



Original article

Application of the Basel Statements self-assessment questionnaire in eight hospitals in Latin America

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Objective: The standardization of hospital pharmacy practice remains a challenge in Latin America due to the heterogeneity of healthcare systems. The Basel Statements, developed by the International Pharmaceutical Federation, provide guidelines aimed at improving patient safety and medication management; however, their implementation across the region is inconsistent.

To evaluate the application of the Basel Statements Self-Assessment Questionnaire in hospitals across Latin America and identify priority areas for improvement.

Method: A multicenter study was conducted in eight hospitals from eight countries. A 33-item questionnaire based on the Basel Statements was electronically distributed to clinical and hospital pharmacists. A descriptive analysis was performed.

Results: Only 25% of hospitals reported effective integration of pharmacists into clinical decision-making. Fewer than one-third had adequate medication traceability systems. Additionally, only 37.5% reported having regulations for the use of dietary supplements. Lack of standardization in medication storage and administration was also observed, increasing the risk of medication errors.

Conclusions: Implementation of the Basel Statements in Latin America is heterogeneous and requires targeted interventions. Strengthening pharmacists' involvement in multidisciplinary teams, improving traceability systems, and developing stronger regulations to support the safe use of medications are essential steps to enhance patient safety in the region.

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Aplicación del cuestionario de autoevaluación de las Declaraciones de Basilea en 8 hospitales de América Latina

R E S U M E N

Palabras clave:

Seguridad del paciente
Farmacéuticos
Servicio de farmacia hospitalaria
América Latina
Evaluación de programas
Gestión de medicamentos

Objetivo: la estandarización de la farmacia hospitalaria continúa siendo un reto en América Latina debido a la diversidad de sus sistemas de salud. Las Declaraciones de Basilea, desarrolladas por la Federación Farmacéutica Internacional, buscan orientar la práctica farmacéutica mediante criterios dirigidos a mejorar la seguridad del paciente y la gestión de medicamentos; sin embargo, su implementación en la región es desigual.

Evaluar la aplicación del Cuestionario de Autoevaluación de las Declaraciones de Basilea en hospitales de América Latina e identificar áreas prioritarias de mejora.

Método: Estudio multicéntrico en 8 hospitales de 8 países. Se aplicó un cuestionario de 33 ítems basado en las Declaraciones de Basilea, distribuido electrónicamente a farmacéuticos clínicos y hospitalarios. El análisis fue descriptivo.

Resultados: Solo el 25% de los hospitales reportó integración efectiva del farmacéutico en decisiones clínicas. Menos de un tercio cuenta con sistemas adecuados de trazabilidad de medicamentos. El 37,5% dispone de normativas para suplementos dietéticos. Asimismo, se evidenció falta de estandarización en almacenamiento y administración, aumentando el riesgo de errores.

Conclusiones: La implementación de las Declaraciones de Basilea es heterogénea y requiere intervenciones dirigidas. Es esencial fortalecer la participación del farmacéutico, mejorar la trazabilidad e impulsar regulaciones más robustas para promover el uso seguro de medicamentos.

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Introduction

The concept of establishing the International Pharmaceutical Federation (IPF) was first proposed in 1910 in Brussels (Belgium), to promote collaboration among pharmacists worldwide and to safeguard pharmacy practice as a fundamental discipline in healthcare. The IPF was formally established in 1912 in The Hague (Netherlands).¹ Prior to this, pharmacists from different countries had limited interaction, which was largely confined to occasional conferences. Today, the IPF brings together more than 130 national organizations, including academic institutions and individual pharmacists, thereby facilitating the standardization and advancement of pharmacy practice worldwide.²

One of the main objectives of the IPF is to strengthen the role of pharmacists in healthcare through strategies focused on reducing morbidity and mortality, preventing avoidable hospital admissions, minimizing medication errors, and promoting the rational use of medicines.³ To this end, the IPF has developed educational programs and competency frameworks that address region-specific challenges, thereby promoting the training and continuous professional development of clinical pharmacists.⁴

Standardizing pharmaceutical practice remains a significant challenge; therefore, the IPF developed initiatives such as the Basel Statements, which it adopted in 2008 at the IPF Congress in Switzerland. The purpose of these statements is to provide guidelines for hospital pharmacy practice, thereby promoting the development of common standards and facilitating the adaptation of good practices across different regions.⁵ Initially, 75 statements were established that reflected the shared vision of hospital pharmacy and served as a roadmap for optimizing pharmaceutical care.⁶ These statements have evolved to respond to the changing needs of health systems and clinical practice in hospital pharmacy.⁷ The statements are aspirational rather than mandatory international standards; they aim to guide the continuous improvement of hospital pharmacy practice worldwide by adapting to different health-system contexts and levels of development.

