ANALYSIS OF ANALGESIC DRUG PRESCRIPTION IN ONE OF THE PHARMACY IN BANDUNG CITY

Rd. Iyan Arsyad Fitriana
Piksi Ganesha Polytechnic
Bandung, Indonesia

Meiti Rosmiati
Piksi Ganesha Polytechnic
Bandung, Indonesia

Abstract. Analgesics are among the most widely consumed drugs by the public and are readily available not only at licensed pharmaceutical facilities, such as pharmacies, drug stores, clinics, and hospitals, but also in non-pharmaceutical outlets, such as small and large shops and stalls. As pain relievers, analgesics are commonly sought by patients for both self-medication and doctor-prescribed treatments, making the correct selection crucial to achieve the desired therapeutic effect. Inaccurate prescribing patterns of analgesics can lead to side effects, drug interactions, and potentially serious adverse reactions.

This study aims to analyze the patterns of analgesic prescriptions in a pharmacy in Bandung from January 2024 to April 2024, examining the distribution of analgesic groups, drug types, generic versus non-generic categories, analgesic combinations, and any drug interactions. Conducted as a descriptive study with retrospective data collection, the research analyzed 215 analgesic prescriptions using purposive sampling, with findings presented in frequency tables.

The results revealed that 43.37% of prescriptions were for the phenylacetic acid group, with paracetamol prescribed most frequently at 43.37%. Non-generic analgesics accounted for 64.24% of prescriptions, single analgesics for 92.90%, and no drug interactions were observed in any prescriptions. The predominant prescribing pattern identified was for non-generic, single analgesics, primarily diclofenac from the phenylacetic acid group, with no drug interactions noted according to the MIMS 2016 reference.

Keywords: *Analgesics, Pain relievers, Pharmaceutical facilities*

Introduction

The general definition of analgesics is a compound or drug used by patients to treat or relieve pain and pain caused by a stimulation received by the body, whether it is mechanical, chemical or physical, which then causes tissue damage and triggers the release of pain impulses such as brodykinin or prostaglandin. Until then, it is able to activate pain receptors in the peripheral nerves, then it is transmitted to the brain where it is processed and triggers an action in the form of pain that the patient receives. Analgesics work by inhibiting the transmission of pain signals or damage to that tissue, so the brain recognizes that the body is in good condition because the receptors on the peripheral nerves are inactive.

Among the dangerous effects of using drugs that are classified as analgesics is the risk of addiction that the patient suffers when he consumes the drug continuously without having calculated the correct dosage by a doctor. When treating patients who require this type of painkiller medication, addiction and the high risk of overdose must be taken into account. This is because this drug has properties similar to narcotics and works by affecting the human nervous system. The change in the definition of pain is then transmitted by the nervous system as a network that receives and transmits stimuli that are processed by the brain to trigger a response of the pain itself.

The main function of analgesics is to relieve pain. But that's not all, here are some of the functions of analgesics including anti-inflammatory drugs, where anti-inflammatory is the inflammatory effect caused by diseases or viruses and bacteria that infect the patient, apart from relieving pain, other types of analgesics include analgesics that can inhibit or eliminate the effects of inflammation in the body, treat fever as well as viral infections and germs, prevent heart attacks, and treat joint pain and arthritis or inflammation and stiffness of the joints.

Analgesics work by attacking or affecting the nervous system of humans. In line with the main analgesic function, which is to reduce or eliminate pain, pain itself can be interpreted as a symptom of disease or damage to cells or tissues in the body caused by either mechanical or chemical stimulation. When the body is in the phase of pain stimulation, it secretes a substance that can activate pain sensors in the body. This substance is commonly referred to as a pain mediator. The stimulus is then transmitted to the central nervous system, where it is processed by the brain via the 7 spinal cord segments.

