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Survey of minimum hospital pharmacy standards in countries within the COSUDEFH

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Abstract

Objectives: The main objective of this study is to establish a reading of the current situation of hospital pharmacy services in the countries that make up the COSUDEFH, and to identify strengths and weaknesses in each country. These findings will serve as input for the formulation of strategies aimed at strengthening hospital pharmacy in South America. **Methods:** For this purpose, a closed multiple-choice survey was designed, based on the regulations of several countries and with specific thematic axes such as: infrastructure, human talent, management processes, technical processes, and quality systems. The survey was distributed among the hospital pharmacy services in the COSUDEFH member countries. **Results:** The results were grouped, tabulated, and quantified on a percentage scale. Significant differences were observed between the different countries across all thematic axes. These differences reflect the varied economic, political, educational, technological, and sociocultural realities of each country. **Conclusion:** The progress of hospital pharmacy services in South America is unequal and multifactorial. Identifying the specific strengths and weaknesses of each country provides a solid foundation for developing strategies aimed at strengthening hospital pharmacy in the region.

Keywords: Pharmacy Service, Hospital, Reference Standards, Health Planning Technical Assistance

Levantamento dos padrões mínimos de farmácia hospitalar nos países membros do COSUDEFH

Resumo

Objetivos: O objetivo principal deste estudo é estabelecer uma leitura da situação atual dos serviços de farmácia hospitalar no países que compõem o SDC e identificar os pontos fortes e fracos de cada país. Essas conclusões servirão de insumo para a formulação de estratégias voltadas ao fortalecimento da farmácia hospitalar na América do Sul. **Métodos:** Para tanto, foi desenhada uma pesquisa fechada de múltipla escolha, baseada nas regulamentações de diversos países e com eixos temáticos específicos como: infraestrutura, talento humano, processos de gestão, processos técnicos e sistemas de qualidade. A pesquisa foi distribuída entre os serviços de farmácia hospitalar dos países membros do COSUDEFH. **Resultados:** Os resultados foram agrupados, tabulados e quantificados em escala percentual. Foram observadas diferenças significativas entre os diferentes países em todos os eixos temáticos. Estas diferenças refletem as diversas realidades econômicas, políticas, educacionais, tecnológicas e socioculturais de cada país. **Conclusão:** O progresso dos serviços de farmácia hospitalar na América do Sul é desigual e multifatorial. A identificação dos pontos fortes e fracos específicos de cada país proporciona uma base sólida para o desenvolvimento de estratégias destinadas a fortalecer a farmácia hospitalar na região.

Palavras-chave: Serviço de Farmácia, Hospital, Normas de Referência, Assistência Técnica de Planejamento em Saúde



Introduction

The South American Coordinator for the Development of Hospital Pharmacy/ *Coordinadora Sudamericana para el Desarrollo de la Farmacia Hospitalaria* – COSUDEFH, is a scientific, non-profit organization, founded in 2010, which brings together hospital pharmacy societies and healthcare systems from Latin American countries. Currently, it consists of six full members: Argentina, Brazil, Chile, Colombia, Ecuador, and Peru, along with two associate members: Bolivia and Uruguay.

The mission of this organization is to promote the technical and scientific development of hospital pharmacy in Latin America as part of the healthcare system, through patient-centered standards¹.

Knowledge in the field of hospital pharmacy has developed rapidly in recent decades, and today, pharmaceutical professionals specialize in areas such as: pharmaceutical management, pharmacoconomics, pharmaceuticals, pharmacovigilance, pharmacokinetics, pharmaceutical toxicology, pharmacogenetics, radiopharmacy, pharmaceutical care, medicinal gas management, oncology pharmacy, telepharmacy, among others². This has led to the creation of specialized services within hospital pharmacies, aimed at meeting the demand and complexity required today. However, the development of these services in Latin American countries has not been uniform, which has created significant gaps that have not been sufficiently studied or addressed to formulate strategies to overcome them³.