The Basel Statements were most recently updated during the 2023 IPF Congress in Brisbane. However, in 2014, the statements were reorganized into 6 key action areas in Bangkok.⁸

These areas include medicine procurement, influences on prescribing, preparation and delivery, safe administration, medication monitoring, and human resource development.⁹ The Basel Statements Self-Assessment Questionnaire (BSSAQ) was designed to assess the

implementation of, and adherence to, these principles. The questionnaire enables pharmacists to analyze their performance, compare results regionally, and receive improvement recommendations based on their responses.^{10,11}

We administered and evaluated the questionnaire in 8 hospitals in 8 Latin American countries, targeting hospital pharmacists working in the pharmacy services of these institutions. We analyzed their perceptions of key aspects, including the organization and competence of pharmaceutical staff, access to continuing education programs, and the implementation of clinical and organizational practices that strengthen the pharmacist's role within hospitals. These aspects enable assessment of the degree of alignment with the principles established by the Basel Statements and identification of the priority areas for improvement.

Methods

Study design and country selection

The study included clinical and hospital pharmacists working in 8 hospitals in 8 Latin American countries: Argentina, Chile, Costa Rica, Uruguay, Colombia, Peru, Brazil, and Mexico. The countries were selected based on the presence of prominent hospitals, the diversity of their health systems, and the professional networks accessible to the authors, all of which facilitated the distribution of the questionnaire. Out of the 20 countries and 14 territories in Latin America, these 8 were chosen for their robust hospital pharmacy infrastructure and accessibility to participants, ensuring a feasible and representative assessment. Only 1 hospital was selected in each country; therefore, the results reflect the pharmacy services of those institutions only and cannot be considered representative of hospital pharmacy practice at the national level.

Participants

The study included clinical and hospital pharmacists from the selected countries. Participants were invited via professional networks and local pharmacy associations to achieve a broad representation of those practicing in hospital pharmacy services. We prioritized professionals with active experience in medium- and high-complexity hospitals to ensure that responses reflected clinical pharmacy practice in settings relevant to the Basel Statements. In each hospital, we attempted to include a diverse sample of pharmacists from across the pharmacy

service—including clinical, logistical, and administrative areas—in order to capture a range of perspectives on the implementation of the Basel Statements. However, participation was voluntary and contingent on the availability and willingness of staff in each hospital.

Questionnaires

We used two IPF-validated instruments: the BSSAQ and a reliability and validity testing questionnaire (RVTQ).

The BSSAQ comprises 33 questions divided into 3 sections and assesses pharmacists' knowledge and practices in relation to international standards. The first section collects demographic data, including age, educational level, and professional experience; the second examines participation in health teams and clinical decision-making; and the third assesses medication preparation and delivery practices in accordance with safety protocols. These 33 questions were selected by the authors from the current statements, prioritizing those with the greatest operational applicability and relevance to the study objectives. The selection was based on alignment with measurable aspects of daily hospital practice and was validated by local clinical pharmacy experts.

We used the 10-question RVTQ to evaluate the clarity, comprehensibility, relevance, and suitability of the BSSAQ for professional practice across different countries. Both questionnaires were administered in Spanish to ensure accessibility and comprehension.

Data collection and analysis

The questionnaires were distributed electronically in July 2024, and data were collected over 3 months. We used descriptive statistics to summarize demographic characteristics, pharmacists' involvement in patient care, medication practices, and perceptions of the clarity and applicability of the BSSAQ.

Countries were compared to identify similarities, regional differences, and potential barriers to implementing international standards, thereby providing a comprehensive overview of pharmaceutical practices in Latin America.

To optimize the understanding and analysis of the results, the wording of some BSSAQ questions was adapted and grouped into specific thematic categories. This approach allowed for the development of more comprehensive and contextualized items, thereby improving the organization, interpretation, and comparability of the data obtained.