The classification of analgesics is divided into two large groups:

1) Narcotic analgesics (central analgesics) Narcotic analgesics act in the CNS and have an excellent analgesic effect. In large doses, it can act as a general sedative (reduction of consciousness) and has a pleasant feeling (euphoria) as a side effect. With the exception of skin sensations, almost all unpleasant feelings can be relieved by narcotic analgesics. You must be careful when using this painkiller because it carries a high risk of drug dependence (addiction) and a tendency to drug abuse. This medicine is only approved for occasional use in cases of severe pain (severe trauma, bone fractures, heart attack pain, gallstone colic/kidney stones). The classification of analgesics – narcotics is as follows:

• natural alkaloids: morphine, codeine

• semi-synthetic derivatives: heroin

• synthetic derivatives: methadone, fentanyl

• morphine antagonists: nalorphine, naloxone and pentazocine

2) Non-opioid (non-narcotic) analgesics

Also called peripheral analgesics because they do not affect the central nervous system. All peripheral analgesics have antipyretic properties, namely lowering body temperature in fever. Its effectiveness is due to the stimulation of the heat control center in the hypothalamus, which leads to peripheral vasodilation in the skin with increased heat release and profuse sweating. For example, paracetamol, acetosal, etc. And it is also effective as an anti-inflammatory, anti-inflammatory or antiphlogistic agent. Classification Based on the chemical formula, peripheral analgesics are divided into the following categories:

a) Salicylate group. Acetylsalicylic acid is better known as acetosal or aspirin. This drug is indicated for headaches, muscle pain, fever and others. Currently, acetosal is increasingly used due to its antiplatelet properties. For example, small doses of aspirin are used to prevent coronary and cerebral thrombosis. Acetosal is an antipyretic and anti-inflammatory analgesic that is very widely used and is classified as an over-the-counter drug. The problem of side effects, which have a stimulating effect and can even cause irritation of the stomach and gastrointestinal tract, can be reduced by taking the drug after eating or by processing it into an enteric-coated preparation. Since salicylates are hepatotoxic, they are not recommended for people with chronic liver disease.

b) The para-aminophenol group consists of phenacetin and paracetamol (acetaminophen). In recent years, the use of paracetamol, better known as acetaminophen in Indonesia, has increased rapidly. The analgesic effect of this class is similar to that of salicylates, namely the elimination or relief of mild to moderate pain, and it can reduce body temperature in febrile conditions, with a central

mechanism of action. Due to its toxicity to the liver and kidneys, the use of phenacetin is currently prohibited. Side effects of paracetamol and its combination in large doses or long-term use can cause liver damage.

c) Phenylbutazone and its derivatives are currently used as antipyretic analgesics because their anti-inflammatory effects are weak. Side effects of all pyrazolone derivatives can cause agranulocytosis, aplastic anemia and thrombocytopenia. 94 In some countries, the use of dipyrone is very restricted or even banned due to these side effects, but in Indonesia the frequency of dipyrone use is quite high, although there are reports of agranulocytosis. Phenylbutazone is used to treat rheumatoid arthritis.

d) The anthranilate group (mefenamic acid) is used as an analgesic because it is less effective than aspirin in terms of anti-inflammatory effects. Side effects such as irritation symptoms of the gastric mucosa and gastrointestinal disorders are common.

3) NSAIDs (non-steroidal anti-inflammatory analgesics) NSAIDs are painkillers that have an anti-inflammatory effect in addition to an analgesic effect. Therefore, this type of medication is used to treat rheumatism and gout. Examples include ibuprofen, indomethacin, diclofenac, phenylbutazone and piroxicam. Most rheumatic diseases require symptomatic treatment, but single or mixed painkillers can still be used to relieve pain in degenerative joint diseases such as osteoarthritis. However, if the pain and stiffness are caused by an inflammatory rheumatic disease, treatment with NSAIDs should be used.

1. Ibuprofen is a derivative of propionic acid with anti-inflammatory, analgesic and antipyretic properties. The side effects are minimal compared to other NSAIDs, however, the anti-inflammatory effect is also quite weak, so it is not suitable for severe joint inflammations such as acute gout.

