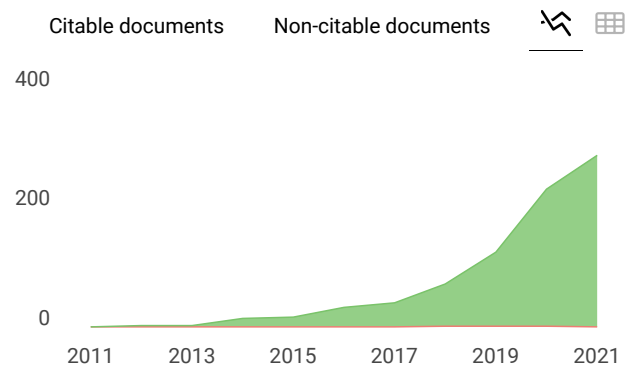
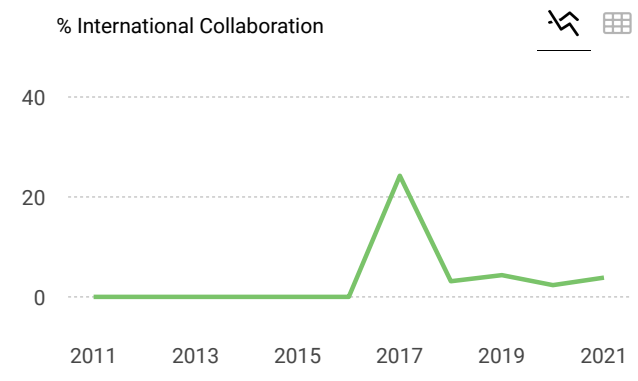
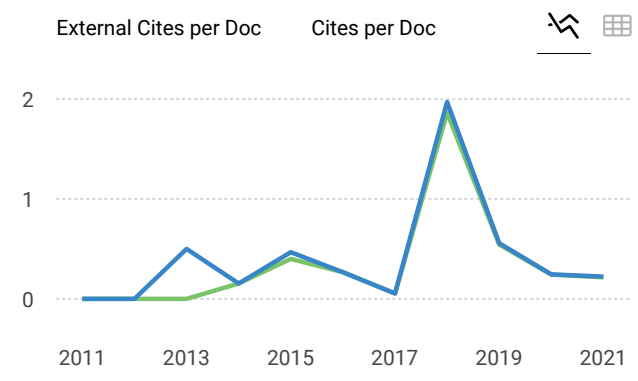
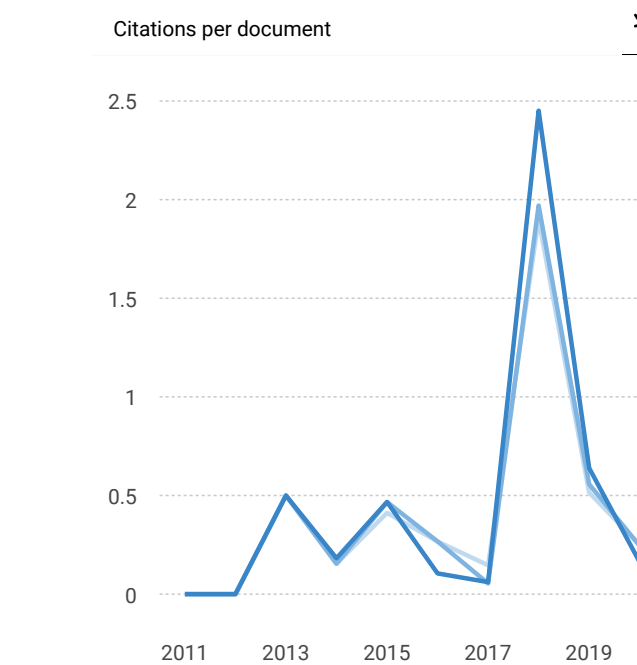
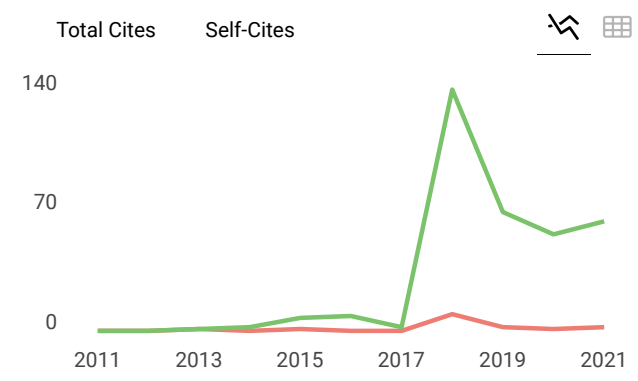
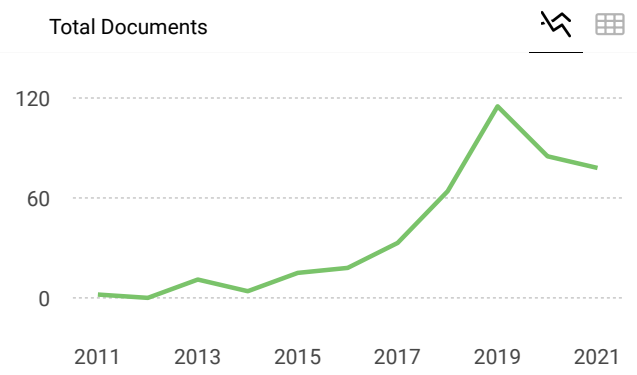
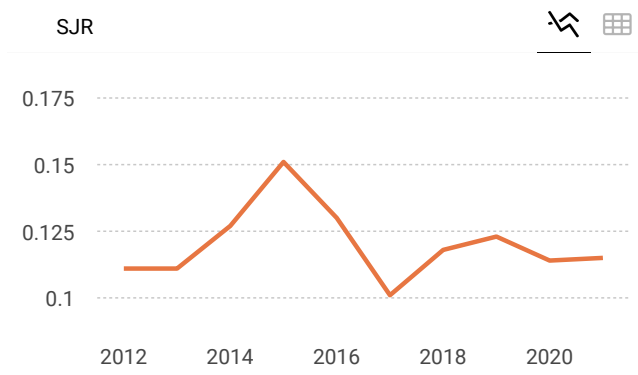
33%
similarity