Results

The BSSAQ is divided into three sections. Section 1 includes demographic questions about the participating hospital, such as its location (state or territory), name, and type or specialty. This section also collects data on the primary services offered, its population coverage, and the number of hospital beds, as well as its legal status (public or private), given that this factor can influence the organization of the pharmacy service and the implementation of the standards evaluated. Table 1 presents the main data collected in this section of the BSSAQ.

Section 2 examines the pharmacist's role in various hospital activities related to patient care and medication management, including their participation in clinical decision-making, the management of drug treatments, and other key functions in hospital care. The questions provide a comprehensive view of the pharmacist's impact on clinical practice and the optimization of drug therapy.

Figs. 1–3 show an aggregated analysis of all participating hospitals. Although the results help to identify general trends, they should not be taken to represent individual countries or the region as a whole. An individualized analysis of each hospital could provide greater precision regarding local settings.

Fig. 1 shows the results from section 2 of the questionnaire.

We analyzed the data presented in Fig. 2 using a quantitative approach, classifying responses according to their degree of compliance with the established criteria. Each question offers 6 response options (see Appendix 1). The first 2 options indicated full compliance, the next 2 partial compliance, and the final 2 non-compliance.

In this section, medication management and safety were among the lowest-scoring areas, encompassing the preparation and storing of hazardous drugs, prevention of medication errors, identification of adverse effects, and provision of information on safe drug preparation and administration.

Medication training was the highest-scoring category, covering training provided by pharmacists to health professionals on medication use, associated risks, and necessary precautions.

Based on the results of sections 2 and 3, we defined and classified potential areas for improvement. Any score of less than 70% on any question was considered inadequate. Fig. 3 presents these areas grouped by category for a clearer representation of the results.

Table 1
 Section 1: Demographic information of the participating hospitals.

Participating hospitals	Hospital Aeronáutico Central	Hospital Luis Calvo Mackenna	Hospital Clínica Bíblica	Hospital Policial	Clínica Centro	Hospital Regional 1ro de Octubre	Hospital Nacional de la Policía Nacional del Perú	Hospital Unimed
Location	Buenos Aires, Argentina	Santiago, Chile	San José, Costa Rica	Montevideo, Uruguay	Barranquilla, Colombia	Mexico City, Mexico	Lima, Peru	Vitória, Brazil
Type of hospital	Military	Pediatric	Academic	Regional hospital	Academic	Regional hospital	Academic	Pediatric oncology
Legal status	Public	Public	Private	Public	Private	Public	Public	Private
Number of beds	<100	100–250	<100	100–250	100–250	251–500	501–1000	100–250
Services offered	Surgery, oncology, emergency services	Surgery, oncology, emergency services, pediatrics, primary care	Surgery, oncology, emergency services, pediatrics, primary care	Surgery, oncology, emergency services, pediatrics, primary care	Surgery, emergency services, primary care	Surgery, oncology, emergency services, pediatrics, primary care	Surgery, oncology, emergency services, pediatrics	Surgery, oncology, emergency services, pediatrics, primary care
Accreditations	Joint Commission International. National accreditation of medical residencies	National accreditation by the Chilean Health Superintendency	Joint Commission International. ISO 15189	Not applicable	ICONTEC certification (lung transplant)	Not applicable	National accreditation as a Category III-1 Hospital	Highest national accreditation by the ANS (Agencia Nacional de Saúde Suplementar)