Argentina, Brazil, Canada and Ecuador have developed regulatory frameworks with the aim of regulating the operation of hospital pharmacies^{3,4,5,6}. This work aims to conduct a survey with pharmaceutical professionals working in hospital pharmacies in South America to identify strengths and weaknesses in each of the COSUDEFH member countries.

Methods

A review of regulations regarding the functioning of hospital pharmacy services in South America^{4,5,6,7,8} was conducted, as well as in other reference countries such as Spain, Canada, and the United States. This review allowed for the development of a closed, exploratory survey with general and specific thematic axis on the activities of the services^{9,10}.

The three general axes were: (i) Perception of optimal medication supply in 2022 (percentage); (ii) levels of care in the hospitals surveyed (pre-hospital, basic hospital, general hospital, and specialty hospital); (iii) number of installed hospital beds.

The ten specific axes provided response options such as: highly developed; moderately developed; underdeveloped; not developed.

The specific thematic axes were: (i) Coverage of pharmaceutical services (14 pharmaceutical services to choose from); (ii) leadership; (iii) management of medicines and healthcare products; (iv) management of pharmaceutical waste; (v) dispensing of medicines; (vi) drug compounding; (vii) safe use of medicines; (viii) pharmacotherapy monitoring; (ix) safe use of healthcare products; and (x) teaching and research. Leadership was categorized into three types: strategic, operational, and clinical. Eight questions were developed, detailed in the Supplementary Material (Table 1).

The survey was shared with all the scientific societies that make up COSUDEFH, so that it could be widely disseminated through their official communication channels starting on May 25, 2023, and it remained open until July 31, 2023, using the Google Form tool (<https://forms.gle/eJqJ2KiSdCBRGUjG8>) in Spanish and (<https://forms.gle/iAqXVvFHcMSTXAY68>) in Portuguese.

The responses were consolidated into a single database, resulting in a total of 14,742 responses, of which 198 ambiguous responses were identified (where two or more options were chosen simultaneously instead of one). In these cases, the worst reported perception was considered valid. These cases represented 1.34% of the total and did not affect the overall sample.

Valid responses were grouped, tabulated as percentages, and graphically represented, in order to perform the statistical analysis of the proposed thematic axes. The data were analyzed using a randomized block analysis of variance at 0.05%, to determine whether or not there were statistically significant differences in the data obtained.

Results

A total of 274 valid surveys from 8 countries that make up COSUDEFH were processed, as shown in Table 1.

In relation to the index of hospitals that responded to the survey per million inhabitants, Brazil had the most hospitals surveyed; however, considering the population index per million inhabitants, it had the lowest representation. On the other hand, Uruguay had the highest representation among all countries.

The percentage of medication supply during the year 2022 was investigated according to pre-established ranges. Only two countries reported having a supply greater than 75% during the year 2022, with Uruguay having the best perception.

The distribution of levels of care in different countries is as follows: in specialty hospitals, Brazil has 37, Colombia has 26, Argentina has 17, Bolivia has 7, Ecuador has 17, Peru has 17, Colombia has 9 and Uruguay has 7, totaling 137, which represents 50.0% of the general total. Argentina has 23, Bolivia has 1, Ecuador has 9, Peru has 7, and Uruguay has 6, totaling 80, which represents 29.2% of the overall total. In basic hospitals, Argentina has 0, Bolivia has 0, Ecuador has 4, Peru has 3, and Uruguay has 2, totaling 50, which represents 18.2% of the overall total.

In pre-hospital care, Argentina has 2, Bolivia has 0, Brazil has 2, Chile has 0, Colombia has 1, Ecuador has 2, Peru has 0, and Uruguay has 0, totaling 7, which represents 2.6% of the overall total. In summary, the overall total of levels of care is 42 for Argentina, 8 for Bolivia, 93 for Brazil, 19 for Chile, 38 for Colombia, 32 for Ecuador, 27 for Peru, and 15 for Uruguay, with a total of 274, representing 100.0% of the overall total.

