RBFHSS
Revista Brasileira de Farmácia Hospitalar e Serviços de Saúde

Original Paper

Open Access

The drug information center: a central piece to evidence-based decision making

Andréa Cássia SFORSIN[1] , Vanusa Barbosa PINTO[1] , Tázia Lopes de CASTRO[1,2] , Graziela Cabral da SILVA[1,2],
Gustavo Roberto dos SANTOS[1,2], Guilherme Arruda CARNEIRO[1] Tiago ARANTES[1] , Daiana Abreu SALES[1,2] , Maria Alice FALCÃO[1]

[1]Pharmacy Division, Hospital das Clínicas da Faculdade de Medicina da Universidade de São Paulo (HC-FMUSP), São Paulo, SP, Brazil
[2]Uniprofessional residency program in hospital and clinical pharmaceutical assistance, Hospital das Clínicas da Faculdade de Medicina da Universidade de São Paulo (HC-FMUSP), São Paulo, SP, Brazil

Corresponding author: Falcão MA, mpimentelfalcao@gmail.com

Submitted: 04-10-2022 Resubmitted: 08-12-2022 Accepted: 14-12-2022

Peer review: blind reviewers

Abstract

Objective: To describe the profile of the requests made to the drug information center by health professionals, over the last seven years, in a tertiary teaching hospital. **Methods:** This is a retrospective descriptive study that analyzed the request made to a Drug Information Center of the biggest hospital complex in Latin America over 2015 to 2021. The requests were analyzed in terms of their subject, time to answer, Anatomical Therapeutic Classification of drugs and inquirer professional. **Results:** The results demonstrate that the drug information center received and answered 3,442 queries. The number of questions has grown over the years. The time to answer the questioners was mostly less than 1 hour (67%). The majority of the calls were made by pharmacist (45.3%) and nurses (41.6%). The queries from health professionals were mostly about administration (37%), stability (19%), standardization in the institution (11.3%), indication (5.7%) and they referred mainly to agents classified as J- anti-infectious for systemic use (21.2%), B- blood and hematopoietic organs (15.7%), N – nervous system (14.2%), A- Digestive system and metabolism (12.9 %). **Conclusion:** Due to the high demand in the sector, the importance and recognition of the drug information center in the hospital environment is highlighted. The drug information center has provided an essential information search service in order to respond to the demands of healthcare professionals. Always focused on the best and most accurate information, to promote safe and reliable practices for all patients. With potential to guarantee the patient safety.

Keywords: Drug information services; Pharmacist; Evidence-based practice; Pharmaceutical care.

Centro de Informação de Medicamentos: uma peça central para decisões baseadas em evidências

Resumo

Objetivos: Descrever o perfil das solicitações feitas ao centro de informação sobre medicamentos por profissionais de saúde, nos últimos sete anos, em um hospital universitário terciário. **Métodos:** Trata-se de um estudo descritivo retrospectivo que analisou a solicitação feita a um Centro de Informações sobre Medicamentos do maior complexo hospitalar da América Latina no período de 2015 a 2021. As solicitações foram analisadas quanto ao tempo de resposta, profissional solicitante, assunto e Classificação Anatômica Terapêutica Química (ATC) dos medicamentos. **Resultados:** O centro de informações de medicamentos do complexo hospitalar recebeu e respondeu 3.442 consultas. No período do estudo, o número de perguntas cresceu ao longo dos anos. O tempo para responder aos profissionais de saúde foi em sua maioria inferior a 1 hora (67%). A maioria das ligações foi feita por farmacêutico (45,3%) e enfermeiros (41,6%). As consultas dos profissionais de saúde foram em sua maioria sobre administração (37%), estabilidade (19%), padronização na instituição (11,3%), indicação (5,7%) e se referiam principalmente a agentes classificados como J- anti-infeccioso para uso sistêmico (21,2%), B- sangue e órgãos hematopoiéticos (15,7%), N- sistema nervoso (14,2%), A- sistema digestivo e metabolismo (12,9%). **Conclusão:** Devido à alta demanda do setor, destaca-se a importância e o reconhecimento do centro de informação sobre medicamentos no ambiente hospitalar. O centro de informação sobre medicamentos disponibiliza um serviço de busca de informação essencial para responder às demandas dos profissionais de saúde. Sempre focado nas melhores e mais precisas informações, para promover práticas seguras e confiáveis para todos os pacientes. Com potencial contribuição para garantia da segurança do paciente.