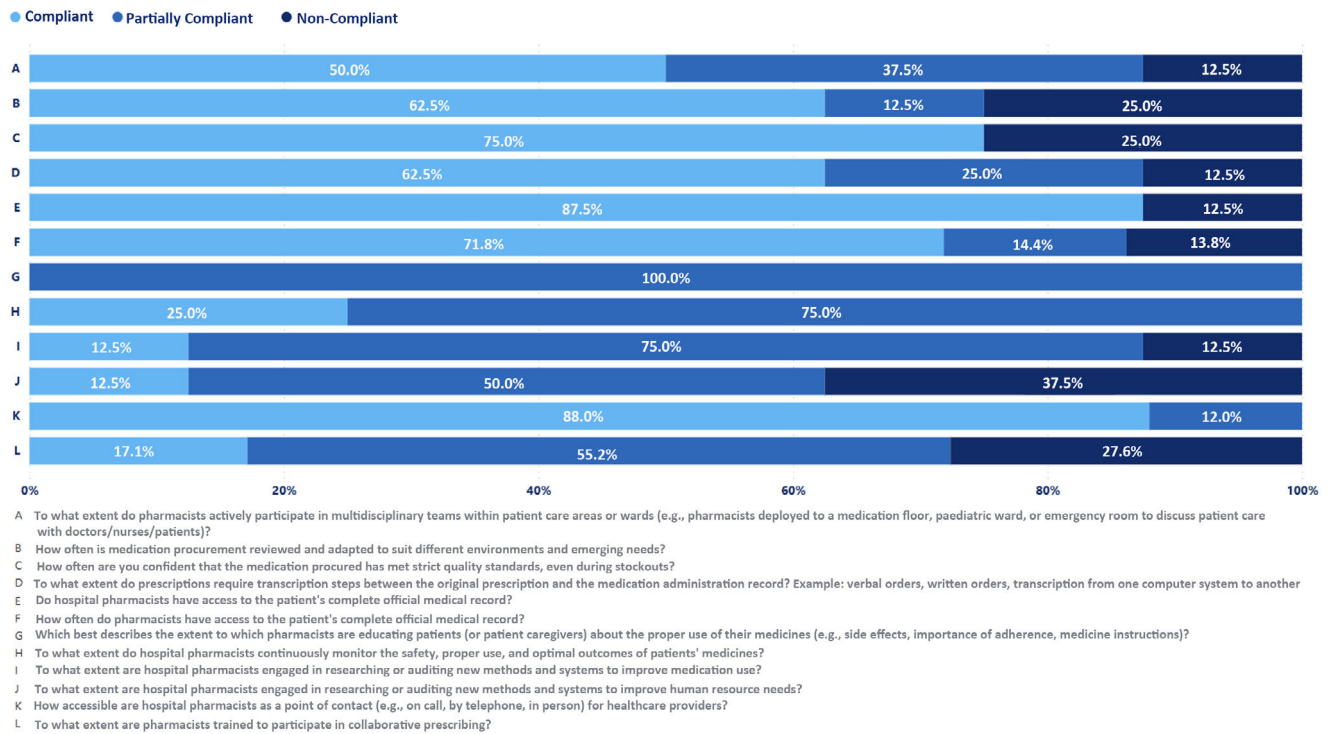


Figure 1. Pharmacist involvement in hospital care.

The questionnaire evaluated 4 categories: Clinical care and collaboration, covering pharmacists' participation in multidisciplinary teams and communication of medicine information; medicine management and quality, focusing on procuring, storing, and safely handling medicines, as well as quality assurance; support technologies and systems, addressing implementing, evaluating, and maintaining technologies that support the medicine use; and safety and continuous improvement, dealing with error and adverse event reporting and tools to improve administration safety.

Discussion

The Basel Statements aim to establish a standardized framework for hospital pharmacy practice worldwide and provide common guidelines to facilitate the evaluation of pharmaceutical management and operations across different healthcare settings. In Latin America, emphasis is often placed on ensuring adequate medication management standards, based on models such as that of the United States.¹²