Most of the surveyed hospitals are considered small or medium-sized, while those with more than 300 beds represent the minority.

Table 1. Index of hospitals surveyed per million inhabitants and Percentage of hospitals with optimal medication supply in 2022.

Country / No. of Beds	No. of Hospitals	Millions of Inhabitants (2021)	Hospital Index / Million Inhabitants	% Optimal Supply of Medications > 75% (2022)
Argentina	42	45,81	0,92	71,4
0-100	12			
101-200	8			
201-300	16			
301-500	4			
500-1000	2			
>1000	0			
Bolivia	8	12,08	0,66	25
0-100	2			
101-200	1			
201-300	2			
301-500	3			
500-1000	0			
>1000	0			
Brazil	93	214,3	0,43	4,3
0-100	30			
101-200	22			
201-300	20			
301-500	14			
500-1000	6			
>1000	1			
Chile	19	19,49	0,97	80
0-100	6			
101-200	3			
201-300	4			
301-500	5			
500-1000	1			
>1000	0			
Colombia	38	51,52	0,74	71,1
0-100	12			
101-200	12			
201-300	6			
301-500	5			
500-1000	2			
>1000	1			
Ecuador	32	17,8	1,80	28,1
0-100	8			
101-200	6			
201-300	10			
301-500	5			
500-1000	3			
>1000	0			
Peru	27	33,72	0,80	44,4
0-100	4			
101-200	7			
201-300	4			
301-500	6			
500-1000	3			
>1000	3			
Uruguay	15	3,43	4,37	93,3
0-100	9			
101-200	3			
201-300	2			
301-500	1			
500-1000	0			
>1000	0			
TOTAL	274	398,15	1,34	52,2

Coverage of pharmaceutical services

For the analysis of this standard, 14 minimum hospital pharmacy services that a medium and high-complexity hospital must offer were proposed, yielding the following results:

In general, there was a good coverage of unit dose services in the region, with 84% of hospitals providing this service.

The drug and technovigilance service, which should be mandatory in all hospitals regardless of their level of care, is lacking, as almost half do not have this service.

Table 2. Number and percentage of hospital services by each member country of COSUDEFH.

Pharmaceutical Services	Argentina	Bolivia	Brazil	Chile	Colombia	Ecuador	Peru	Uruguay	SUMA	% GENERAL
Internal Unit Dose Pharmacy	32 (76)	5 (62,5)	89 (95,7)	19 (100)	27 (71,1)	24 (75,0)	27 (100)	14 (93,3)	237	86,5
Emergency and Outpatient Pharmacy	17 (40)	7 (87,5)	42 (45,2)	9 (47,4)	16 (42,1)	24 (75,0)	26 (96,3)	13 (86,7)	154	56,2
Satellite Pharmacy	14 (33)	1 (12,5)	73 (78,5)	6 (31,6)	29 (76,3)	11 (34,4)	6 (22,2)	2 (13,3)	142	51,8
Drug and Technovigilance	14 (33)	2 (25)	52 (55,9)	10 (52,6)	31 (81,6)	13 (40,6)	14 (51,9)	0 (0,0)	136	49,6
Preparation of Cytostatics	18 (43)	4 (50)	29 (31,2)	4 (21,1)	16 (42,1)	10 (31,3)	11 (40,7)	3 (20,0)	95	34,7
Pharmaceutical Care for Outpatients	23 (55)	4 (50)	21 (22,6)	11 (57,9)	7 (18,4)	16 (50,0)	12 (44,4)	3 (20,0)	97	35,4
Non-Sterile Pharmacy (Galenic Pharmacy)	29 (69)	0,0 (0)	20 (21,6)	6 (31,6)	7 (18,4)	13 (40,6)	21 (77,8)	0 (0)	96	35,0
Preparation of Parenteral Nutrition	1 (2)	4 (50)	6 (6,5)	2 (10,5)	18 (47,4)	13 (40,6)	12 (44,4)	0 (0)	56	20,4
Preparation of Cytostatics	4 (10)	0 (0)	16 (17,2)	2 (10,5)	18 (47,4)	2 (6,3)	5 (18,5)	1 (6,7)	48	17,5
Research and Clinical Trials	5 (12)	0 (0)	16 (17,2)	2 (10,5)	13 (34,2)	1 (3,1)	6 (22,2)	0 (0,0)	43	15,7
Drug and Toxicology Information Center	4 (10)	2 (25)	16 (17,2)	1 (5,3)	8 (21,1)	1 (3,1)	6 (22,2)	1 (6,7)	39	14,2
Preparation of Enteral Nutrition	1 (2)	0 (2)	4 (4,3)	2 (10,5)	6 (15,8)	2 (6,3)	10 (37,0)	0 (0,0)	25	9,1
Telepharmacy	1 (2)	0 (2)	4 (4,3)	2 (10,5)	1 (2,6)	1 (3,1)	5 (18,5)	0 (0,0)	14	5,1
Pharmacokinetics	0 (0)	0 (0)	4 (4,3)	3 (15,8)	1 (2,6)	0 (0,0)	3 (11,1)	0 (0,0)	11	4,0
Number of Hospitals	42	8	93	19	38	32	27	15	274	NA