Keywords: Drug information services; Pharmacist; Evidence-based pactice; Pharmaceutical care.

RBFHSS
Revista Brasileira de Farmácia Hospitalar e Serviços de Saúde

Introduction

Brazil has a territorial extension of 8.5 million km^2, being the fifth largest country in the world (behind the United States, China, Canada, and Russia), with a population of approximately 213 million in 2020 [1]. The country presents a socioeconomic discrepancy, which consequently leads to appearance of epidemiological diseases that are difficult to control, challenging the provision of health services [2]. Therefore, the integrity and development of high-quality healthcare delivery will depend on the strength and knowledge of frontline specialties such as pharmacists, focused on evidence-based care.

Within a hospital structure, a drug information center (DIC) is the sector responsible for seeking the best evidence to provide support, assistance, and promotion of the rational and specific use of a treatment for the patient. In addition there is a great contribution of valuable information in an attempt to reduce medication errors [3]. Beyond that, the drug information centers are also responsible for provides drug information to healthcare professionals, thus promoting the rational use of drugs.

The DIC service is provided by pharmacists, and involves a search for scientific evidence, drug evaluation, and communication to enhance the knowledge of medicines and assist in care decisions, empower rational prescribing, and guarantee the patients the best outcomes [4,5]. In addition to promoting an essential service in pharmaceutical care, ensuring the safe and effective use of the drug [6].

Evidence-based medicine (EBM) has as its principle structured decision-making on the best available evidence combined with clinical practice and also respecting patient's value [7]. In particular, the EBM in public health affects a large part of the population, being a central requirement in the prevention, promotion, and protection of public health [8]. To guarantee the best evidence-based practice trained professionals must know where to look for the most reliable scientific evidence in an assertive and fast way.

Considering the importance of evidence-based information in the hospital environment to promote safe decisions, this work aimed to describe and evaluate the profile of requests made to DIC by health professionals from the largest public hospital complex in Latin America.

Methods

This is a retrospective descriptive study that analyzed the services provided by the Drug Information Center of a tertiary hospital and its importance in evidence-based practices, over the last seven years (2015-2021). For this, all requests made during this period were analyzed.

Description of DIC-ICHC-FMUSP

The Clinical Hospital from the Faculty of Medicine of the University of São Paulo (HCFMUSP) is the biggest public hospital complex in Latin America. The Central Institute (IC) is the largest institute in the HCFMUSP complex, a general hospital with medical and tertiary care, concentrating an average of 31 medical and surgical specialties with 958 operational beds, performing high-complexity care.

The DIC-ICHC-FMUSP attends and provides evidence-based technical information on medicines to the team of health professionals (pharmacists, physicians, and nurses, among others) at ICHC-FMUSP. The request can be made via phone, email, or in person. The service is performed by one pharmacist in charge and two pharmaceutical residents, who are responsible for receiving requests from health professionals and providing the best evidence-based information.

Data Collection

The data were collected in the Access Database (BDA), which is used in service with the purpose to document all drug requests made to the DIC-ICHC-FMUSP, using the following information: request per year; inquirer professional, time to answer, question, and drug classification. Inquirer professions were classified as nurse, pharmacist, physician, or others. Time to answer was defined as less than 1 hour, between 1 to 5 hours, between 5 to 24 hours, between 1 to 3 days, or more than 3 days. Questions were classified as indication; dosage; administration; ADR; pharmacokinetics and pharmacodynamics; pharmaceutical presentation; stability and compatibility; legislation and registration with ANVISA; standardization in the institution and registration in the system; logistics and supply; drug interaction; magistral formulation; and others.

Drugs were classified according to ATC classification, including digestive system and metabolism (A), blood and hematopoietic organs (B), cardiovascular system (C), dermatological (D), genitourinary system and sex hormones (G), systemic hormonal preparations- except sex hormones and insulins (H), anti-infectious for systemic use (J); antineoplastic and immunomodulatory agents (L), musculoskeletal system (M), nervous system (N), products antiparasitics, insecticides and repellents (P), respiratory system (R), sensory organs (S), and several (V).

Data analysis

The data were exported from the database to the Excel spreadsheet. Data were analyzed and presented in the form of graphs.

Results

The DIC-ICHC-FMUSP received and answered 3,442 queries from 2015 to 2021. Over the years, there has been an increase in the number of questions, probably due to the consolidation of the sector in the hospital. The DIC has participated in patient safety events, pharmacology committee meetings and has been gaining space within the hospital. This spreads the sector, causing more health professionals to use drug information services. In 2020, there was the height of questions, most likely due to the coronavirus pandemic (figure 1A). The majority of answers required less than 1 hour (67%) to complete, followed by between 1 to 5 hours (17%) to complete (figure 1B).