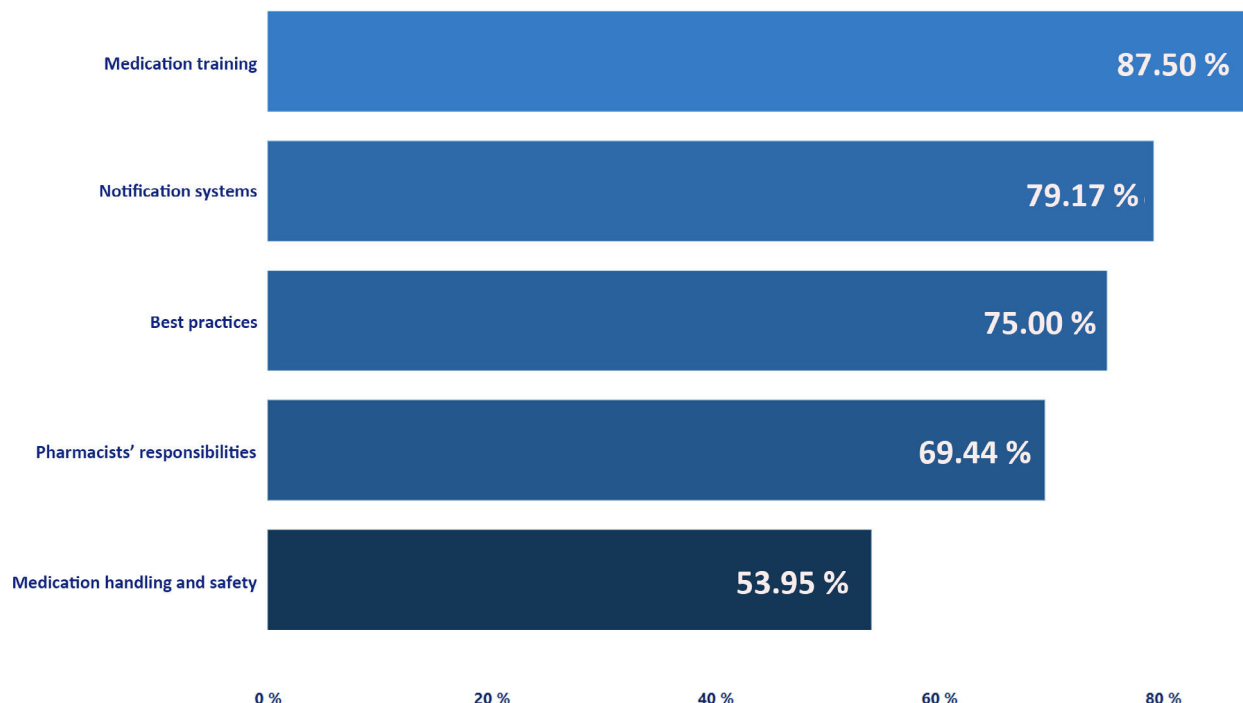


Figure 2. Pharmacists' responsibilities in the procurement and distribution of medicines.

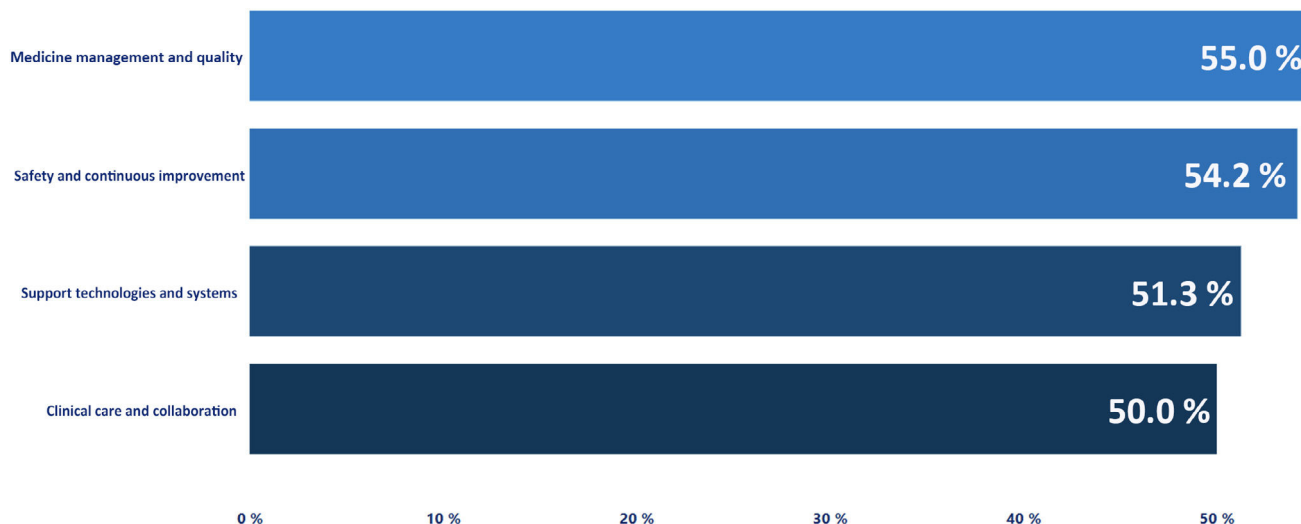


Figure 3. Identified areas for improvement by questionnaire category.