2
**Journal of Pharmaceutical
Sciences and Research
IND**

32%
similarity

3
**Journal of Global Pharma
Technology
IND**

32%
similarity



International Journal of Pharmaceutical Quality...

Q4 Pharmacology, Toxicology and Pharmaceutics... best quartile

SJR 2021

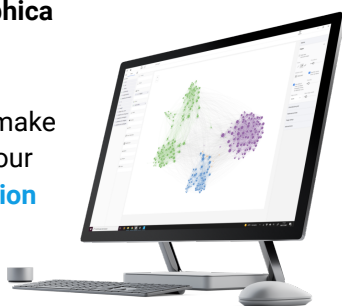
Show this widget in your own website

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

0.12  ← ``
 powered by scimagojr.com

 **SCImago Graphica**

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



charges. Time period of acceptance of a research article



Melanie Ortiz 4 weeks ago

SCImago Team

Dear Sheeja,
 Thank you for contacting us.
 We suggest you visit the journal's homepage or contact the journal's editorial staff , so they could inform you more deeply.
 Best Regards, SCImago Team

A Ali Al-Saffar 2 years ago

Dear Sir/Madam

Are the articles published in this journal covered by SCImago? In SCOPUS web site they already covered.

Regards

Ali

reply



Melanie Ortiz 2 years ago

SCImago Team

Dear Ali,

Thank you for contacting us. SCImago doesn't index particular articles but journals. All

the Scopus data are sent to SCImago in April/May every year.

Best Regards, SCImago

R. kamaraj 2 years ago
Journal is Scopus indexed

Regards
R. kamaraj

reply

D Dr.firas 2 years ago

Dear Sir/madam
I hope this email founds you well
I want this article, please
Abdulgafor, A. B., Owain, M. S., Hasan, M. S., Hussein, M. A., Aboud, Q. M.,



Melanie Ortiz 2 years ago

SCImago Team

Dear Dr. Firas,
thank you for contacting us.
Unfortunately, we cannot help you with your request, we suggest you visit the journal's homepage or contact the journal's editorial staff , so they could inform you more deeply.
Best Regards, SCImago Team



Melanie Ortiz 2 years ago

SCImago Team

Dear Kamaraj,
Thank you very much for your comment.
All the metadata have been provided by Scopus /Elsevier in their last update sent to SCImago, including the Coverage's period data. The SJR for 2019 was released on 11 June 2020. We suggest you consult the Scopus database directly to see the current index status as SJR is a static image of Scopus, which is changing every day.