2. Diclofenac This phenylacetate derivative is one of the most powerful anti-inflammatory NSAIDs with less severe side effects compared to other drugs such as piroxicam and indomethacin. This drug is widely used for all types of pain, including migraines and gout. Parenterally, it is very effective in treating severe colic pain (bladder and gallbladder).

3. Indomethacin has analgesic and anti-inflammatory properties as strong as acetosal and is often used for acute gout attacks. Side effects include stomach discomfort, hidden (occult) bleeding, dizziness, tremors and others.

4. Phenylbutazone This pyrazolone derivative has anti-inflammatory properties that are stronger than its analgesic effect. For this reason, this group of drugs is used in particular as anti-rheumatic drugs, as is oxyphenylbutazone. Phenylbutazone is sometimes secretly included (not indicated on the label) in preparations from small foreign manufacturers, with the intention of treating states of lethargy and fatigue,

weak muscles and pain. Its abuse in restorative drugs and tonics (with ginseng) is very dangerous due to its damaging effect on blood cells.

5. Piroxicam has strong anti-inflammatory, analgesic and antipyretic effects. Used to combat gout. Side effects include bleeding in the stomach and intestines.

Therefore, analgesic users need to be more closely monitored (Pratiwi, 2016). Incorrect analgesic prescription patterns also often lead to side effects and drug interactions that cause serious and undesirable drug reactions. Various side effects can occur by taking painkillers in high doses and over a long period of time. Therefore, long-term use of analgesics is not recommended (Tjay and Rahardja, 2007). Based on the above background, the author is interested to investigate the prescription pattern of analgesics in one of the pharmacies in Bandung city.

METHOD

The type of research conducted was descriptive research with retrospective approach, that is, research conducted with an observational approach and collecting data at a specific point in time (Notoatmodjo, 2010). Data were collected from analgesic prescriptions from a pharmacy in Bandung city from January 2024 to April 2024. The inclusion criteria in this study were oral analgesic prescriptions and original prescriptions from doctors. Exclusion criteria in this study were prescriptions for non-oral analgesics (pain-relieving ointments, eye or ear drops), copies of prescriptions from pharmacies or hospitals, and prescriptions for compound analgesics (home-prepared painkillers) in the pharmacy.

The devices used in this study are prescriptions of oral analgesics prescribed by physicians, both those practicing in pharmacies and those practicing outside pharmacies, tables for tabulating item procurement for each category, and computer devices for data processing.

Results and Discussion

Table 1 shows that the class of analgesics most commonly prescribed in one of the pharmacies in Bandung City is the phenylacetic acid group with 43.37%. This use is in line with the WHO Three Step Analgesic Ladder guidelines regarding the appropriateness of analgesics based on the level of pain experienced by the patient. Non-opioid therapy is used to treat mild pain. Non-opioid analgesics here include the anthranilyl group, para-aminophenol, phenylacetate, propionic acid, oxicam and the sulfonate group.

Table 1. Prescription of Analgesic Groups at a Pharmacy in Bandung City

Golongan Analgetik	Jumlah	Persentase (%)
Antranilat	31	18,67
Para Aminophenol	72	43,37
Fenilasetat	44	26,50
Asam Propionat	7	4,22
Oksikam	8	4,82
Sulfonat	2	1,21
Opioid	2	1,21
Jumlah	166	100

Table 2 shows the type of analgesic drug most widely used in one of the pharmacies in Bandung city is paracetamol as much as 43.37%. The use of paracetamol is most widely used to reduce pain, besides that paracetamol also functions as an antipyretic.