The geographic diversity and variation in the size of the hospitals included in the study reflect the heterogeneity of health systems in Latin America and provide a broader perspective on the implementation of the Basel Statements. The hospitals analyzed are located in regions with advanced health infrastructure, as well as in areas facing greater challenges related to resource availability and regulatory capacity. This structural and geographic variability is crucial for evaluating the implementation of the Basel Statements, as hospital size influences the organization and availability of resources in hospital pharmacies.¹³ In addition, the implementation of the Basel Statements may vary considerably due to structural and regulatory differences between national health systems. The adoption of international standards may be facilitated or hindered by various factors, including drug legislation, the degree to which public health services are decentralized, and the existence of national pharmaceutical policies.

The distribution of hospitals also allows us to identify differences in how these principles are applied in local contexts. Latin America exhibits marked cultural, political, social, and economic contrasts that directly affect the adoption and adaptation of international hospital pharmacy standards. These contrasts provide a broader perspective on the extent to which these standards are implemented.¹⁴

Level of pharmacist involvement in hospital care

The main activities of hospital pharmacists include providing consultations to clinical teams, accessing patient medical records, and overseeing the quality of purchased medicines (see Fig. 1). Access to medical records allows a comprehensive evaluation of treatment, enabling dosage adjustments and the prevention of adverse reactions. Likewise, verification of quality standards in the procurement of medications ensures that products are safe, effective, and traceable, reduces medication errors, and improves risk management in hospital pharmacotherapy.¹⁵

Furthermore, direct interaction with other healthcare team members allows pharmacists to actively contribute to drug therapy selection, identify potential drug interactions, and personalize treatments according to patient needs.¹⁶

In this regard, integrating pharmacists into hospital care would not only improve patient safety but also promote a multidisciplinary approach to healthcare delivery.¹⁶ Their active participation in healthcare processes facilitates better coordination with other healthcare staff, optimizes the use of therapeutic resources, and supports the implementation of evidence-based strategies for the continuous improvement of medical care.¹⁷

Despite these aspects, compliance with collaborative prescribing remains low (Fig. 1). Currently, pharmacists play a limited role in decision-making related to patient prescriptions. This level of participation may compromise patient safety, resulting in suboptimal treatments, an increased risk of drug interactions, and delayed detection of medication errors.^{16,17} This situation may stem from the absence or limitations of legal frameworks supporting collaborative prescribing in many countries in the region. Although some countries, such as Brazil and Mexico, have begun to recognize limited forms of collaboration, others still lack clear regulations allowing pharmacists to participate in therapeutic decisions, which hinder their effective integration into clinical teams.

Similarly, the low level of pharmacist participation in research, auditing, and pharmacovigilance, as observed in the study, limits the optimization of medication use and resource management. These aspects hinder evidence generation, error identification, and continuous improvement in prescribing. Better integration is crucial to optimizing treatments and improving patient safety.¹⁸

Medication procurement and distribution

The procurement and distribution of medications are essential activities in hospital pharmacy, with pharmacists playing a key role in purchasing, transporting, storing, and dispensing them. Some drugs require special handling, such as thermolabile drugs, which must be maintained in a cold chain, or cytotoxic drugs, which require strict protocols to minimize risks during handling and administration.¹⁹

The results reveal shortcomings in medication management and safety, with low compliance in areas such as storage, preparation, handling, and administration (Fig. 2). These shortcomings pose a risk to patient and healthcare staff safety and increase the risk of medication errors and preventable adverse events.²⁰

In addition, the identification and prevention of medication errors were inadequate in this category, highlighting the need to strengthen surveillance and risk management systems associated with medication use in hospitals. Based on these findings, corrective measures should be implemented to optimize pharmaceutical management procedures and enhance the training of personnel involved in these tasks.

These results underscore the importance of conducting more detailed studies to investigate the factors that limit the correct implementation of the Basel Statements in Latin America. More reliable data will enable the development of specific strategies to improve medication management safety and advance the consolidation of international

standards in hospital pharmacy, thereby contributing to optimized pharmaceutical care and patient safety.