Leadership

The perception of strategic leadership in the COSUDEFH member countries is moderately developed, with Chile being the only country where this percentage exceeds 55%. The perception of operational leadership among COSUDEFH member countries is also moderately developed, with Chile being the only country where this parameter is above 60% of respondents. Overall, the perception of clinical leadership is low in all COSUDEFH member countries, making this standard one of the most needed areas for strengthening in the region (Figure 1).

Management of Medications, Health Products, and Pharmaceutical Waste

In all COSUDEFH countries, there was a low perception of highly developed management of medications and health products. Only Brazil stands out in this parameter with over 51%.

There is a statistically significant difference in the perception of highly developed management of medications and health products among COSUDEFH member countries and across parameters of this standard.

The perception of pharmaceutical waste management in COSUDEFH member countries was generally low, with only Colombia achieving a value of 50%.

A statistically significant difference was found in the perception of highly developed pharmaceutical waste management among COSUDEFH member countries and across the parameters of this standard.

Dispensing and Preparation of Medications

Overall, there was a very low perception of medication dispensing in COSUDEFH member countries, showing a tendency toward underdevelopment of this standard.

A statistically significant difference was observed in the perception of highly developed dispensing among COSUDEFH countries and across dispensing parameters.

A statistically significant difference was evident in the perception of highly developed medication preparation among COSUDEFH member countries and across the parameters of this standard. This is primarily due to the varying complexities of the surveyed hospitals, despite half belonging to a specialized level.

Safe Use of Medications

The analysis showed that the perception of safe medication use in most COSUDEFH countries is poorly or moderately developed, with only Brazil exceeding 41% and Colombia exceeding 51%.

A statistically significant difference was found in the perception of highly developed safe medication use among countries and across the parameters of the standard.