Table 2 Prescription of Analgesic Types at a Pharmacy in Bandung City

Golongan Analgetik	Jumlah	Persentase (%)
Asam Mefenamat	31	18,67
Parasetamol	72	43,37
Natrium Diklofenak	44	26,50
Asam Propionat	7	4,22
Oksikam	8	4,82
Sulfonat	2	1,21
Opioid	2	1,21
Jumlah	166	100

Table 3 shows that the majority of prescribed drugs are non-generic drugs, 106 prescriptions (64.24%) and generic drugs, 59 prescriptions (35.76%). National data on the use of generic drugs in Indonesia is still relatively low, although the price is cheaper and the efficacy is the same as non-generic (branded) drugs. According to data from the Indonesian Ministry of Health in 2010, prescription of generic drugs by doctors in government-owned general hospitals is currently only 66%, while in private hospitals and pharmacies it is only 49%. This is influenced by, among other things, the low level of generic drug use in health services (Indonesian Ministry of Health, 2010).

Table 3 Prescription of Generic-Non-Generic Analgesics at a Pharmacy in Bandung City

Jenis Analgetik	Jumlah	Persentase (%)
Generik	59	35,76
Non Generik	106	64,24

Table 4 shows that the use of single analgesics prescribed by doctors was 144 (92.90%) prescription sheets. Prescription of single analgesics paracetamol was 27.09%, mefenamic acid was 18.05%, diclofenac was 4.86%, meloxicam was 5.56%, metampirone was 0.69%. The use of combination analgesics was 11 (7.10%) prescription sheets. Prescription of single and combination analgesics was based on the intensity of the patient's pain. Prescription of combination analgesics was adjusted to the stage of pain felt by the patient. The combination of analgesics (paracetamol) and NSAIDs such as diclofenac can produce a synergistic effect in relieving pain so that it can relieve pain symptoms faster. WHO formulated an algorithm called the three steps analgesic ladder as a guideline in pain management based on the intensity of the patient's pain, namely mild, moderate, and severe. In the first stage, the nonopioid group can be used for light therapy. Examples of first-stage drugs include aspirin, non-steroidal anti-inflammatory drugs/NSAIDs/diclofenac, and paracetamol. If the pain does not subside, it can be increased by using second-stage analgesic drugs, namely weak opioids for mild and moderate pain, for example codeine. If the pain persists or increases, then it is increased to the next stage. Common drugs given in this second stage are codeine or tramadol, either combined with paracetamol or not. The third stage is opioids for moderate and severe pain. Examples are morphine, methadone, fentanyl transdermal system (WHO, 1986). Based on research conducted at a pharmacy in Bandung, analgesic drug prescriptions were often combined with antibiotics and corticosteroids, as many as 49 (31.61%) analgesic prescription sheets were combined with antibiotics and corticosteroids. While 28 (18.06%) prescription sheets were combined with antibiotics only. The use of analgesics alone was 22 (14.20%) prescription sheets and the use of analgesics with other drugs was 56 (36.13%) prescription sheets.

Table 4 Prescription of Single or Combination Analgesics at a Pharmacy in Bandung City

Kombinasi Analgetik	Jumlah	Persentase (%)
Tunggal	144	92,90
Kombinasi	71	7,10
Jumlah	215	100

Some analgesic uses should not be consumed simultaneously with other drugs because it will cause interactions that can reduce drug performance and analgesic

use should not be consumed simultaneously with other drugs because it will cause interactions that can reduce drug performance, including:

1. Mefenamic acid should not be consumed simultaneously with anticoagulants because it will increase the effects of anticoagulants such as coumarin.

2. Paracetamol should not be consumed simultaneously with oral anticoagulants because long-term use of paracetamol can increase the anticoagulant effects of coumarin. Concurrent use with metoclopramide can increase paracetamol absorption. Concurrent use with cholesteramine can reduce paracetamol absorption. The use of paracetamol with intravenous cytotoxic drugs should be monitored for 72 hours because it can inhibit the metabolism of cytotoxic drugs (intravenous busulvan).

3. Diclofenac should not be consumed simultaneously with methotrexate because it will increase the toxic effects of the drug. Concurrent use with cyclosporine can increase the risk of nephrotoxicity. Concurrent use with lithium can reduce diclofenac excretion.

4. Ibuprofen should not be taken together with aspirin because it can reduce the antiplatelet effect of aspirin. Concomitant use with methotrexate can increase the risk of toxicity. The use of ibuprofen can increase nephrotoxicity when taken together with tacrolimus.

