

Original Article

Drug Utilization Research in a Tertiary Specialty Hospital: Medication Use Pattern, Dispensing Performance and Facility Evaluation

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Abstract. Drug utilization practices play an important role in ensuring safe, rational, and cost-effective patient care, especially in tertiary specialty hospitals where prescription volume and complexity are high. However, limited local evaluation of prescribing and dispensing practices may hinder improvements in pharmaceutical services. This study aimed to evaluate drug utilization practices in a tertiary specialty hospital by examining prescribing patterns, dispensing performance, and facility structure using the World Health Organization (WHO) drug use indicators. A descriptive-analytical cross-sectional design was used. Data were collected from licensed outpatient pharmacists using three validated questionnaires that assessed medication-use practices, pharmacists' self-evaluations of dispensing activities, and the adequacy of pharmacy facilities. A retrospective review of outpatient prescriptions was also conducted over a one-and-a-half-month period. Data were summarized using descriptive analysis and compared across pharmacist tenure and department assignment. Results showed that most prescriptions originated in the Outpatient Department and primarily involved generic oral medications, supporting rational, cost-effective prescribing. Pharmacists generally rated their dispensing practices as highly competent, with early-career pharmacists and those with advanced degrees reporting higher engagement in counseling, communication, and error reporting. In contrast, pharmacists with longer tenure reported lower involvement in some communication practices. Facility structure and staffing were viewed positively, although perceptions differed by years of experience. The review of prescriptions also identified non-Philippine National Formulary drugs and documentation gaps, suggesting the need for stronger formulary compliance and better monitoring systems. Overall, the findings show encouraging practices in rational drug use but reveal areas that require improvement in documentation, communication, and adherence to formulary guidelines. Strengthening electronic prescribing, conducting regular audits, providing professional training, and integrating information systems may help improve safe, efficient, and patient-centered pharmaceutical care.

Keywords: *Dispensing performance; Drug utilization research; Facility evaluation; Medication use pattern; Specialty hospital.*

Appropriate use of medicines is essential to provide safe and effective healthcare and reduce morbidity and mortality. The World Health Organization defines rational drug use as a process in which patients receive medicines that are appropriate for their clinical needs, in correct doses, for an adequate period of time, and at the lowest cost to them and their community (World Health Organization, 2025). In tertiary hospitals, where patients often experience complex health conditions and require multiple medications, monitoring drug utilization practices becomes particularly important. Evaluating how medicines are prescribed, dispensed, and managed helps identify irrational practices, prevent medication-related harm, and improve treatment outcomes. Drug utilization research, therefore, supports evidence-based healthcare decisions and strengthens the overall quality of patient care.

To guide the evaluation of medication use, the World Health Organization developed a set of drug use indicators that measure prescribing practices, patient care processes, and health facility readiness (WHO, 1993). These indicators provide a systematic way to assess how medicines are used in healthcare facilities. Prescribing indicators include the average number of medicines per encounter, the use of generic names, and the proportion of antibiotic and injection prescriptions. Patient care indicators assess factors such as consultation time, dispensing time, labeling quality, and patient knowledge about medicines. Health facility indicators assess the availability of essential medicines and the effectiveness of formulary systems that support rational drug use. Reference values were subsequently established to guide the interpretation of these indicators and remain widely used to evaluate rational drug use in health systems (WHO, 2006).

Recent studies continue to demonstrate the value of these indicators in identifying problems in medication practices. Lanip et al. (2024) found that while some tertiary hospitals in the Philippines follow WHO recommendations for generic prescribing and injection use, concerns remain regarding antibiotic overprescribing and polypharmacy. Similarly, Tadesse et al. (2022) reported that many antibiotic prescriptions are issued without clear clinical indications, raising concerns about irrational drug use and highlighting the need for stronger antibiotic stewardship programs. These findings suggest that even when some indicators meet recommended standards, other aspects of prescribing practices may still require improvement. Prescribing indicators are particularly important in assessing rational drug use because they directly reflect physicians' medication decisions. Studies show that inappropriate prescribing can increase the risk of medication-related harm and unnecessary healthcare costs. Hodkinson et al. (2022) reported that complex medication regimens and excessive drug prescribing contribute significantly to preventable medication harm. Therefore, monitoring prescribing indicators helps healthcare institutions identify patterns such as polypharmacy or inappropriate antibiotic use and supports efforts to improve medication safety and quality of care.

Patient care indicators also play a critical role in evaluating the quality of healthcare delivery, particularly provider-patient interactions. Effective communication about medicines helps patients understand how to take their medications correctly and improves treatment adherence. Jabour (2020) found that longer consultation times are associated with better patient satisfaction and improved health outcomes. Similarly, Wendie et al. (2021) emphasized that patient education and proper communication significantly influence adherence to treatment protocols. Pharmacists contribute greatly to this aspect of care because dispensing medicines involves not only providing the correct medication but also ensuring that patients understand dosage instructions, precautions, and treatment duration. Health facility indicators further influence the success of rational drug use programs because healthcare systems must provide the necessary resources for safe medication practices. These indicators assess the availability of essential medicines, the adequacy of infrastructure, and the efficiency of supply systems. Studies have shown that medicine shortages and weak inventory systems remain challenges in many healthcare facilities. In the Philippines, the Philippine Institute for Development Studies reported that only a small proportion of local government unit hospitals maintain a complete set of essential medicines, which affects treatment continuity and patient care (Abrigo et al., 2021). Similar findings have been reported in other countries, where stock shortages are linked to weak supply chain systems and poor inventory management (World Health Organization, 2021). Other studies also emphasize the importance of hospital pharmacy management and compliance with dispensing standards to support effective medication services (Chand et al., 2022).

Despite the growing number of studies on drug utilization practices, several gaps remain. Many hospitals still lack consistent monitoring systems for prescribing indicators, which limits the ability to identify irrational prescribing patterns (Abrigo et al., 2021; WHO, 2021). In addition, patient care indicators are often under-evaluated because counseling practices are not consistently measured. While dispensing is recognized as an

important component of pharmaceutical care, pharmacists' actual dispensing performance is not always systematically assessed. Furthermore, many studies focus primarily on structural aspects of facility indicators, such as infrastructure and the availability of medicines. Meanwhile, pharmacists' operational capacity and the environment that supports safe dispensing practices receive less attention. To address these gaps, the present study evaluates drug utilization practices in a tertiary specialty hospital by examining medication use patterns, pharmacists' dispensing performance, and facility indicators, using the WHO drug use framework. By analyzing these components together, the study aims to provide a clearer understanding of how prescribing practices, dispensing activities, and facility resources influence rational drug use in hospital settings. The findings may help improve pharmaceutical care, strengthen medication safety practices, and support evidence-based policy and management decisions in tertiary healthcare institutions.

Methodology

This study employed a descriptive-analytical cross-sectional design to examine the different dimensions of drug utilization in a tertiary specialty hospital, focusing on medication use, dispensing performance, and health facility structure. These domains correspond to prescribing indicators, patient care indicators, and health facility indicators. The design enabled the systematic examination of retrospective prescription data, pharmacist self-assessment responses, and health facility indicators at a specific point in time, providing a comprehensive view of the current practices without altering existing variables. The descriptive component presented a detailed account of medication use patterns among patients, including classification based on the Philippine National Formulary (PNF), drug type, and prescribing source. At the same time, pharmacists' dispensing performance was assessed using a structured self-assessment tool based on World Health Organization (WHO) patient care indicators, which evaluated practices in medication handling, patient counseling, and workflow efficiency. Data collection for the administered questionnaires was completed within five days, as pharmacists were on rotating duty in the outpatient pharmacy from June 22 to 26, 2025. The retrospective review of outpatient prescriptions from July 1, 2024, to December 31, 2024, was conducted over one and a half months, with rigorous encoding and prescription validation.

This purposive sampling was appropriate for the research objectives because it enabled a comprehensive assessment of drug utilization practices without manipulating current conditions. By combining descriptive and analytical elements, the study examined the relationships among prescribing behavior, dispensing performance, and facility readiness, aligned with WHO's prescribing, patient care, and health facility indicators. The design also enabled a retrospective review of prescriptions, which is important, as this evaluation is being conducted for the first time at the participating tertiary hospital. In addition, it supported the collection of pharmacist self-assessment data and facility-level indicators, providing a multidimensional view of current practices. Overall, this approach generates baseline information, identifies potential gaps, and guides future improvements in pharmaceutical services without disrupting ongoing healthcare delivery.

Research Respondents

This study included 20 licensed pharmacists assigned to the outpatient pharmacy of the Philippine Orthopedic Center. Of the 29 pharmacists, the following were excluded: the researcher, one Pharmacist V, two Pharmacist IV, two AMS Pharmacists, two clinical pharmacists, and one dangerous drugs pharmacist. Their professional experience ranged from less than a year to over a decade in practice, and although classified under different plantilla designations, all performed equivalent roles in dispensing, medication handling, and patient service. The respondents also had diverse educational backgrounds, including Bachelor's degrees in Pharmacy and Master's degrees, which provided additional context for examining dispensing efficiency, communication, and acceptance of interventions. Data were collected using a researcher-developed, expert-validated self-evaluation tool that measured performance across domains such as prescription validation, workflow efficiency, accuracy, counseling, compliance, stock management, and error prevention. Pharmacists from the outpatient department were purposively selected as this unit manages the highest patient turnover and most complex dispensing activities, ensuring that findings reflect diverse competencies and real-world pharmacy practice. The retrospective review of prescriptions included drugs dispensed from July 1, 2024 to December 31, 2024 in the outpatient pharmacy. Prescriptions containing drugs that are covered in the latest 8th edition of the Philippine National Formulary are included in the research.

Research Instrument

Research instrument 1 was designed to assess drug use patterns in a specialty care hospital following WHO's Drug Utilization Research framework. Prescriptions were classified according to the Philippine National Formulary (PNF, 8th edition), drug label category (generic or branded), and dosage form (oral, parenteral, or topical), providing a structured appraisal of prescribing indicators. Data were drawn from prescriptions issued to outpatients, non-admitted ER patients, and discharged ward patients, ensuring focus on those managed outside inpatient care. Analysis was primarily descriptive, with monthly prescription volumes summarized through frequency counts and categorized by source (OPD, ER, ward, radiology, other hospitals, or not indicated). Dosage forms were likewise documented to capture prescribing preferences and therapeutic approaches, reflecting both clinical rationale and facility readiness. This systematic classification enabled comparative assessment of prescribing trends, highlighted documentation gaps, and strengthened the evaluation of rational drug use within the institutional context.