As the data shows, over the seven years, the majority of the calls were made by a pharmacist (45.3%), followed by a nurse (41.6%) and a physician (10.8%) (figure 2A and B).

Figure 1. DIC-ICHC-FMUSP requests. **(A)** The number of requests received per year during the study period. (B) Categorization of the time used to provide the answers over the seven years.
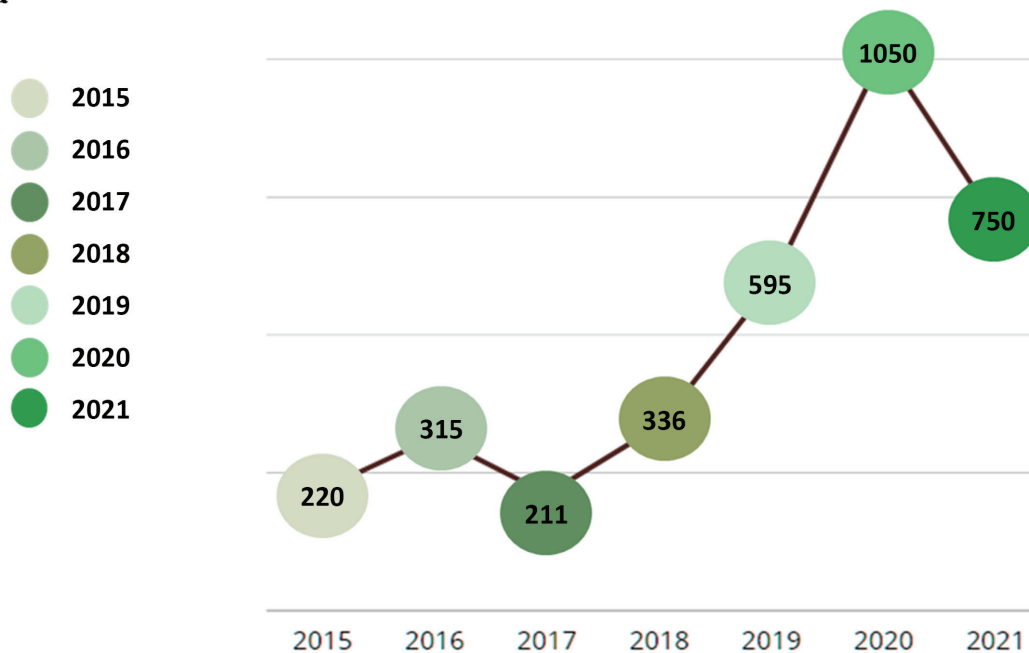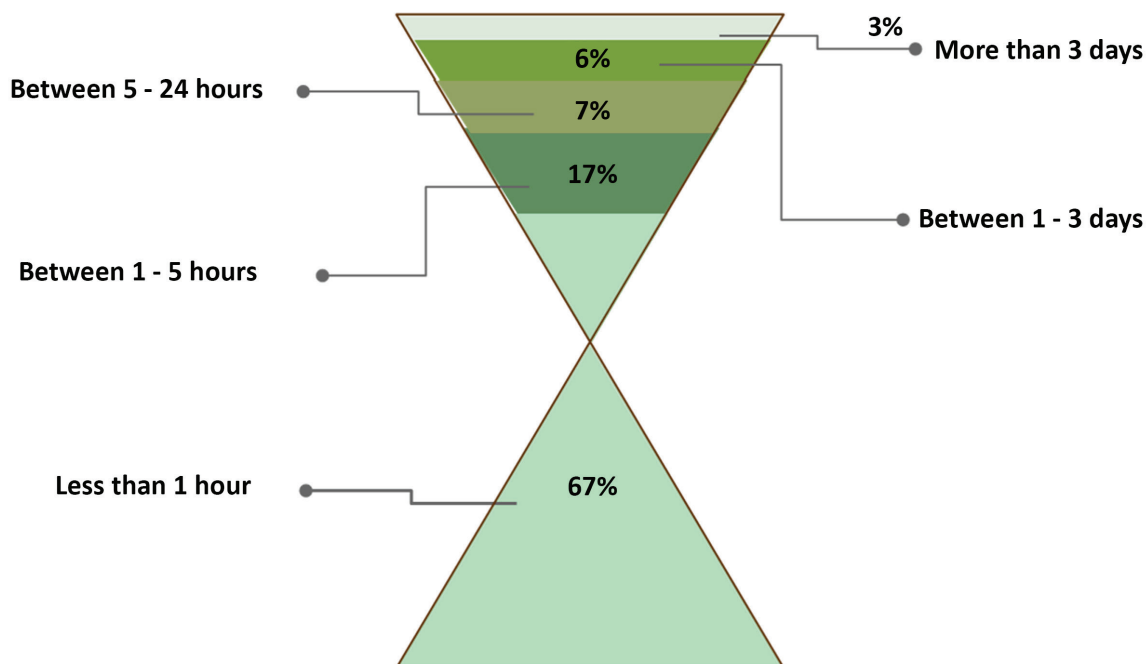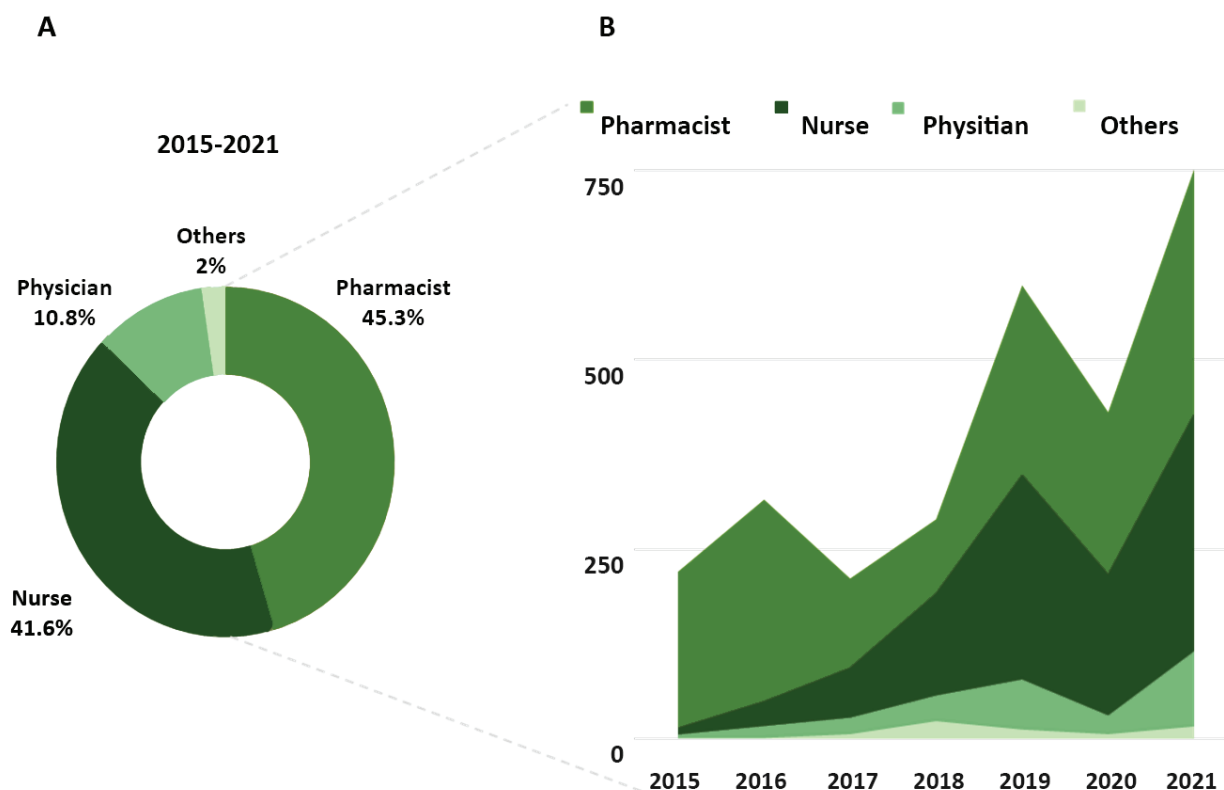
Figure 2. Health professional's inquiries. **(A)** Total percentage of healthcare professionals who submitted questions to DIC during the last seven years. **(B)** The total number of health professionals who sent questions to the DIC per year.