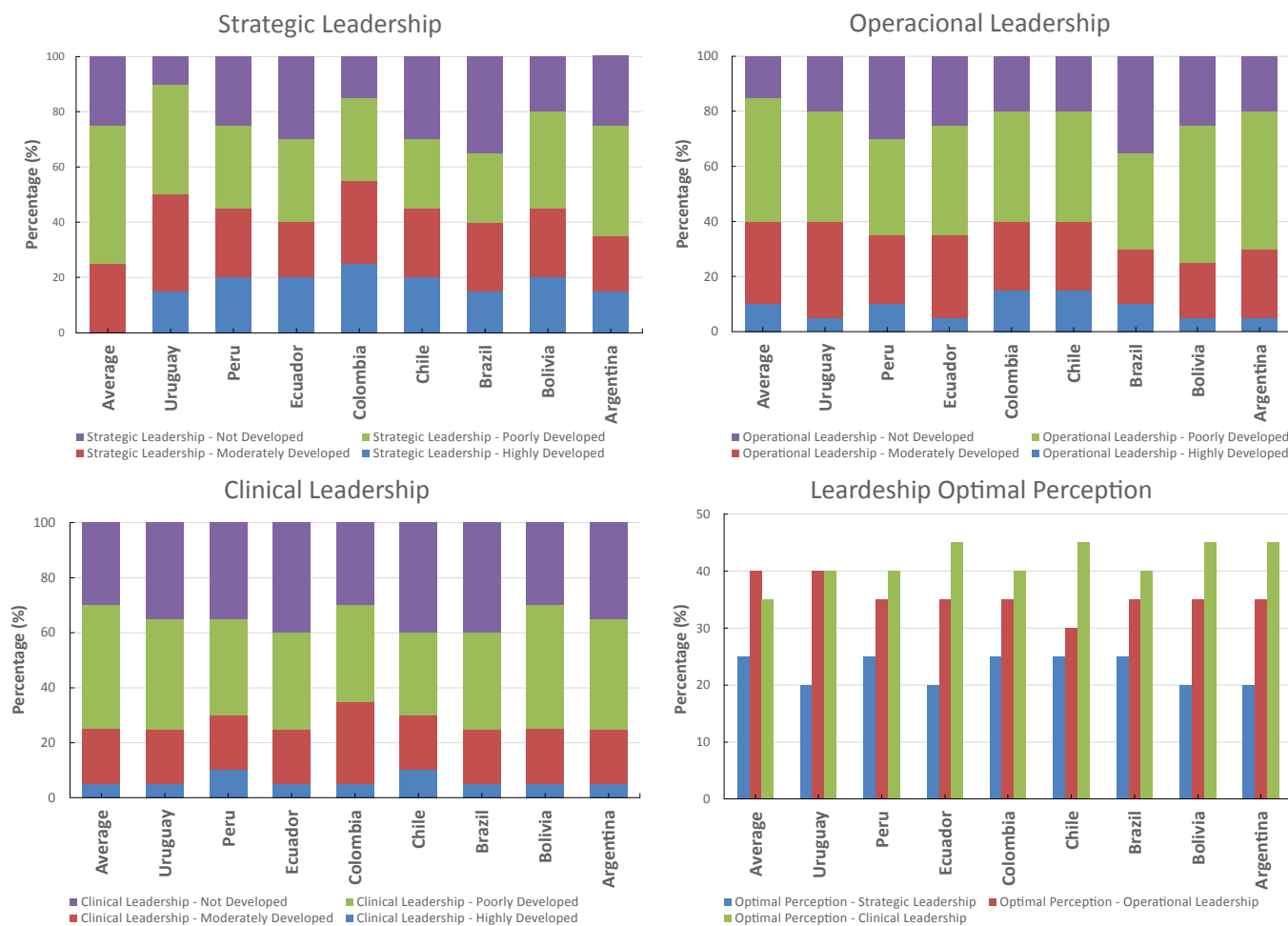


Figure 1. Perception of Leadership in all COSUDEFH member countries

Monitoring of Pharmacotherapy

The analysis of this standard revealed that throughout the region of COSUDEFH member countries, there is a low perception of pharmacotherapy monitoring.

There was a statistically significant difference in the perception of highly developed therapy monitoring among COSUDEFH member countries and across the evaluated parameters. There is a widespread deficit in pharmacokinetics services, as well as in pharmaceutical follow-up with appropriate patient selection.

Safe Use of Health Products

The perception of the safe use of health products in COSUDEFH member countries is low. This is primarily due to discrepancies in public policies regarding the management of health products at the hospital level. In countries like Argentina, Ecuador, and Peru, pharmacy services are responsible for the acquisition, storage, and distribution of health products, while in other countries, these processes are managed by other professionals, such as nurses, biomedical technologists, and surgical instrument technicians, due to their greater affinity and knowledge of these products.