For research instrument 2, a retrospective self-assessment tool was developed to help pharmacists reflect on their dispensing practices, guided by WHO's Patient Care Indicators (1993) and the 2011 FIP/WHO Good Pharmacy Practice guidelines. It gathered personal and professional information and used a 5-point Likert scale to rate performance across three domains: efficiency in dispensing and medication handling, organizational communication and error reporting, and pharmacists' interventions with openness in communication. The instrument operationalized core responsibilities such as prescription validation, dispensing accuracy, counseling, compliance, stock management, and error prevention, while also recognizing modern practices like automated dispensing and barcode scanning as institutional adaptations. Scores were interpreted through categorical descriptors: 10–20 = Needs Improvement, 21–30 = Developing Competency, 31–40 = Proficient, and 41–50 = Highly Competent. Error reporting, feedback, systems thinking, intervention acceptance, and openness in communication were likewise scored in ranges reflecting weak to strong performance. The scoring framework, proportionally aligned to item counts, provided clarity and meaningful differentiation, translating numerical ratings into actionable insights for benchmarking and continuous quality improvement in pharmaceutical services.

Research Instrument 3 assessed the facilities and resources supporting pharmacists' dispensing practices in the specialty care hospital, focusing on infrastructure, technology, reference materials, and staffing. Anchored on the 2011 FIP/WHO Good Pharmacy Practice guidelines, the questionnaire evaluated elements such as lighting adequacy, availability of digital tools, updated formularies, staffing sufficiency, workspace organization, safety and privacy measures, communication systems, training opportunities, and environmental conditions. These factors were considered essential for safe, efficient, and patient-centered dispensing. A researcher-developed rating scale, grounded in WHO principles, was used to interpret facility performance. Scores of 10–20 indicated Needs Improvement, with major gaps in workflow, accuracy, counseling, and infrastructure; 21–30 reflected Developing Competency with basic standards met but inconsistently applied; 31–40 denoted Proficient facilities with reliable performance and minor areas for enhancement; and 41–50 signified Highly Competent facilities consistently aligned with best practices, integrating digital tools and strong workflow strategies. Together with the other instruments on prescribing patterns and dispensing performance, this tool provided a holistic view of pharmaceutical care by addressing both clinical and organizational dimensions of medication use.

The validity of the research instrument was established through expert evaluation using Questionnaire Rubrics, assessing clarity, objectives, layout, content, grammar, and utilization. The validators rated each criterion on a 1 to 5 scale, with six experts: one psychometrician, one doctor of pharmacy, two academic pharmacists, and two hospital pharmacists. The mean scores indicated strong validity, with scores in objectives and clarity (4.17), layout (4.42), content and utilization (4.00), and grammar (4.17), with an overall mean of 4.15, confirming the instrument's suitability, with minor refinements incorporated prior to use. This validation ensured alignment with study objectives on prescribing patterns, dispensing performance, and facility operations.

Reliability was tested using Cronbach's alpha with responses from the 10 pharmacists in a comparable institution. All domains demonstrated strong internal consistency: Efficiency in Dispensing (0.947), Organizational Communication (0.807), Interventions and Openness (0.909), and Facility Evaluation (0.943). These coefficients, exceeding the 0.70 threshold, confirm that the instrument is dependable and methodologically sound for assessing the intended constructs.

Data Gathering Procedure

The data collection process was conducted systematically and ethically to ensure integrity across all instruments. Coordination with hospital administrators and pharmacy staff preceded ethics clearance and formal communication with respondents. Drug use patterns were evaluated through a retrospective review of prescriptions from specialty care units, encoded using a structured template categorizing drug type, label, dosage form, and source, with patient identifiers excluded to maintain confidentiality. Trained pharmacist encoders assisted voluntarily to ensure accurate data entry.

For the second instrument, 20 outpatient pharmacists completed the self-evaluation questionnaire on dispensing performance, providing demographic data and Likert-scaled responses. Other pharmacists working in clinical pharmacy, in-patient pharmacy, dangerous drugs, and unit dose dispensing were excluded. Participation was voluntary, anonymous, and confidential, with safeguards against self-reporting bias and minimal workflow disruption. Reliability testing confirmed internal consistency of responses.

The third instrument, the Health Facility Evaluation Questionnaire, was administered to the same group and focused on stock management, patient education, prescribing accuracy, and workflow efficiency. Responses were submitted privately and securely stored. All data were reviewed and double-checked for accuracy. The entire process was completed within five days, combining prescription reviews and pharmacist self-evaluations to balance objective and perceptual data while upholding ethical and institutional standards.

The surveys were distributed and collected at scheduled intervals to minimize disruption to pharmacy operations. Respondents provided demographic information, rated their practices using Likert-scale items, and evaluated institutional practices such as stock management, patient education, prescribing accuracy, and workflow efficiency. Measures were implemented to minimize self-reporting bias, including anonymity, confidential submission in sealed envelopes, neutral wording of questions validated by experts, voluntary participation, and assurance that responses would not affect employment. All completed questionnaires and prescription data were reviewed, encoded, and securely stored for analysis, with entries double-checked for accuracy. The entire data-gathering process was conducted over five days, from June 22 to 26, 2025, combining prescription reviews and pharmacist self-evaluations to provide both objective and perceptual data while maintaining methodological rigor and ethical standards.

Data Analysis Procedure

The statistical analysis aligned with the study's research objectives and statement of the problem. Descriptive statistics summarized the demographic profile of the pharmacist respondents ($N = 20$). Frequency counts (n) and percentages (%) were used to analyze categorical variables such as years of tenure in the pharmacy, job position, and highest educational attainment, providing a clear overview of respondents' experience levels, professional roles, and educational backgrounds. A comparative descriptive analysis also examined pharmacists' perceptions of dispensing performance, organizational communication, error-reporting practices, interventions, and communication openness. Mean scores for each subgroup—based on tenure, job position, and educational attainment—were calculated and interpreted using predefined competency levels: Needs Improvement, Developing Competency, Proficient, and Highly Competent. Inferential statistical methods tested for significant differences and relationships among variables. Nonparametric tests, including the Kruskal-Wallis H test and the Mann-Whitney U test, were applied to assess whether pharmacists' perceptions of dispensing performance, organizational communication, and error-reporting practices, as well as perceptions of health facilities and resource availability, differed across demographic profiles. These tests compared mean ranks among independent groups and assessed significance at the 0.05 alpha level. In addition, correlational analysis using Pearson's correlation coefficient (r) examined relationships between pharmacists' self-evaluated dispensing performance and organizational factors, including communication and error-reporting practices, openness to interventions, and health facility resource availability. Overall, the statistical methods combined descriptive statistics, non-parametric tests, and correlation analysis to produce valid and meaningful interpretations aligned with the study's objectives.

Ethical Considerations

This study adhered to stringent ethical standards to ensure the integrity, confidentiality, and responsible conduct of research involving health professionals and prescription data. Before data collection, the ethics review boards of the Philippine Orthopedic Center and the Philippine Women's University formally reviewed the study. They

issued certificates of ethics approval (REC Protocol No: POCERC 2025_05_031 and ERB 2025_068, respectively). All procedures were examined for compliance with the principles of informed consent, data privacy, and professional accountability. Participation was voluntary, and pharmacists were briefed on the research purpose, scope, and methodology. Consent forms were distributed alongside the questionnaire to ensure that each respondent understood the nature of their involvement and the anonymity of their responses. No identifying personal data was collected, and all results were encoded in aggregate form to preserve participant confidentiality. Additionally, special care was taken in the handling of retrospective prescription records. Access to sensitive data was restricted to the researcher, with safeguards in place for secure storage and analysis. Communication with hospital administrators and pharmacy department heads was conducted transparently to align the study's implementation with institutional goals and foster support for data sharing within ethical bounds. Throughout the research process, the principle of beneficence guided decision-making by prioritizing the study's contribution to improving pharmaceutical care while minimizing risks to participants. Likewise, the principles of justice and respect for autonomy ensured equitable treatment of all respondents and upheld their right to decline or withdraw at any point without penalty. Because the study involved licensed health professionals and sensitive prescription data, strict ethical safeguards were necessary to protect confidentiality and professional accountability. Ethics approval from two independent review boards, informed consent, and data collection ensured credibility while minimizing risks to participants.

Results and Discussion

Evaluation of the Medication Use Pattern

Monthly Distribution of Prescriptions Across Different Hospital Sources

Table 1 presents the monthly distribution of prescriptions by source within a specialty tertiary hospital over six months.

Table 1. Monthly Distribution of Prescriptions by Source of Prescription

Month	Source of Prescription						Total
	Ward	OPD	ER	Others*	Other Hospitals	Not Indicated	
July	13	325	31	46	0	70	485
August	13	276	202	40	5	109	645
September	16	398	283	48	0	168	913
October	30	450	383	47	14	213	1,137
November	15	698	318	58	0	67	1,156
December	22	651	238	46	1	163	1,121
Total (%)	109 (2.00)	2,798 (51.27)	1,455 (26.67)	285 (5.22)	20 (0.37)	790 (14.48)	5,457

*Note: *Others refer to the Radiology Department*

The data showed that the Outpatient Department (OPD) generated the most prescriptions, accounting for 2,798 of 5,457 total prescriptions (51.27%), underscoring its central role due to its high patient volume and broad services. The Emergency Room (ER) accounted for 1,455 prescriptions (26.67%), while other units, such as Radiology (5.22%) and the Ward (2.00%), contributed smaller shares, reflecting their specialized functions. Prescriptions from other hospitals were minimal (0.37%). Monthly trends revealed a peak in November (1,156 prescriptions), with October and December also showing high counts, possibly due to seasonal or operational factors, while July recorded the lowest volume. Overall, these findings highlight the OPD's major contribution to medication demand and the importance of improving documentation for accurate source tracking, resource planning, and workflow efficiency.