5. Meloxicam should not be taken together with anticoagulants because it can increase the effect of anticoagulants.

6. Metampiron should not be taken with heparin and warfarin because it can increase the risk of bleeding.

7. Tramadol should not be taken together with carbamazepine because it can reduce the effect of tramadol. Concomitant use with antipsychotics can increase the hypotensive and sedative effects. Administration with ondansetron can have an antagonistic effect, namely a decrease in one of the performances if taken together.

Based on the description above, no drug interactions were found in this study based on MIMS 2016. The combination of analgesics with antibiotics in the study did not cause drug interactions as well as the combination of analgesics with antibiotics alone and other drugs contained in the prescription in this study. The presence of interactions, whether pharmaceutical, pharmacodynamic, and pharmacokinetic interactions, can produce effects that reduce or increase the performance of other drugs. There are two possible unintended consequences of this drug interaction event, namely increased toxic effects or side effects or reduced expected clinical effects (IONI, 2014).

The following is a table detailing the presence or absence of interactions in analgesic prescriptions at one of the pharmacies in Bandung City, which can be seen in Table 5 below:

Table 5 Analgesic Drug Interactions in Drug Prescriptions at a Pharmacy in Bandung City Based on MIMS 2016

Interaksi Obat	Jumlah	Persentase (%)
Ada	0	0
Tidak ada	215	100
Jumlah	215	100

CONCLUSION

1. The most commonly prescribed analgesic group in one of the pharmacies in Bandung city is the aminophenol group phenylacetic acid, with a share of up to 43.37%.

2. The type of painkiller most commonly prescribed in one of the pharmacies in Bandung city is paracetamol, even 43.37%.

3. The generic/non-generic based classes of analgesics most commonly prescribed in one of the pharmacies in Bandung city are non-generic analgesics, with 64.24%.

4. The most commonly prescribed combination of analgesics in one of the pharmacies in Bandung city is the use of a single analgesic, with 92.90%.

5. Based on drug interactions in one of the pharmacies in Bandung city, based on MIMS 2016, no drug interactions were found when prescribing analgesics when taken concomitantly with other drugs included in a prescription (analgesic/non-analgesic).

BIBLIOGRAPHY

Budiasih, S., Masyitah, I., Jiyauddin, K., Kaleemullah, M., Samer, A. D., Fadli, A. M., & Yusuf, E., 2019, Formulasi dan Karakterisasi Serum Kosmetik yang Mengandung Minyak Argan sebagai Agen Moisurizing. *Bromo*, 297–304.

Carlotta M, Maria C, Luisa DM, Federica R, Chiara DM, Franco A, Pietro M dan Tommasina C., 2011. Sistem hidrogel baru yang dimuat kendaraan yang cocok untuk aplikasi topikal: Persiapan dan Karakterisasi, *Jurnal Pharm Pharmace Sci*., 14(3): 336-346.

Fisher GJ, Kang S, Varani J, Bata-Csorgo Z, Wan Y, Datta S, Voorhees JJ., 2002. Mekanisme photoaging dan penuaan kulit kronologis. *Lengkungan Dermatol*. 138(11):1462-70.

Intan Kusumaningrum, M., & Rosmiati, M. . (2021). Profil Penggunaan Obat Tradisional di Apotek Sumber Waras. Jurnal Sosial Dan Sains, 1(11), 1.454 – 1.463. https://doi.org/10.59188/jurnalsosains.v1i11.257

IONI. 2014. Informatorium Obat Nasional Indonesia (IONI). Jakarta.

Kartika, B.,1992, *Petunjuk Evaluasi Sensori Hasil Industri Produk Pangan*. Yogyakarta.