Therefore, class J- anti-infectious for systemic use (21.2%), B- blood and hematopoietic organs (15.7%), N- nervous system (14.2%), A - Digestive system and metabolism (12.9%) were among the most frequent drug classes (figure 3A). Due to the complexity of patients treated in the hospital, some questions become more frequent, such as administration (37%), stability (19%), standardization in the institution (11.3%), and indication (5.7%), among others (figure 3B).

Discussion

Evidence-based health information is intended to support healthcare professionals in a conscious and scientific decision that needs to be made. The important basis is evidence – that is, the carefully researched and evaluated results of the research [9]. The DIC's function is the research, analysis, interpretation, synthesis, and transmission of information in line with clinical practice [10]. Evidence-based health information aims to support people in making health decisions, understanding diseases, and realistically assessing the advantages and disadvantages of interventions. In the present study was demonstrated that from 2015 until 2021 DIC-ICHC-FMUSP received 3,442 queries.

The receiving of drug-related queries demands accurate answers, resulting in the safe and effective use of drugs in patients and knowledge for the professional. One of the main roles of pharmacists the DIC is to answer in a passive way the questions received. Therefore, the question first reaches the DIC, and the pharmacist gets as much detail about the question as possible (whether the patient has venous access, swallowing ability, water deprivation, renal clearance, or any specific condition). Then, a search begins in pharmacotherapeutic guides, books, and databases such as Up To Date, Pubmed, Cochrane, Micromedex, and others. The obtained information is filtered, summarized, extracted, and transformed into a direct and assertive answer.
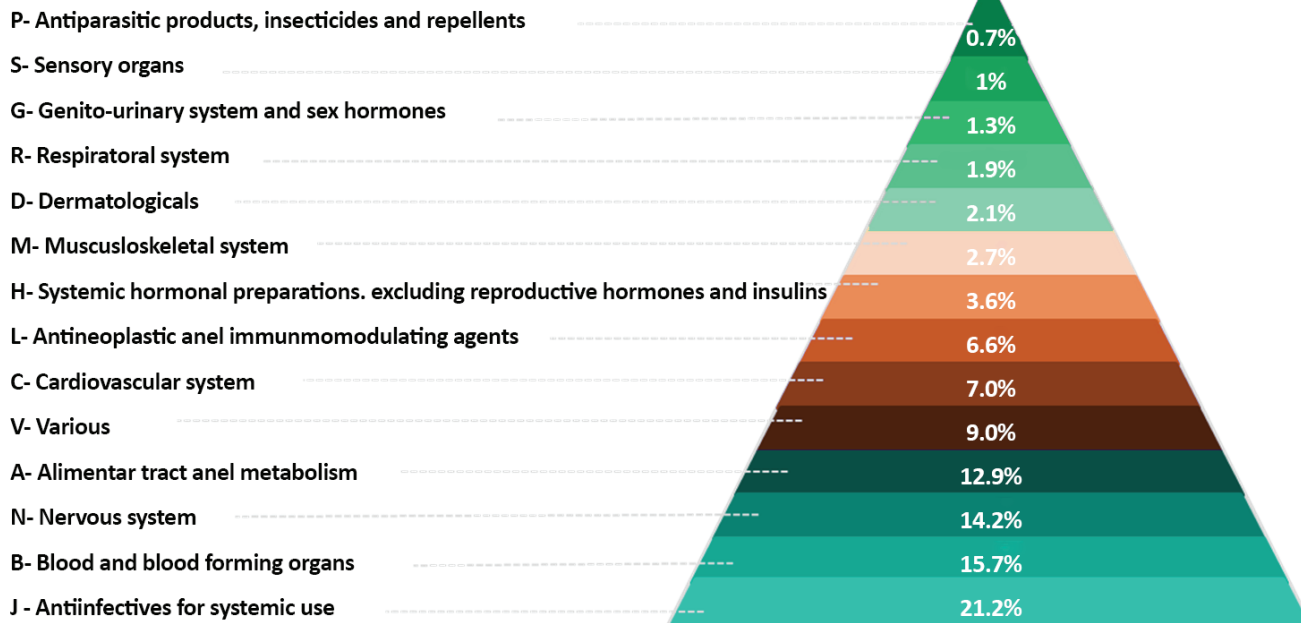
Understanding the level of complexity in a tertiary hospital, DIC staff seeks as much information as possible in the questions in order to provide an accurate and individualized answer. The answers are double-checked and, depending on this, they go through other sectors of the pharmacy in order to obtain more precise information, for example when it comes to the hospital pharmaceutical sector.