A significant portion of prescriptions categorized as "Not Indicated" reveals gaps in documentation and system integrity. Since these prescriptions cannot be traced to their source, they compromise data quality and limit the accuracy of drug utilization and prescribing indicator assessments, as the World Health Organization emphasizes the need for reliable data in evaluating rational drug use. This lack of traceability weakens accountability, restricts the analysis of prescribing patterns across departments, and may pose risks to patient safety, such as dispensing errors or difficulty in reviewing medication histories. Furthermore, it reflects workflow and system issues in labeling and recording practices, highlighting the need for stronger institutional policies and standardized documentation processes to ensure accurate data, accountability, and safe medication use.

Distribution of Drug Classification of Prescribed Drug and Source of Prescription

The table shows that over the six months, prescriptions were dominated by mineral supplements (23.28%), anti-inflammatory and antirheumatic products (17.10%), and drugs for treatment of bone disease (11.63%). Together,

these three categories account for more than half of all prescriptions, reflecting the facility's prescribing focus on musculoskeletal health, chronic pain management, and nutritional supplementation (Bondre & Ghube, 2018).

Table 2. *Distribution of Drug Classification of Prescribed Drug and Source of Prescription*

Drug Classification	Source of Prescription						Total	%
	Ward	OPD	ER	Radiology	Other Hospitals	Not Indicated		
Mineral supplements	57	1,611	455	0	1	282	2,409	23.28
Anti-inflammatory and antirheumatic products	67	341	1014	0	6	342	1,770	17.10
Drugs for treatment of bone disease	4	1,151	17	0	0	32	1,204	11.63
Antibacterials for systemic use	71	261	325	0	1	218	876	8.46
Analgesics	43	435	115	0	1	155	748	7.23
Vitamins	35	337	142	0	0	159	673	6.50
Non-PNF drug	20	218	169	0	0	157	564	5.45
Muscle relaxants	8	185	201	0	2	101	497	4.80
Contrast media	0	0	0	285	0	0	285	2.75
Agents acting on the renin-angiotensin system	2	160	38	0	0	33	233	2.25
Drugs used in diabetes	5	156	22	0	0	29	213	2.06
Calcium channel blockers	3	121	30	0	0	30	184	1.78
Lipid modifying agents	0	133	24	0	0	15	172	1.66
Antibiotics and chemotherapeutics for dermatological use	2	35	21	0	1	21	80	0.77
Drugs for acid related disorders	4	32	9	0	0	21	66	0.64
Blood substitutes and perfusion solutions	2	23	7	0	0	14	46	0.44
Antithrombotic agents	3	21	5	0	0	9	38	0.37
Antineoplastic agents	1	28	1	0	1	2	33	0.32
All other therapeutic products	0	12	17	0	0	5	33	0.32
Beta-blocking agents	2	19	3	0	0	8	32	0.31
Psychoanaleptics	0	11	9	0	0	7	31	0.30
Drugs for constipation	0	17	2	0	0	6	25	0.24
Antianemic preparations	1	8	8	0	0	3	20	0.19
Anesthetics	0	11	1	0	0	4	16	0.15
Cardiac therapy agents	0	10	2	0	0	0	12	0.12
Psycholeptics	0	7	1	0	0	3	11	0.11
Drugs for obstructive airway diseases	0	4	3	0	0	4	11	0.11
Herbal preparations	0	5	3	0	1	2	11	0.11
Urologicals	0	10	0	0	0	0	10	0.10
Immunostimulants	1	4	1	0	0	1	7	0.07
Thyroid therapy	0	6	0	0	0	0	6	0.06
Corticosteroids, dermatological preparations	0	2	0	0	0	2	4	0.04
Sex hormones and modulators of the genital system	0	3	0	0	0	1	4	0.04
Centrally acting antiadrenergic agents	0	1	0	0	0	2	3	0.03
Corticosteroids for systemic use	0	3	0	0	0	0	3	0.03
Immune sera and immunoglobulins	0	0	3	0	0	0	3	0.03
Ophthalmological	0	2	0	0	0	1	3	0.03
Antiepileptics	0	2	0	0	0	0	2	0.02
Other nervous system drugs	0	1	1	0	0	0	2	0.02
Antihistamines for systemic use	0	0	2	0	0	0	2	0.02
Drugs for gastrointestinal disorders	0	0	1	0	0	0	1	0.01
Antiemetics and antinauseants	0	1	0	0	0	0	1	0.01
Antiseptics and disinfectants	0	0	0	0	0	1	1	0.01
Other drugs for disorders of the musculo-skeletal system	0	1	0	0	0	0	1	0.01

Note: 5,457 total prescriptions over a 6-month period from July to December, 2024.

Mineral supplements (23.28%) were most frequently prescribed in OPD (1,611) and ER (455), suggesting a strong emphasis on preventive and supportive therapy. This may reflect prescribing patterns for patients with nutritional deficiencies, bone health concerns, or chronic conditions requiring supplementation. Anti-inflammatory and antirheumatic products (17.10%) were most commonly prescribed in the ER (1,014), suggesting frequent use for acute pain and inflammatory conditions. This aligns with WHO prescribing indicators, which highlight NSAIDs as commonly prescribed drugs in both acute and chronic care settings (World Health Organization, 2009). Drugs

for treatment of bone disease (11.63%), with 1,151 prescriptions from OPD, reflect a significant outpatient burden of osteoporosis and related musculoskeletal disorders, consistent with long-term management needs. Antibacterials for systemic use (8.46%) were concentrated in the ER (325) and ward (71), underscoring their role in acute and inpatient care. This is critical under WHO prescribing indicators, as antibiotic use is closely monitored to prevent irrational prescribing and antimicrobial resistance (Ofori-Asenso & Agyeman, 2016). Analgesics (7.23%) and vitamins (6.50%) reflect supportive care and symptomatic management, with OPD as the main source. The presence of non-PNF drugs (5.45%) indicates prescribing outside the Philippine National Formulary, which has implications for rational drug use and policy compliance (Bondre & Ghube, 2018). Contrast media (2.75%) are prescribed exclusively in the Radiology Department and are used for specialized diagnostic procedures.

The remaining categories (e.g., cardiovascular drugs, lipid-modifying agents, antithrombotics, antineoplastics) each account for less than 2% of prescriptions, showing limited but targeted use in specialized cases. These results are significant because they provide a clear picture of prescribing behavior across clinical contexts, which directly informs WHO prescribing indicators. The dominance of supplements, NSAIDs, and bone disease drugs suggests polypharmacy risk in chronic care, especially in OPD. Antibiotics (8.46%) concentrated in ER and ward settings reflect acute care needs but also require monitoring to prevent irrational use (World Health Organization, 2009). Categories like contrast media and blood substitutes highlight specialized use of parenteral agents, which the WHO flags as high-risk for irrational prescribing. Finally, the presence of non-PNF drugs (5.45%) indicates deviations from the essential medicines policy, which may affect affordability and rational use (Ofori-Asenso & Agyeman, 2016). Overall, the distribution reflects a prescribing pattern heavily skewed toward musculoskeletal and supportive therapies, with antibiotics and analgesics playing a secondary but critical role. The data underscores the importance of monitoring prescribing indicators to ensure rational drug use, prevent over-reliance on supplements and NSAIDs, and strengthen compliance with essential medicines policies (World Health Organization, 2009; Ofori-Asenso & Agyeman, 2016; Bondre & Ghube, 2018).

Distribution of Drug Label Category (Generic vs. Branded)

The table shows a strong predominance of generic prescribing (99.12%) over branded drugs (0.88%). This pattern reflects the facility's alignment with rational drug use principles and national formulary compliance, as generic prescribing is widely promoted to ensure affordability, accessibility, and equity in healthcare (World Health Organization, 2009).

Table 3. Distribution of Drug Label Category (Generic vs. Branded) by Source of Prescription

Source of Prescription	Generic		Branded		Total	
	n	%	n	%	n	%
Ward	329	3.18	6	0.06	335	3.24
OPD	5,358	52.23	38	0.37	5,396	52.14
ER	2,647	25.58	23	0.22	2,670	25.80
Radiology Department	285	2.75	0	0.00	285	2.75
Other Hospitals	22	0.21	0	0.00	22	0.21
Not Indicated	1,617	15.62	24	0.23	1,641	15.86
Total (%)	10,258	99.12	91	0.88	10,349	100.00

In the Outpatient Department (OPD), generic prescriptions accounted for 52.23% of total prescriptions, making them the largest contributor, consistent with their role in managing chronic conditions and routine consultations, where cost-effective medicines are preferred (Bondre & Ghube, 2018). The Emergency Room (ER) accounted for 25.58%, reflecting the need for rapid access to essential drugs in acute care. In comparison, the Ward (3.18%) and Radiology Department (2.75%) contributed smaller shares; the latter exclusively prescribed generics, such as contrast media. The Not Indicated category (15.62%) highlights persistent documentation gaps that affect traceability and evaluation of prescribing indicators (Ofori-Asenso & Agyeman, 2016). Overall, generic prescribing accounted for 99.12% compared to 0.88% for branded drugs, indicating strong adherence to rational drug use principles and national formulary compliance (World Health Organization, 2009).

The minimal use of branded drugs, particularly in OPD (0.37%) and ER (0.22%), may reflect physician preference or patient demand but remains within acceptable limits, reinforcing adherence to essential medicines policies (World Health Organization, 2009). The high reliance on generics across departments suggests cost-effective management of most patient encounters, reducing financial burden while maintaining therapeutic coverage (Bondre & Ghube, 2018). Moreover, the predominance of generics in antibiotics and injections supports

affordability, although continuous monitoring is needed to ensure appropriate use (Ofori-Asenso & Agyeman, 2016). With generic prescribing exceeding the WHO benchmark of 90%, the facility demonstrates excellent compliance with prescribing indicators, promoting equitable access and rational drug use while highlighting the need for continued monitoring and patient education to sustain these practices (World Health Organization, 2009; Ofori-Asenso & Agyeman, 2016; Bondre & Ghube, 2018).

Distribution of Drug Label Category per Dosage Form and Source of Prescription

Table 4 highlights how prescribing practices vary across clinical contexts and service areas. The data show that oral dosage forms dominate overall prescribing, accounting for 9,493 prescriptions (91.73%). These were most frequently issued in the OPD (5,057), ER (2,570), and ward (318), reflecting the standard route for chronic disease management, ambulatory care, and general inpatient therapy. These data align with WHO's recommendation that oral medicines should be the primary mode of treatment due to their cost-effectiveness, ease of administration, and patient acceptability (World Health Organization, 2009).