Best Regards, SCImago Team

E **Elham** 2 years ago

From my experience you must think twice before publishing.. waiting is up to 5 months after payment (March issue released in July)..They don't reply to emails or respond to corrections even if it is only mistakenly typed affiliation name, months of multiple emails with no action..there is no effective post publication services between author/editor..because of misspelled affiliation name, my article is of no credit by my institution (a problem seems to be easily managed if I published with another journal).

reply

W **Wafa Badulla** 2 years ago

Dear Sir

Greetings,,, I would like to publish an original article about the quality control of different dosage forms of Ciprofloxacin in Aden-Yemen. could you please tell me the publication charges because I could not find it at you website.

Best regards

Wafa Badulla

reply

W **Wafa Badulla** 2 years ago

Thank you for reply.

Have a nice day



Melanie Ortiz 2 years ago

SCImago Team

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

B **Basil Saaed** 2 years ago

Dear,
the name of the journal in Scopus list 2020,
yet there is another journal mentioned in Bealls list under the name of International Journal of
Pharmaceutical Quality Assurance and Pharmaceutical Analysis, when clicked it directs us to the
same journal.
So we have a journal mentioned in Scopus and in Bealls list.
Any information or guide about that.
Regards.
Basil Saeed.

reply



Melanie Ortiz 2 years ago

ScImago Team

Dear Basil,
Thank you for contacting us.
SJR is a portal with scientometric indicators of journals indexed in Scopus. All the data
have been provided By Scopus /Elsevier and ScImago doesn't have the authority over this
data. If this journal appears in Bealls List, please contact Scopus Support here:
[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/)

Best Regards, ScImago Team

A **Anto Cordelia** 2 years ago

Hello Scimago team
Is this journal still indexed with scopus.
Thank you

reply

SCImago Team

**Melanie Ortiz** 2 years ago

Dear Anto,

Thank you very much for your comment.

All the metadata have been provided by Scopus /Elsevier in their last update sent to SCImago, including the Coverage's period data. The SJR for 2019 was updated on June 2020, 11th. We suggest you consult the Scopus database directly to see the current index status as SJR is a static image of Scopus, which is changing every day.

Best Regards, SCImago Team

**Rohit Jaiswal** 2 years ago

Is it still indexed with Scopus?

reply

**Melanie Ortiz** 2 years ago

SCImago Team

Dear Rohit, thank you very much for your comment. We suggest you consult the Scopus database directly. Keep in mind that the SJR is a static image (the update is made one time per year) of a database (Scopus) which is changing every day.

Best Regards, SCImago Team

B brijesh 3 years ago

hello

Dear editor,

I would like to contact with International Journal of Quality Assurance [ISSN-09759506]. I Was submit my manuscript before 7 months ago and my manuscript was accept before 2 months. I have made payment within 1 day after acceptance but still no reply from editorial team.

my manuscript title: first derivative spectroscopic method for estimation of telmisartan and metformin in finished dosage form

reply

G Garsen Naidoo 3 years ago

Dear Authors, have you had any success in having your work published after payment? I urgently require some feedback on the status of their manuscripts after "accepted status"

regards

Gasen



Melanie Ortiz 3 years ago

SCImago Team

Dear Sir,

thank you for contacting us.

Sorry to tell you that SCImago Journal & Country Rank is not a journal. SJR is a portal with scientometric indicators of journals indexed in Elsevier/Scopus.

Unfortunately, we cannot help you with your request, we suggest you to contact the journal's editorial staff again, so they could inform you more deeply.

Best Regards, SCImago Team

K **khalid shaalan sahab** 4 years ago

Hello

I would like to ask about the publication of my research in your journal noting that it was accepted for publication several months ago..