The individualization of each case requires a unique and targeted response, making evidence-based health a unique process for each question received. The complexity and urgency of information in emergency services and tertiary hospitals demand the need for an accessible, complete, impartial, reliable, and fast response [10].
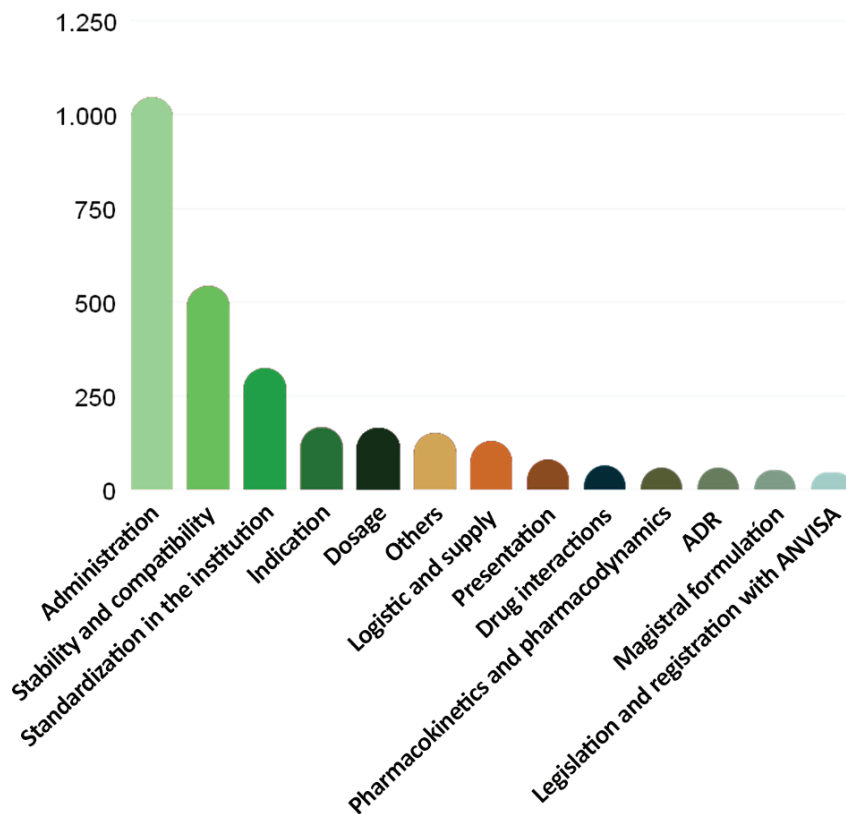
The results highlight that 67% of the questions are answered in less than 1 hour. This represents 2306 searches for evidence allied to practice, information processing, and return of the response to the requesting professional. Questions with a response time greater than one hour and less than 24 hours represented a total of 24% (n=825). The response time is crucial in the hospital environment. Many of the questions are related to administration, and the delay in providing information can affect medication schedules, delay the dispensing of prescriptions or even worsen a clinical condition. And despite the accessibility of information on the internet, health professionals are not always able to quickly filter this information, which makes them turn to specialists at drug information centers [11].

Figure 3. Profile of requests received in the last seven years (2015-2021). **(A)** Categorization of questions from the last seven years according to the ATC code. **(B)** Classification and quantification of all questions received according to the subject.

A

Category	Value
P- Antiparasitic products, insecticides and repellents	0.7%
S- Sensory organs	1%
G- Genito-urinary system and sex hormones	1.3%
R- Respiratoral system	1.9%
D- Dermatologicals	2.1%
M- Muscusloskeletal system	2.7%
H- Systemic hormonal preparations. excluding reproductive hormones and insulins	3.6%
L- Antineoplastic anel immunmomodulating agents	6.6%
C- Cardiovascular system	7.0%
V- Various	9.0%
A- Alimentar tract anel metabolism	12.9%
N- Nervous system	14.2%
B- Blood and blood forming organs	15.7%
J - Antiinfectives for systemic use	21.2%

B

The response time above 24 hours represented 9% (n=309) and was usually related to questions involving the pharmaceutical industry's customer service or consultation with the regulatory agency, which require a longer return time, which may take up to 15 working days. Studies have already shown that a timely response, with agility and responsibility, is related to the satisfaction of clinical professionals [12,13] and is a time save for several health professionals [14].