Table 4. *Distribution of Drug Label Category per Dosage Form and Source of Prescription*

Source of Prescription	Generic				Branded		
	Oral	Parenteral	Topical	Others	Oral	Parenteral	Topical
Ward	318	7	4	0	0	0	6
OPD	5,057	240	51	10	22	6	10
ER	2,570	46	28	3	10	2	11
Radiology Department	0	285	0	0	0	0	0
Other Hospitals	13	8	1	0	0	0	0
Not Indicated	1,535	44	31	7	6	2	16
Total (%)	9,493 (91.73)	630 (6.09)	115 (1.11)	20 (0.19)	38 (0.37)	10 (0.10)	43 (0.42)

Parenteral dosage forms (630 prescriptions, 6.09%) were concentrated in the Radiology Department (285), OPD (240), and ER (46). Their use reflects specialized diagnostic procedures (e.g., contrast media) and acute care needs that require rapid therapeutic action. WHO prescribing indicators emphasize monitoring parenteral use, as injections are often associated with irrational prescribing and higher risks compared to oral medicines (Ofori-Asenso & Agyeman, 2016). Topical dosage forms (115 prescriptions, 1.11%) were distributed across OPD (51), ER (28), and ward (4), with additional entries in the "Not Indicated" category (31). These reflect dermatological and localized treatments, which, while limited in proportion, demonstrate the facility's coverage of diverse therapeutic needs (Bondre & Ghube, 2018). Other dosage forms (20 prescriptions, 0.19%) were prescribed in OPD (10) and "Not Indicated" (7), representing specialized or less common formulations. Overall, the distribution underscores that the facility's prescribing pattern is heavily skewed toward oral dosage forms, consistent with rational drug use principles. Parenteral and topical forms are used more selectively, reflecting their specialized roles in acute care, diagnostics, and dermatological management. This pattern supports WHO's prescribing indicators by showing strong reliance on oral medicines, while also highlighting the need to monitor parenteral use to prevent irrational prescribing.

Evaluation of the Dispensing Performance of Hospital Pharmacists

Pharmacists' Perceived Efficiency in the Dispensing Process and Medication Handling

Table 5 presents pharmacists' dispensing performance across the three core dimensions. In analyzing dispensing performance by demographic profile, all groups, regardless of tenure, job position, or educational background, consistently scored within the "Highly Competent" range. Notably, those with less than 10 years of experience exhibited slightly higher scores across all core areas than those with more than 10 years of experience, whose scores dropped to "Proficient" in prescription validation and interpretation, dispensing time, and patient counseling. This may suggest that newer pharmacists are either better trained in current practices or more engaged in standardized protocols.

The findings align with existing literature indicating that pharmacists with fewer years of practice tend to adhere more strongly to standardized dispensing protocols. Studies in Taiwan and Saudi Arabia show that newer pharmacists, trained under updated curricula and competency-based frameworks, demonstrate higher accuracy in prescription validation and patient counseling than more experienced practitioners who may rely on routine practices (PLOS One, 2020; Alanazi et al., 2024). In relation to WHO patient care indicators, the evaluation of Efficiency in the Dispensing Process and Medication Handling reveals that pharmacy personnel generally exhibit strong competencies in prescription interpretation, which supports safe dispensing, accurate labeling, and error

prevention—core elements of rational drug use and patient safety (WHO, 2009; Ofori-Asenso & Agyeman, 2016).

Table 5. *Pharmacists' Perceived Efficiency in Dispensing Process and Medication Handling by Demographic Profile and Core Competency Area*

Demographic Profile		Core Areas							
		Overall Perceived Dispensing Performance*	Prescription Validation & Interpretation	Dispensing Time & Workflow Efficiency	Accuracy in Medication Selection & Labeling	Patient Counseling & Communication	Compliance with Regulatory & Institutional Standards	Stock Management & Availability	Error Prevention & Quality Assurance
		Score	Score	Score	Score	Score	Score	Score	Score
Years of Tenure in the Pharmacy	Less than 5 years	45.6 (Highly Competent)	46.2 (Highly Competent)	41.2 (Competent)	45.6 (Highly Competent)	45.0 (Highly Competent)	43.8 (Highly Competent)	47.2 (Highly Competent)	45.6 (Highly Competent)
	5-10 years	45.4 (Highly Competent)	44.0 (Highly Competent)	43.9 (Highly Competent)	45.9 (Highly Competent)	43.9 (Highly Competent)	43.6 (Highly Competent)	45.5 (Highly Competent)	46.4 (Highly Competent)
	More than 10 years	41.4 (Highly Competent)	39.0 (Proficient)	40.7 (Proficient)	43.7 (Highly Competent)	36.3 (Proficient)	41.3 (Highly Competent)	41.3 (Highly Competent)	43.3 (Highly Competent)
Job Position	Pharmacist	44.5 (Highly Competent)	42.8 (Highly Competent)	42.5 (Highly Competent)	45.3 (Highly Competent)	42.8 (Highly Competent)	43.2 (Highly Competent)	45.0 (Highly Competent)	45.7 (Highly Competent)
	Admin Asst	46.2 (Highly Competent)	47.8 (Highly Competent)	43.8 (Highly Competent)	46.5 (Highly Competent)	44.3 (Highly Competent)	43.8 (Highly Competent)	46.5 (Highly Competent)	46.0 (Highly Competent)
Degree in Pharmacy	Bachelor's Degree in Pharmacy	44.5 (Highly Competent)	43.3 (Highly Competent)	42.1 (Highly Competent)	45.1 (Highly Competent)	42.8 (Highly Competent)	43.2 (Highly Competent)	45.1 (Highly Competent)	45.4 (Highly Competent)
	Master's Degree	46.9 (Highly Competent)	46.7 (Highly Competent)	46.7 (Highly Competent)	47.7 (Highly Competent)	44.7 (Highly Competent)	43.7 (Highly Competent)	46.3 (Highly Competent)	47.7 (Highly Competent)

Across demographic groups, Dispensing Time & Workflow Efficiency scores ranged from Proficient to Highly Competent, suggesting that dispensing processes are generally adequate, though slightly lower scores among those with more than 10 years of tenure may indicate challenges in adapting to newer systems. This supports WHO's emphasis on balancing speed, accuracy, and patient engagement (WHO, 2009), as well as studies linking shorter dispensing times to compromised counseling and labeling (Desalegn, 2013; Al-Jumah et al., 2014; Alanazi et al., 2024). Similarly, high scores in Accuracy in Medication Selection & Labeling and Stock Management & Availability reflect strong adherence to safety standards and consistent availability of medicines (Ofori-Asenso & Agyeman, 2016; Bondre & Ghube, 2018). While Patient Counseling and Communication remained generally strong, lower scores among more experienced pharmacists suggest possible gaps in adapting to evolving patient-centered care approaches, consistent with findings that recent training enhances counseling competencies (WHO, 2009; FIP, 2020; Alomi, 2015).

Supporting these results, Agaceta et al. (2013) found that pharmacists with 1–5 years of experience demonstrated higher competence and engagement in pharmaceutical care despite systemic barriers such as limited IT infrastructure. This aligns with the current study, which found that early-career pharmacists scored higher in prescription validation, workflow efficiency, and counseling, likely due to greater exposure to Good Pharmacy Practice (GPP). Additionally, pharmacist administrative assistants and those with master's degrees achieved the highest dispensing performance, consistent with findings that advanced education enhances motivation and competence (Mondragon et al., 2021). Organizational communication and error reporting were generally rated Highly Developed, reflecting a strong culture of safety; however, lower scores among more tenured pharmacists suggest challenges in adapting to evolving systems. In contrast, administrative assistants and less experienced pharmacists demonstrated stronger engagement in feedback, systems thinking, and reporting, indicating greater responsiveness to continuous quality improvement initiatives and institutional standards.

Pharmacists' Perceived Organizational Communication and Error Reporting Practices

Table 6 shows clear contrasts in organizational communication and error reporting practices. Pharmacists with more than 10 years of tenure had the lowest scores (10.3, Developing), with weaker performance in error reporting (10.7, Moderate), feedback (10.0, Inconsistent), and systems thinking (10.0, Moderate), suggesting less engagement with evolving systems, while those with less than 5 years scored highest (13.3, Highly Developed), demonstrating proactive systems thinking (14.6) and strong engagement (13.8). By plantilla, administrative assistants achieved the highest overall score (13.7, Highly Developed), particularly in systems thinking (15.0) and feedback (14.3), likely due to greater involvement in institutional processes. In contrast, educational background showed minimal

differences, with both bachelor's (12.8) and master's (12.4) degree holders rated highly developed, though master's degree holders scored lower in error reporting (10.7, Moderate). Overall, the gap between administrative assistants and long-tenured pharmacists highlights the influence of tenure and plantilla classification on these practices.