Title of my article.

Relation of Homocysteine With Malondialdehyde and Dyslipidemia in Type 2 Diabetic Patients with Coronary Artery diseases.

which accepted for publication vol:9 (no:4-5)

thank you

reply

S **Suhad mohammed** 4 years ago

Hello

I would like to ask about the publication date of my research in your journal noting that it was accepted for publication several months ago..

Title of my article..

Anticancer activity assay of some purification compounds extracted from pleurotus ostreatus.

Thank you

reply

SCImago Team

**Elena Corera** 4 years ago

Please, contact International Journal of Pharmaceutical Quality Assurance, you are contacting Scimago Journal and Country Rank.

Best,
SCImago Team

M Mohammed Kadhim 4 years ago

good greeting

When to publish my research

Preparation and Characterization Teeth Filling of PMMA / n-TiO₂

To Wear Resistance and Netscape

Vol: 9 (No.:5-6)

reply

**Elena Corera** 4 years ago

SCImago Team

Dear Mohammed,

thank you very much for your comment. Unfortunately, we cannot help you with your request, we suggest you contact journal's editorial staff so they could inform you more deeply. You can find contact information in SJR website <https://www.scimagojr.com>

Anyway, if there is any user who has already published in the journal, maybe could help us with your request.

Best Regards,
SCImago Team

M Mohammed Kadhim 4 years ago

Preparation and Characterization Teeth Filling of PMMA/ n-TiO₂

To Wear Resistance and antibacterial

We wish to bring to your kind notice the following

√ We acknowledge the receipt of the above mentioned article.

√ The above mentioned article(s) has been sent to the reviewer of expert comments

√ The above mentioned article(s) (IJPQA A210) have been accepted for publication in the Vol:9 (No.:5-6) to get release in October 2018):(International Journal of Pharmaceutical Quality

Assurance ISSN: 0975-9506).

reply



Elena Corera 4 years ago

SCImago Team

Thank you for your participation!

F **Furqan** 4 years ago

What is the instructions?

reply



Elena Corera 4 years ago

SCImago Team

Dear Furqan, in the link below you will find the information corresponding to the author's instructions of this journal. Best regards, SCImago Team

<https://www.elsevier.com/journals/international-journal-of-pharmaceutics/0378-5173/guide-for-authors>

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 2007-2022. Data Source: Scopus®

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

[Edit Cookie Consent](#)



Source details

International Journal of Pharmaceutical Quality Assurance

Scopus coverage years: 2011, from 2013 to Present

Publisher: Dr. Yashwant Research Labs Pvt. Ltd.

ISSN: 0975-9506

Subject area: [Pharmacology, Toxicology and Pharmaceutics: Pharmacology, Toxicology and Pharmaceutics \(miscellaneous\)](#)

Source type: Journal

CiteScore 2021
0.3

SJR 2021
0.115

SNIP 2021
0.105

- [View all documents >](#)
- [Set document alert](#)
- [Save to source list](#)

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

CiteScore 2021 ▼

$$0.3 = \frac{114 \text{ Citations 2018 - 2021}}{342 \text{ Documents 2018 - 2021}}$$

Calculated on 05 May, 2022

CiteScoreTracker 2022 ⓘ

$$0.4 = \frac{121 \text{ Citations to date}}{322 \text{ Documents to date}}$$

Last updated on 05 September, 2022 • Updated monthly

CiteScore rank 2021 ⓘ

Category	Rank	Percentile
Pharmacology, Toxicology and Pharmaceutics	#21/30	31st
Pharmacology, Toxicology and Pharmaceutics (miscellaneous)		

[View CiteScore methodology >](#) [CiteScore FAQ >](#) [Add CiteScore to your site ↗](#)

About Scopus

[What is Scopus](#)

[Content coverage](#)

[Scopus blog](#)

[Scopus API](#)

[Privacy matters](#)

Language

[日本語版を表示する](#)

[查看简体中文版本](#)

[查看繁體中文版本](#)

[Просмотр версии на русском языке](#)

Customer Service

[Help](#)

[Tutorials](#)

[Contact us](#)

ELSEVIER

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

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

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