Areas for improvement

Any score of less than 70% on questions in Sections 2 and 3 was considered inadequate, indicating a potential area for improvement.

The 70% threshold defines a compliance limit indicating the need to optimize specific processes or practices. This threshold is a widely accepted standard for identifying areas for intervention in performance evaluation across multiple disciplines.²¹

As shown in the results section, responses to survey questions that scored below the 70% threshold were categorized (Fig. 3). These areas include functions such as collaborative participation, which achieved a compliance rate of only 25% in the hospitals surveyed.

The optimization of drug therapy requires the collaborative participation of pharmacists within healthcare teams. Their absence from clinical discussions can result in prescribing errors and the inefficient use of therapeutic resources. This situation is a challenge worldwide, and there is a recognized need to integrate pharmacists more fully into clinical decision-making and hospital management. The IPF has highlighted the need for pharmacists to collaborate with health authorities and administrators to ensure that adequate resources are provided and medicines are used optimally.²²

In addition, traceability in hospital pharmacies is crucial to ensuring the quality and safety of medicines, as it allows tracking them from purchase to administration. A lack of traceability can lead to misplacement, dispensing errors, and treatment delays. In Latin America, automated drug dispensing and control systems that integrate technologies such as barcodes and radio frequency are needed to minimize prescription and drug administration errors.^{23,24}

Hospital pharmacies should be strengthened by integrating pharmacists into clinical decision-making, designing efficient traceability systems, and establishing clear guidelines for the off-label use of medicines. These improvements would optimize safety and therapeutic efficacy and align pharmaceutical practice with international standards and the Basel Statements.

Limitations

The study has several limitations. In some countries, local standards or accreditation programs, such as national quality standards or internal certifications, may conflict with or overlap with the implementation of the Basel Statements. This situation may affect both institutional prioritization and the perceived utility of the framework proposed by the IPF. The selection of countries was based on accessibility and professional networks, excluding regions with different healthcare structures. Participants were unevenly distributed by country, which may have introduced bias. Although hospitals of different types and sizes were included, they cannot be assumed to be fully representative of hospital pharmacy practice in their respective countries. Local conditions may vary significantly between urban and rural regions, public and private institutions, and the size and complexity of hospitals. As the questionnaire was self-reported, the responses may be biased. Furthermore, the questionnaire was translated from English to Spanish, which may have led to variations in how questions were interpreted. In addition, as the analysis was purely descriptive and did not include inferential statistical tests, no causal relationships can be inferred. Future research should include more representative samples and more rigorous statistical analyses.

This study identified the advances and challenges involved in implementing the Basel Statements in Latin American hospitals. The results show that there is considerable variability in the extent to which

pharmacists are integrated into hospital care and medication management. Although positive outcomes were observed in activities such as quality supervision and medical record consultation, deficiencies persist in key areas, including collaborative prescribing, drug traceability, and the regulation of off-label medicine use. The limited participation of pharmacists in clinical decision-making negatively impacts treatment optimization and patient safety. In addition, the lack of traceability systems and robust regulations increases the risk of medication errors. Latin America faces greater challenges than other regions in adopting pharmacotherapeutic safety technologies and policies. To improve pharmaceutical care, we recommend strengthening professional training, enhancing access to resources, and standardizing processes.

Ethical responsibilities

The authors declare that the study complied with ethical research guidelines, ensuring informed consent and participant confidentiality. No identifiable information was collected, and all responses were anonymized for analysis.

Authorship statement

All of the authors made significant contributions at various stages of the study and in preparing the manuscript. Esteban Zavaleta-Monestel, Arturo Villalobos-Madriz, Abigail Fallas-Mora, Ernesto Martínez-Vargas, and Amil Munich-Calvo participated in the conception and design of the study, as well as in data collection, analysis, and interpretation. Esteban Zavaleta-Monestel, Arturo Villalobos-Madriz, and Abigail Fallas-Mora designed the methodology. Esteban Zavaleta-Monestel was responsible for supervising and directing the project. Antonella Milano-Gil, César Sánchez, Dadier Arroyo-Monterroza, Gladys Delgado-Pérez, Jorge Morales-Villaspin, Silvestre Dalmaso-Neto, Stephen Eackel, Vania Teixeira, and Marianne Ivey conducted data verification and provided substantial intellectual contributions to the critical review of the paper. Ernesto Martínez-Vargas and Amil Munich-Calvo critically reviewed the paper. Ernesto Martínez-Vargas, Stephen Eackel, and Marianne Ivey reviewed and edited the paper. All authors reviewed and approved the final version of the manuscript for its publication.