Table 6. *Pharmacists' Perceived Organizational Communication and Error Reporting Practices by Demographic Profile and Core Competency Area*

Demographic Profile		Overall Perceived Communication and Error Reporting Practices	Core Areas		
		Error Reporting Practices	Error Reporting Behavior	Feedback and Engagement in Improvement	System Thinking & Communication
		Score*	Score*	Score*	Score*
Years of Tenure in the Pharmacy	Less than 5 years	13.3 (Highly Developed)	11.4 (Strong)	13.8 (Actively Involved)	14.6 (Proactive Engagement)
	5-10 years	13.1 (Highly Developed)	11.4 (Strong)	13.9 (Actively Involved)	14.0 (Proactive Engagement)
	More than 10 years	10.3 (Developing)	10.7 (Moderate)	10.3 (Inconsistent)	10.0 (Moderate)
Job Position	Pharmacist	12.5 (Highly Developed)	11.2 (Strong)	13.1 (Actively Involved)	13.2 (Proactive Engagement)
	Admin Asst	13.7 (Highly Developed)	11.8 (Strong)	14.3 (Actively Involved)	15.0 (Proactive Engagement)
	Bachelor's	12.8 (Highly Developed)	11.4 (Strong)	13.4 (Actively Involved)	13.6 (Proactive Engagement)
Degree in Pharmacy	Degree in Pharmacy	12.4 (Highly Developed)	10.7 (Moderate)	13.3 (Actively Involved)	13.3 (Proactive Engagement)
	Master's Degree	12.4 (Highly Developed)	10.7 (Moderate)	13.3 (Actively Involved)	13.3 (Proactive Engagement)

Note: Item #2 - Reverse scored* 0-2: Absent/Needs Improvement (Error reporting behavior is not observed; no engagement in communication or safety practices/ No evidence of error reporting or communication practices; disengaged from safety processes/ No evidence of systems thinking; procedures for communication and error reporting are unclear or not followed); 3-6: Underdeveloped (Error reporting behavior is weak, possibly due to fear of blame or lack of support; feedback is limited and staff disengaged in safety analysis/Limited feedback or disengagement in safety analysis; reporting may be hindered by fear or lack of support/ Weak systems thinking or lack of clarity in procedures; communication is fragmented and inconsistent); 7-10: Moderately engaged (Reporting occurs but inconsistently; requires institutional reinforcement and stronger encouragement to sustain engagement/Inconsistent participation or awareness; reporting occurs but is irregular and requires reinforcement/Inconsistent participation or awareness; reporting occurs but requires reinforcement and clearer procedures.); 11-15: Strongly Developed (Reporting occurs but inconsistently; requires institutional reinforcement and stronger encouragement to sustain engagement/ Actively involved in learning and process improvement; strong culture of accountability and openness/ Strong culture of accountability; proactive engagement in learning, communication, and system-level improvement.)

Plantilla classification influences how pharmacists engage with organizational communication and error reporting systems. Administrative assistants, despite sharing the same job descriptions as pharmacists, achieved the highest scores, likely due to their greater involvement in documentation and compliance processes, whereas pharmacists with more than 10 years of tenure recorded the lowest scores, suggesting a reliance on experiential judgment rather than structured protocols. This aligns with guidance emphasizing the role of workforce classification and role clarity in communication system engagement (WHO, 2009; FIP, 2020), as well as findings that administrative-track pharmacists demonstrate stronger responsiveness to structured reporting practices (Alomi, 2015). Supporting literature further shows that younger or less tenured pharmacists are more open to reporting errors and engaging in system improvements due to greater exposure to current protocols and supportive organizational climates. Similarly, effective incident reporting is linked to trust, transparency, and inclusive feedback systems, with administrative personnel playing key roles in maintaining compliance and facilitating communication (Helman et al., 2020).

Consistent with these insights, the study found that pharmacists with less than 10 years of experience and administrative assistants exhibited stronger systems thinking, feedback engagement, and error reporting behaviors, reflecting better alignment with institutional tools and contemporary practices. They also demonstrated higher acceptance of interventions and stronger openness in communication, whereas more tenured pharmacists showed lower openness, possibly indicating reduced adaptability to change. Despite this, all groups maintained generally strong perceptions, with pharmacists holding master's degrees achieving the highest openness scores, likely due to enhanced competencies in leadership and communication. Overall, the findings suggest that proactive error reporting and collaborative engagement are shaped not only by experience but also by educational exposure, organizational support, and alignment with modern practice frameworks such as Good Pharmacy Practice (GPP).

Pharmacists' Interventions and Perception of Openness in Communication

The data from Table 7 show that pharmacists with less than 10 years of tenure scored significantly higher in intervention acceptance and openness in communication than those with more than 10 years of experience, with

the 5–10 year group achieving 19.8 overall (Strong), including 20.7 in intervention acceptance (High) and 19.0 in openness (Strong), compared to only 14.3 overall (Adequate), 16.3 (Moderate), and 12.3 (Adequate), respectively, among more tenured pharmacists, indicating greater receptiveness to interdisciplinary input and clinical dialogue among newer staff. Similarly, administrative assistants scored higher overall (19.0, Strong) than regular plantilla pharmacists, particularly in intervention acceptance (21.3, High), likely due to their closer involvement in documentation and cross-departmental coordination. Educational attainment also influenced outcomes, as pharmacists with master’s degrees recorded the highest scores (19.8 overall, Strong; 21.0 in openness, Strong), possibly reflecting stronger competencies in leadership, communication, participatory decision-making, and exposure to advanced training in Good Pharmacy Practice (GPP) and interprofessional collaboration.

Table 7. *Distribution of Drug Label Category per Dosage Form and Source of Prescription*

Demographic Profile		Overall Interventions and Perception of Openness in Communication		Core Areas			
				Acceptance of Pharmacists’ Interventions		Perceived Openness in Communication	
		Score	Descriptive Rating	Score	Descriptive Rating	Score	Descriptive Rating
Years of Tenure in the Pharmacy	less than 5 years	18.5	Strong	20.0	High	17.0	Adequate
	5-10 years	19.8	Strong	20.7	High	19.0	Strong
	more than 10 years	14.3	Adequate	16.3	Moderate	12.3	Adequate
Job Position	Pharmacist	18.6	Strong	19.5	High	17.7	Adequate
	Administrative Assistant	19.0	Strong	21.3	High	16.8	Adequate
Degree in Pharmacy	Bachelor's Degree in Pharmacy	18.5	Strong	20.1	High	16.9	Adequate
	Master's Degree	19.8	Strong	18.7	High	21.0	Strong

Note: Ratings and descriptions: Interventions and Perception of Openness in Communication: 0–4: Absent/Needs Development (No evidence of acceptance or communication; interventions and collaboration are ignored or not practiced.); 5–10: Low acceptance/Limited Communication (Interventions may be overlooked or dismissed; communication is minimal, with silos or barriers present.); 11–17: Moderate acceptance/Adequate Communication (Some support and collaborative exchanges occur, but not consistently; communication is functional but limited.); 18–25: High acceptance/Strong, Open Communication (Prescriber collaboration is actively practiced and valued; communication is transparent, proactive, and team-based.)

Several studies support the observed differences in pharmacists’ openness to communication and responsiveness to interventions. Research shows that structured communication training significantly improves confidence, openness, and engagement, particularly among early-career pharmacists (Rahim et al., 2023), while gaps in traditional pharmacy curricula highlight the advantages of training under updated frameworks that equip pharmacists with stronger interpersonal and clinical communication skills (O’Donovan et al., 2021). Global standards further emphasize the importance of communication, leadership, and collaboration in pharmacy practice (FIP, 2020), with openness and acceptance of interventions identified as critical to the rational use of medicine and patient safety (WHO, 2009). These findings collectively support the current study’s results, which show that newer pharmacists and those with advanced training demonstrate stronger engagement in communication and intervention practices. Leadership and training perspectives further explain these differences. Pharmacists exposed to transformational and participatory leadership approaches are more likely to foster open communication and shared decision-making (Holdford, 2003), which aligns with the higher scores of less-tenured pharmacists and those with master’s degrees in the current study. In contrast, more experienced pharmacists may exhibit lower openness due to entrenched routines or limited exposure to evolving communication norms, a gap that structured communication training can help address (Rahim et al., 2023). This reinforces the idea that communication competence is not innate but can be developed through targeted interventions, particularly through exposure to Good Pharmacy Practice (GPP) and interprofessional collaboration. Personality factors and professional development also contribute to these patterns. A positive relationship between openness to experience and organizational commitment suggests that pharmacists who are more adaptable and receptive to change are also more engaged in collaborative practices. This helps explain why early-career pharmacists and those with advanced education scored higher in intervention acceptance and communication, as both recent training and postgraduate education tend to foster systems thinking, creativity, and responsiveness to feedback. Overall, the findings indicate that a combination of training, leadership exposure, personality traits, and organizational support shapes communication and intervention effectiveness.

Overall Scores and Rating on Dispensing Performance

Based on Table 8, the pharmacist respondents demonstrate strong, well-rounded dispensing performance across three critical domains: operational efficiency, communication systems, and acceptance of their interventions.

Table 8. Overall Scores and Rating on Dispensing Performance

Indicators	Score	Descriptive Rating
Perceived Efficiency in Dispensing Process and Medication Handling	44.85	Highly Competent
Perceived Organizational Communication and Error Reporting Practices	12.73	Strongly Developed
Acceptance of Pharmacists' Interventions and Perception of Openness in Communication	18.68	High acceptance/Strong, Open Communication

The overall results demonstrate that the hospital's pharmacy services are performing strongly across three critical domains: dispensing efficiency, organizational communication, and openness to pharmacist interventions. First, the perceived efficiency in the dispensing process and medication handling scored 44.85 (Highly Competent), indicating that workflows are timely, accurate, and well-organized. This suggests that staff can manage medication preparation and release effectively, minimizing delays and errors, which aligns with WHO (2009) standards for rational medicine use and safe dispensing practices. Second, the perceived organizational communication and error-reporting practices scored 12.73 (Strongly Developed), indicating the presence of structured systems for reporting, feedback, and collaborative improvement. This shows that staff feel confident in documenting incidents and participating in communication loops, consistent with FIP (2020) workforce development goals that emphasize system-level learning and safety culture. Third, the acceptance of pharmacists' interventions and openness in communication scored 18.68 (High acceptance/Strong, Open Communication). Importantly, this measure is based on pharmacists' self-evaluation of how they perceive other medical staff accept their roles and interventions. The high score suggests that pharmacists feel valued and supported in their contributions, though triangulation with other professionals' perspectives would strengthen the interpretation. Literature supports these findings: Rahim et al. (2023) and O'Donovan et al. (2021) highlight that structured training and updated curricula enhance communication confidence, while Helman et al. (2020) emphasize that supportive organizational climates foster transparency and accountability in error reporting. Taken together, the results portray a hospital pharmacy environment that is operationally efficient and communicatively mature, and pharmacists perceive it as collaborative and inclusive, underscoring the importance of sustaining institutional support, role clarity, and continuous professional development to maintain high performance across all domains.

Pharmacists' Perception of Health Facilities and Resource Availability for Good Dispensing Practice

The current study's findings on pharmacists' perceptions of facility and resource adequacy offer valuable insights into how professional experience, job role, and educational attainment shape views on institutional support for good dispensing practices.