It is known that the clinical demand is huge, as well as the time spent in the search for scientific evidence. The use of DIC services has been described by health professionals as a huge time saver [15,16]. DIC consultation has tremendous potential in helping doctors and pharmacists with drug information, for example, in patient education and counseling for the disease exacerbations associated with drug use, especially due to the complexity of patients co-morbidities and context, as well as limited resources. The similarity of these two professions being the most inquiries may be caused by the fact that prescribing and dispensing occurred sequentially[17].

This study also verified which professional classes used DIC services more often. In first place were pharmacists representing a total of 1553 questions over the seven years followed by the nursing team and physicians, with 1411 and 379 respectively. The process of answering drug-related questions requires the addition of knowledge and interpretation of databases, and the ability to align with the patient's clinical profile, it also requires the development of the pharmacist interaction with other hospital professionals. For this, sometimes the pharmacist needs to go to the applicant personally, clarify some doubts, discuss the clinical case with the professionals and thus make a more assertive search for evidence. This process allows for greater promotion of the pharmaceutical profession and recognize of the hospital team.

Evidence-based medicine is essential to prevent medical errors, Makary and Daniel (2016) [18] estimated that 400,000 deaths per year occur due to medical error, representing 1.1% of all hospital admissions in the United States, ranking the third position of cause of death, behind cardiovascular diseases and cancer. Medication errors have various definitions and may occur at any time during the medication process, involving physicians, pharmacists, and nurses in primary, secondary, and tertiary care settings [19].

This study portrays a DIC inserted in a high complexity hospital, where most of the patients are surgical and/or are hospitalized in the intensive care unit, most of the questions refer to injectable drugs. It has already been shown, in a study involving six countries, that intravenous medications are the most likely to cause great harm to patients. Administration, prescription, and preparation are the avoidable key points of possible errors[20]. Constantly, the questions are about administration and compatibility of injectable drugs, which need support from the clinical pharmacist, to ensure patient safety[21,22].

Professionals often face rare and/or difficult-to-treat disease situations, requiring high-quality and accurate evidence searches, so evidence-based health seeks to fill knowledge gaps through specific treatments available or in the clinical trial phase[23]. HCFMUSP is a hospital complex and works as a reference center for various diseases, receiving patients from all over the country.

The high demand of complex cases that require intubation and/or intensive care unit justifies the profile of questions asked to the DIC. The great demand for questions about groups J, B, and N of the ATC group is highly related to the profile of patients treated at the hospital and is consistent with other DICs[24,25]. Pharmacists need to be knowledgeable about hospital protocols, for example, venous thromboembolism and stress ulcer prophylaxis, rational use of medications especially antimicrobials, and stewardship programs.

Before any search for evidence, the pharmacist needs to understand the patient's general health and disease condition. The clinical knowledge of the pharmacists allows them to understand the characteristics of the patient (whether it is intubated or if the patient has central or peripheral access) and provide guidance about the administration of opening or crushing tablets for enteral use, drug dilution, as well as stability and compatibility of drugs administered by catheter.

Conclusion

A substantial number (3,442) of medicine requests were included in total DIC requests from 2015 to 2021, and pharmacists were associated with higher percentages of complex questions. Most of the queries targeted drug administration and stability. This work highlights the importance of drug information centers in providing safe, effective, and unbiased pharmaceutical care. The lack of access to information and the time spent searching for evidence can be optimized with the implementation of a drug information center, and in hospital settings, this service can promote a safe medication.

Considering the main role of the drug information center in providing assertive, reliable and safe information, this sector contributes a lot to safe practices based on evidence, as well as in health education. Using DIC is also a time saver for healthcare professionals as industry pharmacists search, process, filter, and summarize the answer. In addition to being a sector that has professionals specialized in the search for evidence that are able to help health professionals in an assertive way in promoting the rational use of medicines, patient safety through scientific evidence.

RBFHSS
Revista Brasileira de Farmácia Hospitalar e Serviços de Saúde

References

1. IBGE- Instituto Brasileiro de Geografia e Estatística. Panorama geral Brasil. https://cidades.ibge.gov.br/brasil/panorama (accessed 20 Jun 2022).