A statistically significant difference was observed in the perception of highly developed safe use of health products among COSUDEFH member countries and across the evaluated parameters.

Much work is needed on traceability, reuse, re-sterilization, reprocessing, and proper disposal of health products, as well as in technovigilance in our region.

Teaching and Research

The perception of teaching and research is low in COSUDEFH member countries. While many already have residency programs, such as Argentina, Brazil, Chile, and Peru, other countries do not even have this possibility in the area of teaching.

There is a statistically significant difference in the perception of highly developed teaching and research among COSUDEFH member countries and across the parameters of this standard.

The perception regarding the level of development of the standards can be observed in Figure 2.

The distribution of responses regarding the preparation of medications, safety, use of pharmacotherapy, use of health products, teaching, and research considered highly developed can be seen in Figure 3.

In general, the perception of compliance with minimum standards of hospital pharmacy was mostly low (poorly or not developed), especially in the areas of pharmaceutical waste management, medication dispensing, medication preparation, therapy monitoring, safe use of health products, and teaching and research (Table 3).

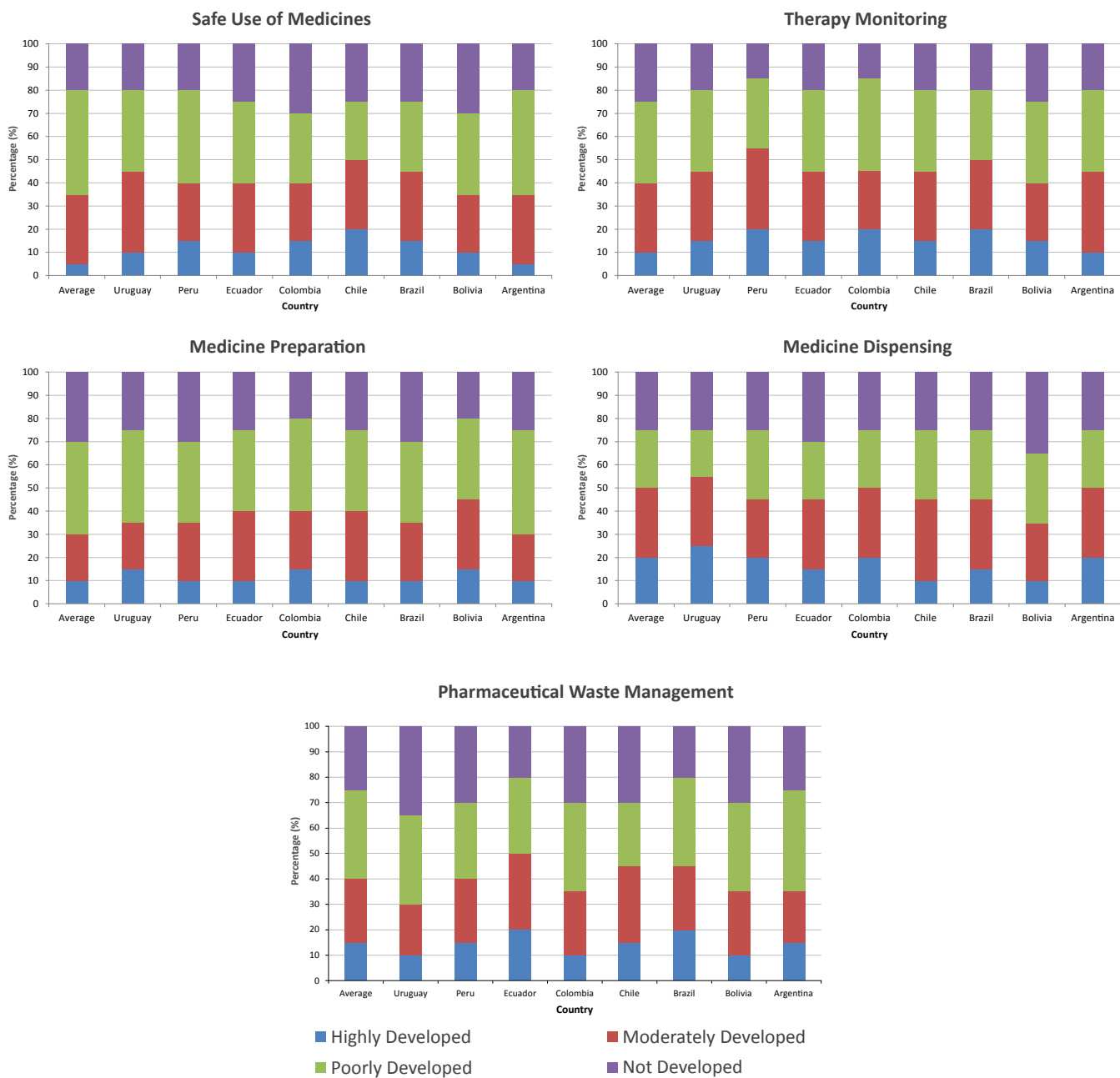


Figure 2. Distribution of the Level of Development of Pharmaceutical Practices in COSUDEFH Member Countries

Discussion

This survey suggests that there is not a high development of hospital pharmacy standards within the countries that make up COSUDEFH. It is believed that many of these standards are moderately or poorly developed, creating significant gaps not only between countries but also among hospitals within the same country. This is largely due to inadequate distribution of resources among different regions.

One noteworthy standard is leadership, as only adequate training and education of leaders is required to improve the perception of this standard. This does not necessarily require extensive financial resources, but rather the political and institutional will to implement it.

Strengthening undergraduate and postgraduate programs in hospital pharmacy schools in the region is imperative, promoting residency programs, specialization, and knowledge exchange among countries¹¹.

This survey provides an initial overview, and further analysis with a representative sample of all participating countries is necessary. However, research in our region concerning hospital pharmacy is still very limited compared to developed countries. The lack of public-private partnerships for funding projects and the lack of incentives from governments to promote scientific research are responsible factors for our lag in this area¹². It is a priority to reinforce the involvement of hospital pharmacists in clinical trials and patient¹³ education programs.