Table 9. Pharmacists' Perception of Health Facilities and Resource Availability for Good Dispensing Practice

Demographic Profile		Overall Facilities and Resource Availability for Good Dispensing Practice	
		Score	Descriptive Rating
Years of Tenure in the Pharmacy	less than 5 years	42.4	Highly Competent
	5-10 years	37.9	Proficient
	more than 10 years	41.0	Highly Competent
Job Position	Pharmacist	38.2	Proficient
	Administrative Assistant	47.0	Highly Competent
Degree in Pharmacy	Bachelor's Degree in Pharmacy	39.4	Proficient
	Master's Degree	43.3	Highly Competent
Overall	40.0	Proficient	

Note: Score 10–20 – Needs Improvement = The facility demonstrates substantial gaps across key medication use practices. Persistent deficiencies in stock management, prescribing accuracy, patient education, workflow efficiency, and availability of dispensing-related facilities suggest systemic concerns. Urgent and strategic interventions are required to ensure safe, effective, and patient-centered pharmaceutical services. Score 21–30 – Developing Competency = The facility meets some basic operational standards but lacks consistency in areas such as medication availability, workflow management, and dispensing infrastructure. While select processes function adequately, there are clear opportunities for improvement—particularly in facility readiness, staff support, and adherence to rational drug use guidelines. Score 31–40 – Proficient = The facility demonstrates reliable performance in most domains. Stock systems, prescribing habits, patient education, and pharmacy workflow are generally well-executed. Adequate resources are available to support dispensing, although minor enhancements in technology, infrastructure, or staff capacity could further optimize patient care. Score 41–50 – Highly Competent = The facility exhibits excellence in all major aspects of medication use. It maintains consistent stock levels, supports accurate prescribing, empowers patients through education, and demonstrates optimal workflow efficiency. Most notably, it provides the facilities, resources, and professional environment necessary to uphold high standards in dispensing. This score affirms the institution's strong alignment with WHO indicators and patient safety principles.

The overall score of 40.0 (Proficient) indicates that pharmacists generally perceive the hospital's dispensing facilities and resources as adequate, though not consistently optimal across all groups. Administrative assistants rated the highest (47.0, Highly Competent), followed by master's degree holders (43.3) and pharmacists with more than 10 years of tenure (41.0), suggesting that those with broader institutional exposure tend to view resource availability more favorably due to their deeper involvement in systems, documentation, and workflows. In contrast, pharmacists with 5–10 years of tenure (37.9), regular plantilla pharmacists (38.2), and bachelor's degree holders (39.4) recorded lower – though still Proficient – scores, possibly reflecting transitional challenges, limited access to decision-making, or gaps between expectations and actual resource availability. These findings align with the FIP (2020) emphasis on the role of workforce development, access to tools, and professional growth in shaping perceptions of resource adequacy, as well as the WHO (2009) view that effective dispensing depends on both infrastructure and the ability to navigate systems efficiently. The higher ratings among administrative assistants are also consistent with their role in compliance and resource coordination (Kenny, 2024). Overall, while resources are considered sufficient, the results highlight the need for more inclusive access, stronger support for mid-career pharmacists, and improved engagement in institutional processes to ensure consistent performance across all profiles.

Test of Significant Difference in Medication Use Pattern When Grouped According to Source of Prescription **Test for Significant Differences in the Number of Prescriptions**

The Kruskal–Wallis H test was conducted to determine whether there were significant differences in the number of prescriptions across the different sources of prescription within the hospital. As shown in Table 10, there was a statistically significant difference in the number of prescriptions by the source ($p < .001$). This indicates that the distribution of prescriptions varied significantly across the Ward, Outpatient Department (OPD), Emergency Room (ER), and Radiology Department. Among these, the OPD obtained the highest mean rank (20.83), followed by the ER (15.17), the Radiology Department (10.50), and the Ward (3.50).

Table 10. Test for Significant Differences in the Number of Prescriptions According to Source of Prescription

Source of Prescription	Mean Rank	Test Statistic	P-Value	Conclusion
Ward	3.50	19.40	< .001*	with significant difference
OPD	20.83			
ER	15.17			
Radiology Department	10.50			

*Significant at $\alpha = 0.05$

In interpreting the results of the Kruskal–Wallis H test, it is important to note that the prescriptions utilized in this study were drawn specifically from three sources: the Outpatient Department (OPD), patients in the ward who were about to be discharged, and non-admitted patients in the Emergency Room (ER). This methodological focus explains the observed distribution. The OPD obtained the highest mean rank (20.83), consistent with its role in managing a large and diverse patient population, including chronic disease management, routine consultations, and follow-up care, all of which culminate in discharge prescriptions. The ER followed with a mean rank of 15.17, reflecting prescriptions for patients treated and released directly, often requiring immediate take-home medications. The Radiology Department (10.50) contributed fewer prescriptions, as these are typically linked to diagnostic procedures or contrast-related medications. Finally, the ward recorded the lowest mean rank (3.50), since most inpatient medications are administered during admission and consolidated into treatment charts, with only a limited number of prescriptions issued at discharge. This pattern is consistent with international findings. Idris et al. (2024) reported that outpatient clinics consistently generate more prescriptions than inpatient wards, largely due to higher patient turnover and broader diagnostic scope. Robles-Piedras et al. (2023) similarly observed that prescription frequency varies significantly by department, with outpatient services leading, while inpatient wards show fewer discharge prescriptions because medications are consolidated during hospital stays. WHO (2009) also emphasizes that prescription volume is closely tied to patient flow and discharge practices, underscoring the importance of monitoring prescribing patterns across different hospital units.

Post Hoc Test for Pairwise Comparison of Number of Prescriptions

The post hoc analysis presented in Table 11 further identified the specific group differences. Results revealed that the number of prescriptions from the OPD was significantly higher than those from the Ward ($p < .001$) and the ER ($p = .026$). Meanwhile, no significant differences were observed in the other pairwise comparisons (all $p > .05$). The findings suggest that the number of prescriptions is not evenly distributed across hospital departments, with the OPD contributing a significantly greater volume.

Table 11. *Post Hoc Test for Pairwise Comparison of Number of Prescriptions According to Source of Prescription*

Source of Prescription	Test Statistic	P-Value	Conclusion
Ward – Radiology Department	-7.00	.518	No significant difference
Ward – ER	-11.67	.026*	With significant difference
Ward – OPD	-17.33	< .001*	With significant difference
Radiology Department – ER	4.67	1.000	No significant difference
Radiology Department – OPD	10.33	.068	No significant difference
ER – OPD	5.67	.990	No significant difference

*Significant at $\alpha = 0.05$

Given the study's findings, focus should be placed on strengthening prescribing practices in both the ward and the Emergency Room (ER). For the ward, the low number of discharge prescriptions highlights the need to reinforce systematic discharge planning, ensuring that medication reconciliation and continuity of care are properly documented when patients transition out of inpatient status. Pharmacist involvement at the point of discharge can help bridge gaps between treatment charts and take-home prescriptions, reducing risks of omission and improving adherence. In the ER, where prescriptions reflect non-admitted patients treated and released, the priority is to standardize acute prescribing protocols and embed pharmacists within ER teams to enhance accuracy and safety under time-pressured conditions. Linking ER prescriptions to follow-up care in the OPD would further strengthen continuity and monitoring. Together, these measures align with WHO (2009) and FIP (2020) guidance on rational medicine use and workforce development, ensuring that prescribing practices in lower-volume but high-risk settings, such as the ward and ER, remain consistent, patient-centered, and integrated with broader hospital systems.

Test of Significant Difference Among Pharmacists' Self-Evaluation of Dispensing Performance

Test of Significant Difference in the Dispensing Performance

Table 12 presents results from tests of significant differences in pharmacists' perceived efficiency in dispensing and medication handling, grouped by demographic profile. The results revealed no statistically significant differences across groups for years of tenure ($p = .250$), job position ($p = .617$), or highest educational attainment ($p = .216$). This suggests that pharmacists, regardless of their experience, job title, or education level, generally perceive their dispensing performance similarly. It may indicate that the systems and processes in place standardize the dispensing workflow and expectations, leading to uniform perceptions of performance among staff.

Table 12. *Test of Significant Difference in the Pharmacists' Perceived Dispensing Performance*

Demographic Profile		Mean Rank	Test Statistic	p-Value	Conclusion
Years of Tenure in the Pharmacy	less than 5 years	10.80	2.77	.250	No significant difference
	5-10 years	11.67			
	more than 10 years	5.33			
Job Position	Pharmacist	10.13	26.00	.617	No significant difference
	Administrative Assistant	12.00			
Degree in Pharmacy	Bachelor's Degree in Pharmacy	9.76	13.00	.216	No significant difference
	Master's Degree	14.67			

*Significant at $\alpha = 0.05$

This finding is consistent with international literature. WHO (2009) emphasized that rational use of medicine depends heavily on standardized dispensing processes and institutional safeguards, which help ensure consistency across different cadres of health professionals. Similarly, the International Pharmaceutical Federation (FIP, 2020) highlighted that workforce development goals should prioritize system-level competencies and organizational support, as these foster uniformity in practice across diverse staff groups. Rahim et al. (2023) further noted that communication and dispensing confidence are often shaped more by structured training and institutional culture than by tenure alone, while O'Donovan et al. (2021) observed that curricular gaps in communication and dispensing skills are mitigated when hospitals adopt standardized protocols and continuous professional development programs. Together, these studies reinforce the interpretation that the absence of significant differences across demographic profiles reflects the hospital's ability to maintain equitable, standardized dispensing practices, ensuring that all pharmacists—whether junior or senior, administrative or clinical, bachelor's- or master's-trained—operate within the same structured framework.

Test of Significant Difference in the Organizational Communication and Error Reporting Practices

Table 13 presents the results of the Kruskal-Wallis H test used to determine whether there are significant differences in pharmacists' perceived organizational communication and error-reporting practices across three demographic profiles: years of tenure, job position, and educational attainment. The analysis revealed a statistically significant difference in perceptions of communication and error-reporting practices by years of tenure ($p = .022$), indicating that pharmacists' perceptions varied by tenure. Specifically, those with less than 5 years and 5–10 years of tenure had higher mean ranks (12.70 and 11.71, respectively) compared to those with more than 10 years (mean rank of 2.00). This suggests that newer staff may perceive organizational communication and error reporting more positively than their more experienced counterparts, potentially because of recent training, greater openness to institutional protocols, or an evolving workplace culture.