CRediT authorship contribution statement

Esteban Zavaleta-Monestel: Validation, Supervision, Project administration, Methodology, Investigation, Formal analysis, Conceptualization. **Arturo Villalobos-Madriz:** Methodology, Conceptualization. **Abigail Fallas-Mora:** Validation, Supervision, Conceptualization. **Ernesto Martínez-Vargas:** Writing – original draft, Methodology, Investigation, Formal analysis, Data curation. **Amil Munich-Calvo:** Writing – original draft, Investigation, Formal analysis. **Vania Teixeira:** Validation, Methodology. **Silvestre Dalmaso-Neto:** Validation, Methodology. **Cesar Sánchez:** Validation, Methodology. **Jorge Morales-Vallespín:** Validation, Methodology. **Antonella Milano-Gil:** Validation, Methodology. **Dadier Arroyo-Monterroza:** Validation, Methodology. **Gladys Delgado-Pérez:** Visualization, Methodology. **Michael Stepanovic:** Validation, Methodology. **Stephen Eackel:** Validation, Methodology. **Marianne Ivey:** Validation, Methodology.

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Conflicts of interest

None declared.

Appendix A: Annex 1. Basel statements self-assessment questionnaire (33 items)

Section 1. General information about the hospital (14 items)

What is the name of your organization or hospital?
In what country is your organization or hospital located?
In what state or territory is your organization or hospital located?
In what city is your organization or hospital located?
Which of the following best describes your institution? (teaching hospital, general hospital, pediatric hospital, military hospital, etc).
Population of surrounding or assigned hospital community.
Number of hospital beds.
Total number of full-time professionals by category: clinical pharmacists, distribution pharmacists, integrated pharmacists, IT pharmacists, drug safety pharmacists, residents, technicians, administrative staff, or others.
How many physicians care for patients in your hospital?
Primary services of the hospital (surgery, oncology, pediatrics, emergency care, primary care, etc).
Which of the following clinics does this assessment include?
Is there a pharmacy residency program in your hospital?
Is there a medical residency program in your hospital?
How many pharmacy students does your hospital take on rotations each year?

Section 2. Pharmacist Involvement (11 items)

To what extent are pharmacists actively involved in multidisciplinary teams within patient care areas or wards?
How often is procurement of medicines reviewed and adapted to fit different settings and emerging needs?
How often are you confident that the procured medicine has met strict quality standards including during stockouts?
To what extent do prescriptions require transcription steps between the original prescription and medicines administration record?
Do hospital pharmacists have access to the complete official patient record?
How often do pharmacists document their interventions in the hospital's official patient record?
Which best describes the extent to which patients (or patient caregivers) are being educated by pharmacists on the appropriate use of their medicines?
To what extent do hospital pharmacists continually monitor patient's medications for safety, appropriate use, and optimal outcomes?
To what extent do hospital pharmacists engage in research or auditing involving new methods and systems to improve the use of medicines?
To what extent do hospital pharmacists engage in research or auditing involving new methods and systems to improve human resource needs?
How accessible are the hospital pharmacist(s) as a point of contact (on call, phone, in person) for health care providers?

Section 3. Preparation and Delivery (8 items)

To what extent are pharmacists trained to participate in collaborative prescribing?
Do pharmacists ensure all healthcare professionals responsible for administering injectable medicines and/or chemotherapy receive education/training?

Does your hospital utilize a reporting system (local, regional, or national) in adverse event reporting and analysis systems?
Does the pharmacy or hospital pharmacist participate in adverse event reporting and analysis systems?
Is the pharmacy/hospital pharmacist responsible for the acquisition and storage of dangerous medications?
Is the pharmacy/hospital pharmacist responsible for preparing and dispensing of cytotoxic or high-risk medications?
Is the pharmacy/hospital pharmacist responsible for educating clinical staff on the safe handling of medications?
Have institutional mechanisms for the continuous improvement of medication safety been implemented?

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