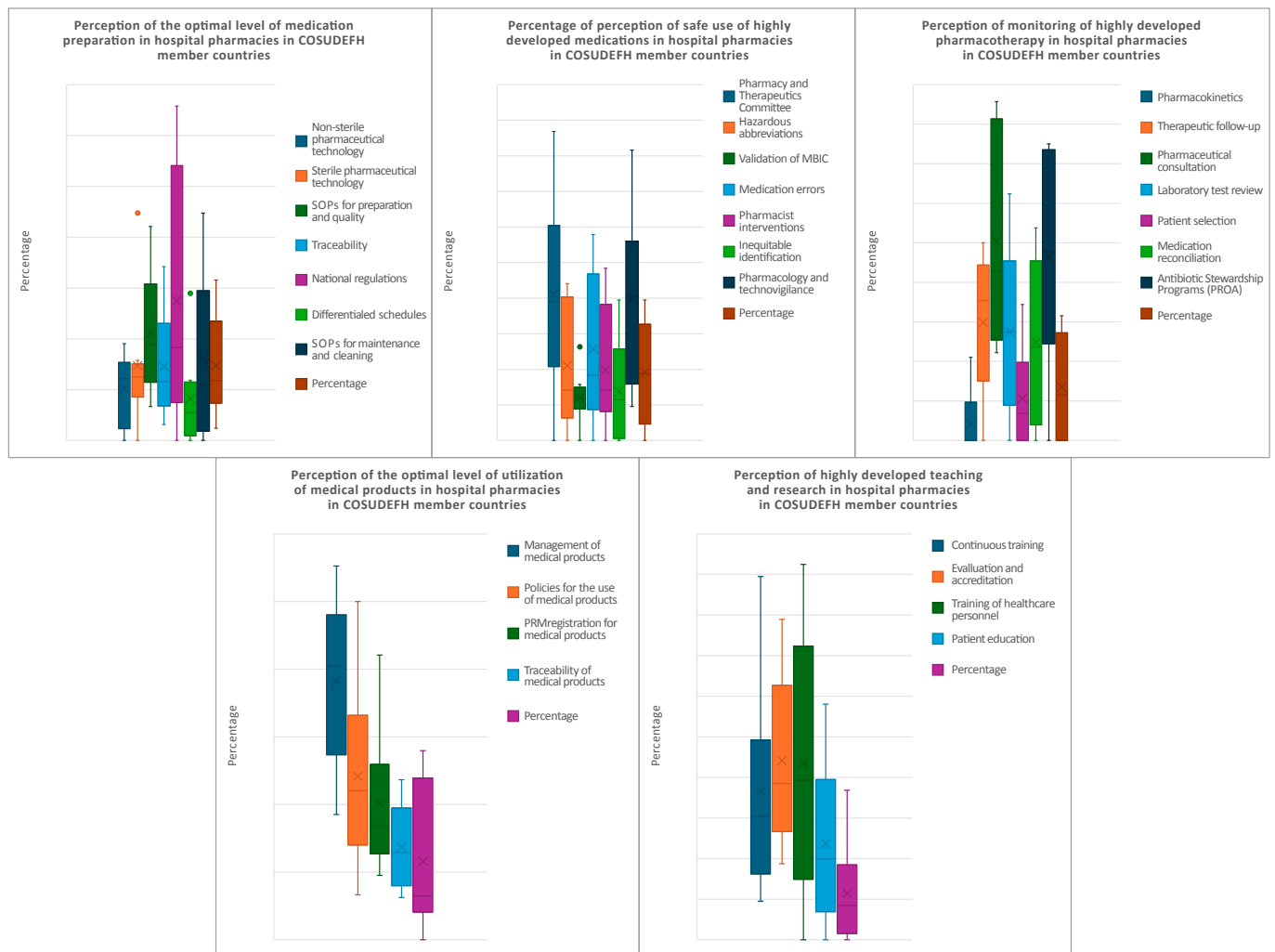


Figure 3. Perception of the Optimal Level of Pharmaceutical Practices in Hospitals Member of COSUDEFH

Table 3. General Perception of Compliance with Minimum Hospital Pharmacy Standards in COSUDEFH Member Countries

EVALUATED STANDARD	Highly Developed	Moderately Developed	Poorly Developed	Not Developed
STRATEGIC LEADERSHIP	29,0	30,21	18,16	22,59
OPERATIONAL LEADERSHIP	32,45	40,61	19,78	7,17
CLINICAL LEADERSHIP	17,30	32,96	25,04	24,70
MEDICATION AND HEALTH PRODUCT MANAGEMENT	30,84	26,56	19,58	23,01
PHARMACEUTICAL WASTE MANAGEMENT	23,41	18,46	19,26	38,88
MEDICATION DISPENSING	22,06	14,50	13,34	50,09
PREPARATION OF MEDICATIONS	15,75	16,49	12,03	55,75
SAFE USE OF MEDICATIONS	26,8	24,49	21,63	27,10
MONITORING OF THERAPY	12,94	18,73	23,49	44,83
SAFE USE OF HEALTH PRODUCTS	21,60	23,76	23,82	30,82
TEACHING AND RESEARCH	15,93	27,22	25,20	31,65

Conclusion

This survey highlights several thematic areas for improvement in the countries of the region. Marked differences were observed in the development of hospital pharmacy among respondents from various nations, and no country perceives that it has achieved

optimal levels of compliance with hospital pharmacy standards. Overall, many of these parameters are underdeveloped, so it is essential to promote instruments for continuous training and scientific exchange to achieve sustained and homogeneous development within the region.



Conflict of Interest Statement

The authors declare that they have no economic, political, or other conflicts of interest related to the development of this research work.

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