Kotler. 2005. Teori kepuasan dan faktor-faktor yang mempengaruhi kepuasan, Jakarta

Walikota, F. A., Kenner, J. R., & Draelos, Z. D. 2014. Piramida kesehatan dan kecantikan kulit: panduan berbasis klinis untuk memilih produk perawatan kulit topikal. *Jurnal Obat-obatan dalam Dermatologi: JDD, 13*(4), 414–421.

Meilgaard, MC, Civille, GV, Carr, TB, 2016. Teknik Evaluasi Sensorik, Edisi ke-5, CRC Press.

Mitsui, T. (1997). *New cosmetic science*: Elsevier.

Notoatmodjo,S. 2010. *Metodologi PenelitianKesehatan*. Hal 127. PT Rineka Cipta. Jakarta.

Nursalam. 2001. Pengertian Kepuasan, Yogyakarta

Rahmawanty, D., Yulianti, N., & Fitriana, M. (2015). Formulasi dan Evaluasi Masker Wajah Peel-Off Mengandung Kuersetin dengan Variasi Konsentrasi Gelatin dan Gliserin. *Media Farmasi, 12*(1), 17-32.

Sahu, G., Sahu, s., Sharma, H., dan Jha, AK, 2014, Tinjauan Tren Saat Ini dan Baru untuk Formulasi Anti-Penuaan, IJPCBS, 4(1), 118-125.

Salipian, W., & Usviany, V. (2023). Gambaran Efek Samping Obat Antihipertensi pada Pasien Rawat Jalan di Salah Satu Rumah Sakit di Kabupaten Bandung Barat. Health Information : Jurnal Penelitian, 15(2), e1163. Retrieved from https://myjurnal.poltekkes-kdi.ac.id/index.php/hijp/article/view/1163

Shai, A., Maibach, H. I., & Baran, R. (2009). *Handbook of Cosmetic Skin Care* (Second Edition ed.). USA: Informa UK.

Syarifah, Siti, R., Mulyanti, D., & Gadri, A. (2015). Formulasi Sediaan Masker Gel Peel-Off Ekstrak Daun Pepaya (Carica Papaya L.) sebagai Antijerawat Dan Uji Aktivitasnya terhadap Bakteri Propionibacterium acnes. *Prosiding Penelitian SPeSIA Unisba*, 662-670.

Schreml, S., Kemper, M., dan Abels, ., 2014. pH Kulit pada Lansia dan Perawatan Kulit yang Sesuai. Jurnal Medis Eropa. 86-94.

Sugiyono. 2010. Metodologi Penelitian Kesehatan. Mitra Cendakia. Yogyakarta

Surini, S., Mubarak, H., & Ramadon, D. (2018). Serum kosmetik yang mengandung anggur (Vitis vinifera L.) fitosom ekstrak biji: Formulasi dan studi penetrasi in vitro. *Jurnal Apoteker Muda, 10*(2), s51–s55.

Thakre, A. D. (2017). Formulasi dan pengembangan serum de pigmen yang menggabungkan ekstrak buah-buahan. *Jurnal Internasional Sains Inovatif dan Teknologi Riset, 2*(12), 330–382.

Tjay dan Rahardja. 2007. Obat-obat penting: Khasiat. Penggunaan dan efek- efek Sampingnya. Halaman: 312-319. PT Elex

Tranggono, R.I., Latifah, F., Jayadisastra, J., 2007, Buku Pegangan Ilmu Pengetahuan Kosmetik. Gramedia Pustaka Utama, Jakarta.s

Undang-undang Repubik Indonesia No.36 Tahun 2009 tentang kesehatan Indonesia. Jakarta

Umar. 2003. Dasar Pertimbangan Kepuasan Pasien. Jakarta

Voigt, Rudolf. (1994). *Buku Pelajaran Teknologi Farmasi* (S. Noerono, Trans. M. S. Reksohadiprojo Ed. 5 ed.). Yogyakarta: Gadjah Mada University Press.

World Health Organization .2015. *GlobalTubercolosis Report 2015*. Sweetzerland.WHO.

World Health Organization. 1986. WHO ThreeStep Analgesic Ladder. Geneva: WHO.