Table 13. *Test of Significant Difference in the Pharmacists' Perceived Organizational Communication and Error Reporting Practices*

Demographic Profile		Mean Rank	Test Statistic	<i>p</i> -Value	Conclusion
Years of Tenure in the Pharmacy	Less than 5 years	12.70	7.61	.022*	With significant difference
	5-10 years	11.71			
	More than 10 years	2.00			
Job Position	Pharmacist	9.56	17.00	.178	No significant difference
	Administrative Assistant	14.25			
Degree in Pharmacy	Bachelor's Degree in Pharmacy	10.59	24.00	.921	No significant difference
	Master's Degree	10.00			

*Significant at $\alpha = 0.05$

In contrast, no significant differences were found based on job position ($p = .178$) or educational attainment ($p = .921$). Pharmacists and Administrative Assistants reported similar perceptions, as did those holding a Bachelor's versus a Master's degree in Pharmacy. These findings imply that role and academic background do not substantially influence pharmacists' views on communication and error reporting within the organization. Overall, the results highlight tenure as a meaningful factor in shaping perceptions of organizational practices, suggesting that targeted interventions or refresher programs may benefit long-tenured staff in aligning their views with evolving standards and expectations. These findings are supported by Hartt et al. (2024), who found that workplace factors and staff experience influenced pharmacists' attitudes toward error reporting, with newer staff viewing systems as more supportive while senior staff expressed skepticism. Similarly, Helman et al. (2020) reported that younger pharmacists were more open to reporting errors and engaging in system-level improvements, while experienced staff expressed reservations rooted in past punitive cultures. The PSNet (AHRQ, 2024) summary of Canadian pharmacists' use of the CPHIR database also highlighted generational differences, noting that early-career pharmacists emphasized transparency and learning. In contrast, the senior staff was less consistent in reporting. These results align with WHO (2009) and FIP (2020) guidance, which emphasize the importance of continuous professional development and supportive organizational climates to sustain engagement in communication and error reporting across all tenure levels.

Post Hoc Test for Pairwise Comparison

The post hoc analysis in Table 14 indicates a clear divergence in pharmacists' views on organizational communication and error reporting by length of service. Those with more than 10 years of tenure reported significantly different perceptions than colleagues with less than 5 years ($p = .036$) and those with 5 to 10 years ($p = .030$). This pattern suggests that seasoned staff may be more critical of current systems, shaped by their accumulated experiences and exposure to earlier organizational climates that may have been less supportive of open reporting. In contrast, early- and mid-career pharmacists did not differ significantly ($p = 1.000$), indicating a shared outlook likely influenced by recent training and a workplace culture that emphasizes transparency and collaborative communication.

Table 14. *Post Hoc Test for Pairwise Comparison of Perceived Organizational Communication and Error Reporting Practices in terms of Years of Tenure*

Years of Tenure	Test Statistic	P-Value
less than 5 years & 5-10 years	0.99	1.000
less than 5 years & more than 10 years	1.70	.036*
5-10 years & more than 10 years	9.71	.030*

*Significant at $\alpha = 0.05$

Comparable findings have been documented in international research. Hartt et al. (2024) observed that newer pharmacists often view reporting structures as constructive, while longer-tenured staff express reservations rooted in past punitive approaches. Helman et al. (2020) similarly noted that younger pharmacists were more willing to engage in error reporting and system improvement. In contrast, experienced staff tended to be less favorable, possibly due to entrenched habits and skepticism about organizational responsiveness. Hartt et al.'s (2024) review of Canadian pharmacists' reporting practices also highlighted generational differences: early-career professionals emphasized learning and openness, while senior staff were less consistent in their engagement. These studies reinforce the interpretation that tenure influences perceptions of communication and reporting, underscoring the importance of targeted strategies—such as refresher training, inclusive dialogue, and recognition of long-tenured staff contributions—to ensure alignment across the workforce.

Test of Significant Difference in the Pharmacists' Interventions and Perception of Openness in Communication

Table 15 showed no statistically significant differences in pharmacists' perceptions of openness in communication and willingness to intervene, regardless of tenure, job position, or educational attainment, as all p-values exceeded the $\alpha = 0.05$ threshold. This uniformity suggests that institutional culture and standardized communication protocols may exert a stronger influence than individual demographic factors. Notably, the p-value for years of tenure ($p = .055$) was marginally above the threshold, hinting at a possible trend: pharmacists with 5–10 years of experience reported the highest mean rank (12.42), followed by those with less than 5 years (10.20), while those with more than 10 years had a markedly lower mean rank (3.33). Although not statistically significant, this pattern implies that longer-tenured staff may perceive openness less favorably or engage less actively in interventions, potentially reflecting reliance on established routines or critical views shaped by past organizational climates.

Table 15. *Test of Significant Difference in the Pharmacists' Interventions and Perception of Openness in Communication*

Demographic Profile		Mean Rank	Test Statistic	p-Value	Conclusion
Years of Tenure in the Pharmacy	Less than 5 years	10.20	5.78	.055	No significant difference
	5-10 years	12.42			
	More than 10 years	3.33			
Job Position	Pharmacist	10.44	31.00	.963	No significant difference
	Administrative Assistant	10.75			
Degree in Pharmacy	Bachelor's Degree in Pharmacy	10.21	50.50	.616	No significant difference
	Master's Degree	12.17			

*Significant at $\alpha = 0.05$

Comparable findings have been reported in the literature. O'Donovan et al. (2021) highlighted that structured communication training helps standardize practices across diverse groups, reducing demographic variation in perceptions. Rahim et al. (2023) similarly noted that communication confidence is often shaped more by institutional training and workplace culture than by tenure or role, which explains the lack of significant differences between pharmacists and administrative assistants in this study. Helman et al. (2025) observed that newer pharmacists tend to be more receptive to evolving communication systems, while longer-tenured staff may be less favorable, echoing the marginal trend identified here. The International Pharmaceutical Federation (FIP, 2020) also emphasizes that workforce development should prioritize system-level competencies and organizational culture, as these create consistency across staff regardless of education or position. Taken together, the results suggest that the hospital's collaborative culture and standardized protocols effectively promote consistent communication practices across staff levels. At the same time, the marginal tenure-related trend underscores the importance of continuous engagement strategies and refresher training to ensure that longer-tenured staff remain aligned with evolving expectations for openness and intervention.

Test of Significant Difference of Health Facilities and Resource Availability for Good Dispensing Practice

Table 16 presents the results of the Mann-Whitney U test used to determine the significant difference in pharmacists' perception of health facilities and resource availability for good dispensing practice. For years of tenure in the pharmacy, those with less than 5 years had a mean rank of 12.29, those with 5–10 years had 9.15, and those with more than 10 years had 10.83. The U statistic was 1.18 ($p = 0.555$), indicating *no significant difference*. By job position, pharmacists had a mean rank of 9.06, while administrative assistants had 16.25. The U statistic was 9.00 ($p = 0.029$), indicating a *significant difference*. By highest educational attainment, bachelor's degree holders had a mean rank of 10.06, while master's degree holders had 13.00. The U statistic was 18.000 with a p-value of 0.479, indicating *no significant difference*.

Table 16. *Test of Significant Difference in the Pharmacists' Perception of Health Facilities and Resource Availability for Good Dispensing Practice*

Demographic Profile		Mean Rank	Test Statistic	P-value	Conclusion
Years of Tenure in the Pharmacy	Less than 5 years	12.29	1.18	0.555	No significant difference
	5-10 years	9.15			
	More than 10 years	10.83			
Job Position	Pharmacist	9.06	9.00	0.029*	With significant difference
	Administrative Assistant	16.25			
Highest Educational Attainment	Bachelor's Degree in Pharmacy	10.06	18.00	0.479	No significant difference
	Master's Degree	13.00			

Note: *Significant at $\alpha = 0.05$

Pharmacists' Self-Evaluation of Dispensing Performance with Health Facility Evaluation

Test of Correlation Between Pharmacists' Self-Evaluation and Health Facility Evaluation

Table 17 presents the results of a correlational analysis examining the relationships between pharmacists' self-evaluation of dispensing performance and three organizational factors: communication and error reporting practices, interventions and openness in communication, and health facility resource availability. The analysis uses correlation coefficients (r) to measure the strength and direction of these associations, with significance determined at an alpha level of 0.05. The findings reveal several statistically significant and positive correlations: (1) perceived dispensing performance was strongly correlated with both organizational communication and error reporting practices ($r = 0.67$) and health facility resource availability ($r = 0.63$).

Table 17. *Test of Correlation Between Pharmacists' Self-Evaluation of Dispensing Performance and Health Facility Evaluation*

Variables	1	2	3	4
1. Perceived Dispensing Performance	-			
2. Perceived Organizational Communication and Error Reporting Practices	.67*	-		
3. Interventions and Perception of Openness in Communication	.39	.62*	-	
4. Perception of Health Facilities and Resource Availability for Good Dispensing Practice	.63*	.74*	.83*	-

*Significant at $\alpha = 0.05$

Conclusion

The Outpatient Department emerged as the leading source of prescriptions, reflecting its central role in chronic and acute care. Generic drugs, predominantly in oral form, supported rational and cost-effective use, though the presence of non-PNF items and documentation gaps highlight the need for improved formulary adherence and data tracking. Pharmacists generally rated themselves as "Highly Competent," with early-career professionals and those with advanced education scoring highest. Communication and error reporting were well-developed, but lower engagement among long-tenured staff suggests the need for targeted support to sustain consistency across experience levels. Facility infrastructure and staffing were viewed positively overall, with newer staff most favorable, mid-tenured staff more critical, and long-tenured staff returning to high ratings, likely due to familiarity and resource access. Prescription volume differed significantly across departments, with the OPD contributing the most, underscoring the need for department-specific strategies in resource allocation and workflow planning. No significant differences were found in self-evaluation scores across tenure, role, or education, though newer pharmacists reported stronger communication and error reporting perceptions, and administrative assistants viewed resources more favorably. Pharmacists' perceived performance was strongly linked to communication systems and resource availability, while openness in communication exerted weaker direct influence but remained interconnected with institutional support. Overall, the findings emphasize the importance of integrated systems, ongoing professional development, and tailored interventions to strengthen pharmaceutical care and align with WHO standards.

Contributions of Authors

Author 1: conceptualization, proposal writing, data gathering, data analysis, manuscript finalization, and revisions

Author 2: proposal writing and revision

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References

- Abrigo, M., Opiniano, G., Tam, Z., Yee, S., & Estopace, K. (2021). Public sector procurement of medicines in the Philippines (PIDS Discussion Paper Series No. 2021-44). Philippine Institute for Development Studies. Retrieved January 15, 2026, from <https://pidswebs.pids.gov.ph/CDN/PUBLICATIONS/pidsdps2144.pdf>
- Agaceta, C., Diano, G., Lintag, P., & Loquias, M. (2013). Current practices and perceptions on pharmaceutical care of hospital pharmacists in Metro Manila. *International Journal of Pharmacy Teaching & Practices*, 4(4), 821–825. <https://tinyurl.com/5e8s455k>
- Alanazi, S., & Alanazi, A. (2024). Enhanced pharmacy service delivery through a pharmacy information system at a medical center: A case study. *Cureus* 16(9): e68865. <https://doi.org/10.7759/cureus.68865>
- Alomi, Y., Alghamdi, S., & Alattay, R. (2015). Strategic plan of general administration of pharmaceutical care at Ministry of Health in Saudi Arabia 2012–2022. *Journal of Pharma and Pharmaceutical Sciences*. 1(3): 1–8. <https://doi.org/10.24218/vipps.2015.11>
- Al-Jumah, K., Hassali, M., & Al-Zaagi, I. (2014). Adaptation and validation of a questionnaire assessing patient satisfaction with pharmacy services in general hospitals. *Patient Preference and Adherence*, 8, 371–375. <https://doi.org/10.2147/PPA.S58565>
- Bondre, S., & Ghuhe, P. (2024). Review on drug distribution in hospital pharmacy. *International Journal of Creative Research Thoughts (IJCRT)*, 12(11), c598–c604. <https://www.ijcrt.org/papers/IJCRT2411291.pdf>
- Chand, S., Shastri, C., Hiremath, S., Joel, J., & Krishnabhat, C. (2022). Hospital pharmacy management in a tertiary care charitable hospital: Compliance study with quality standards. *Clinical Epidemiology and Global Health*, 17, 101154. <https://doi.org/10.1016/j.cegh.2022.101154>
- Desalegn, A. (2013). Assessment of drug use pattern using WHO prescribing indicators at Hawassa University Teaching and Referral Hospital, South Ethiopia: A cross-sectional study. *BMC Health Services Research*, 13, 170. <https://doi.org/10.1186/1472-6963-13-170>
- Goruntla, N., Ssesanga, J., Bommireddy, B., Thammisetty, D., Kasturi Vishwanathasetty, V., Ezeonwumelu, J., & Bukke, S. (2023). Evaluation of rational drug use based on WHO/INRUD core drug use indicators in a secondary care hospital: A cross-sectional study in Western Uganda. *Drug, Healthcare and Patient Safety*, 15, 125–135. <https://doi.org/10.2147/DHPS.S424050>
- Hartt, C., Weigand, H., MacDonald, A., Barker, J., & MacKinnon, N. (2024). Pharmacists' perceptions of error reporting systems. *Journal of Patient Safety and Risk Management*, 29(6), 268–273. <https://doi.org/10.1177/25160435241288287>
- Helman, N., Alrufaiq, B., & Alsahli, A. (2020). Pharmacists' experiences with medication error reporting systems: Examining attitudes, experiences, and challenges in hospitals. *International Journal of Innovative Research in Engineering & Multidisciplinary Physical Sciences (IJIREMS)*, 8(1). <https://www.ijirmps.org/papers/2020/3/230809.pdf>
- Hodkinson, A., Zhou, A., Johnson, J., Geraghty, K., Riley, R., Panagopoulou, E., Chew-Graham, C., Peters, D., Esmail, A., & Panagioti, M. (2022). Associations of physician burnout with career engagement and quality of patient care: Systematic review and meta-analysis. *BMJ*, e070442. <https://doi.org/10.1136/bmj-2022-070442>
- Holdford, D. (2003). Leadership theories and their lessons for pharmacists. *American Journal of Health-System Pharmacy: AJHP: official journal of the American Society of Health-System Pharmacists*, 60(17), 1780–1786. <https://doi.org/10.1093/ajhp/60.17.1780>
- Idris, S., Hussien, T., Al-Shammari, F., Nagi, H., Bashir, A., Elhusein, G., Abdalla, R., Mohammed, H., Abdelaziz, W., Alshammari, A., Alreshidi, H., Alshammari, H., & Ibrahim, S. (2024). An evaluation of drug prescribing patterns and prescription completeness. *Healthcare*, 12(22), 2221. <https://doi.org/10.3390/healthcare12222221>
- International Pharmaceutical Federation (FIP). (2020). The FIP Development Goals: Transforming global pharmacy. The Hague: International Pharmaceutical Federation. Retrieved January 15, 2026, from <https://www.fip.org/file/4793>
- Jabour, A. (2020). The impact of longer consultation time: A simulation-based approach. *Applied Clinical Informatics*, 11(5), 857–864. <https://doi.org/10.1055/s-0040-1721320>
- Kumar, D., & Kumar, D. (2018). "Managing the essential medicines stock at rural healthcare systems in India". *International Journal of Health Care Quality Assurance*, 31(8):950–965. <https://doi.org/10.1108/IJHCQA-12-2016-0186>
- Lanip, N., Dans, L., Tan-Lim, C., Gonzales, M., Galingana, C., Sanchez, J., Aquino, M., Loreche, A., Rey, M., Panganiban, J., & Dans, A. (2024). Prescribing patterns in a primary care service in a rural site in the Philippines from April 2019 to March 2020 – A cross-sectional Study. *Acta Medica Philippina*, 58(19), 93–100. <https://doi.org/10.47895/amp.vi0.8668>
- Mohd Arof, K., Ismail, S., & Saleh, A. (2018). Contractor's performance appraisal system in the Malaysian construction industry: Current practice, perception and understanding. *International Journal of Engineering & Technology*, 7(3.9), 46–51. <https://doi.org/10.14419/ijet.v7i3.9.15272>
- Mondragon, J., Olaverre, D., Ansay, I., & Arenas-Ocampo, J. (2021). Challenges and motivations of pharmacists and pharmacy assistants for continuing professional education. *Universitas*, 9(1), 1–16. <https://journals.umak.edu.ph/universitas/article/view/23/18>
- O'Donovan, R., De Brún, A., & McAuliffe, E. (2021). Healthcare professionals experience of psychological safety, voice, and silence. *Frontiers in Psychology*, 12, Article 626689. <https://doi.org/10.3389/fpsyg.2021.626689>
- Philippine National Formulary. (2022). PNF essential medicines list. PhilHealth. Retrieved January 15, 2026, from
- Rahim, N., Rizal, A., Al-mashhadani, A., Naharuddin, N., & Mat, M. (2023). Improving communication skills among pharmacists through communication skill training. *International Journal of Academic Research in Business and Social Sciences*, 13(12), 3589–3597. <https://tinyurl.com/mr3skvez>
- Robles-Piedras, A., Bautista-Sánchez, E., Bautista-Sánchez, U., Olvera-Hernández, E., Chehue-Romero, A., & Medécigo-Hernández, J. (2025). Prescription and drug consumption patterns in internal medicine: A study in a secondary level hospital. *Biomedical and Pharmacology Journal*, 18 (2). <https://dx.doi.org/10.13005/bpj/3204>
- Shao, S., Chan, Y., Lin, S., Li, C., Yang, Y., Chen, Y., Chen, H., & Lai, E. (2020). Workload of pharmacists and the performance of pharmacy services. *PLOS ONE*, 15(4), e0231482. <https://doi.org/10.1371/journal.pone.0231482>
- Tadesse, T., Molla, M., Yimer, Y., Tarekegn, B., & Kefale, B. (2022). Evaluation of antibiotic prescribing patterns among inpatients using World Health Organization indicators: A cross-sectional study. *SAGE Open Medicine*, 10, 20503121221096608. <https://doi.org/10.1177/20503121221096608>
- Taherdoost, H. (2016). Validity and reliability of the research instrument: How to test the validation of a questionnaire/survey in a research. *International Journal of Academic Research in Management*, 5, 28–36. <https://doi.org/10.2139/ssrn.3205040>
- Wendie, T., Ahmed, A., & Mohammed, S. (2021). Drug use pattern using WHO core drug use indicators in public health centers of Dessie, North-East Ethiopia. *BMC Medical Informatics and Decision Making*, 21(1), 197. <https://doi.org/10.1186/s12911-021-01530-w>
- World Health Organization. (1993). How to investigate drug use in health facilities: Selected drug use indicators. World Health Organization. Retrieved January 15, 2026, from <https://iris.who.int/handle/10665/60519>
- World Health Organization. (2003). Introduction to drug utilization research. World Health Organization. Retrieved January 15, 2026, from <https://tinyurl.com/3dd8thzm>
- World Health Organization. (2006). Using indicators to measure country pharmaceutical situations: Fact book on WHO Level I and Level II monitoring indicators. World Health Organization. Retrieved January 15, 2026, from <https://iris.who.int/handle/10665/354554>
- World Health Organization. (2009). Medicines use in primary care in developing and transitional countries: Fact book summarizing results from studies reported between 1990 and 2006. World Health Organization. Retrieved January 15, 2026, from <https://iris.who.int/handle/10665/70032>
- World Health Organization. (2021). How to investigate drug use in health facilities: Selected drug use indicators. World Health Organization. Retrieved January 15, 2026, from <https://iris.who.int/handle/10665/60519>
- World Health Organization. (2011). Joint FIP/WHO guidelines on good pharmacy practice: Standards for quality of pharmacy services. World Health Organization. Retrieved January 15, 2026, from <https://tinyurl.com/4z3uv7ji>
- World Health Organization. (2022). Medication without harm. World Health Organization. Retrieved January 15, 2026, from <https://www.who.int/initiatives/medication-without-harm>
- World Health Organization. (2025). The selection and use of essential medicines 2025: Executive summary of the recommendations made by the 25th WHO Expert Committee on Selection and Use of Essential Medicines (WHO/MHP/HPS/EML/2025.01). Geneva: World Health Organization. Retrieved January 15, 2026, from <https://www.who.int/publications/i/item/B09544>