2. De Azeredo Passos VM, Champs APS, Teixeira R, *et al.* The burden of disease among Brazilian older adults and the challenge for health policies: Results of the Global Burden of Disease Study 2017. *Popul Health Metr* 2020;18:1–15. doi:10.1186/s12963-020-00206-3

3. Khan N, Naqvi AA, Ahmad R, *et al.* Perceptions and attitudes of medical sales representatives (MSRs) and prescribers regarding pharmaceutical sales promotion and prescribing practices in Pakistan. *J Young Pharm* 2016;8:244–50. doi:10.5530/jyp.2016.3.13

4. Alamri S, Ali Al Jaizani R, Naqvi A, *et al.* Assessment of Drug Information Service in Public and Private Sector Tertiary Care Hospitals in the Eastern Province of Saudi Arabia. *Pharmacy* 2017;5:37. doi:10.3390/pharmacy5030037

5. Maruzi A, Sabbaghian-Tousi S, Karimi G, *et al.* A ten-year report of drug and poison information center in mashhad, iran 2007-2017. *Iran J Pharm Res* 2021;20:53–61. doi:10.22037/ijpr.2020.112228.13617

6. Muralidharan H, Venkatesan A, Venati R, *et al.* Barriers of healthcare professionals in utilizing the service of drugs and poison information Centre: A cross-sectional study. *Explor Res Clin Soc Pharm* 2022;6:100142. doi:10.1016/j.rcsop.2022.100142

7. Lhachimi SK, Bala MM, Vanagas G. Evidence-Based Public Health. *Biomed Res Int* 2016;2016. doi:10.1155/2016/5681409

8. Gerhardus A, Breckenkamp J, Razum O. Evidence-based public health. Prävention und gesundheitsförderung im kontext von wissenschaft, werten und interessen. *Med Klin* 2008;103:406–12. doi:10.1007/s00063-008-1060-9

9. Koch K. Cornerstones of evidence-based health information. *Bundesgesundheitsblatt - Gesundheitsforsch - Gesundheitsschutz* 2021;64:568–72. doi:10.1007/s00103-021-03321-0

10. Oxman AD, Glenton C, Flottorp S, *et al.* Development of a checklist for people communicating evidence-based information about the effects of healthcare interventions: A mixed methods study. *BMJ Open* 2020;10:1–9. doi:10.1136/bmjopen-2019-036348

11. Reppe LA, Spigset O, Böttiger Y, *et al.* Factors associated with time consumption when answering drug-related queries to Scandinavian drug information centres: A multi-centre study. *Eur J Clin Pharmacol* 2014;70:1395–401. doi:10.1007/s00228-014-1749-z

12. Harish CVN, Belavigi D, Patil AN, *et al.* Assessment of the Impact of Clinical Pharmacology Consultations Provided to Hospital Clinicians From the Drug Information Center—An Outcome Research in a Developing Country. *J Pharm Pract* 2021;34:581–6. doi:10.1177/0897190019885256

13. Peter AV, Murali A, Tomy T, *et al.* Assessment and utilization of drug information services and creating awareness for enhanced utilization of drug information center in a tertiary care teaching hospital. *Asian J Pharm Clin Res* 2017;10:270–4. doi:10.22159/ajpcr.2017.v10i5.17180

14. Marrone CM, Heck AM. Impact of a drug information service: Practitioner hours saved. *Hosp Pharm* 2000;35:1065–70. doi:10.1177/001857870003501018

15. Swennen MHJ, Van Der Heijden GJMG, Boeije HR, *et al.* Doctors' perceptions and use of evidence-based medicine: A systematic review and thematic synthesis of qualitative studies. *Acad Med* 2013;88:1384–96. doi:10.1097/ACM.0b013e31829ed3cc

16. Mijumbi-Deve R, Rosenbaum SE, Oxman AD, *et al.* Policymaker experiences with rapid response briefs to address health-system and technology questions in Uganda. *Heal Res Policy Syst* 2017;15:1–10. doi:10.1186/s12961-017-0200-1

17. Shin SM, Kim HA, Song I, *et al.* Physician and pharmacist satisfaction and clinical needs for the real-time medication surveillance program in South Korea. *BMC Health Serv Res* 2019;19:1–12. doi:10.1186/s12913-019-4686-9

18. Makary MA, Daniel M. Medical error-the third leading cause of death in the US. *BMJ* 2016;353:1–5. doi:10.1136/bmj.i2139

19. Walsh EK, Hansen CR, Sahm LJ, *et al.* Economic impact of medication error: a systematic review. *Pharmacoepidemiol Drug Saf* 2017;26:481–97. doi:10.1002/pds.4188

20. Kuitunen S, Niittynen I, Airaksinen M, *et al.* Systemic causes of in-hospital intravenous medication errors: A systematic review. *J Patient Saf* 2021;17:E1660–8. doi:10.1097/PTS.0000000000000632

21. Ameer A, Dhillon S, Peters M, *et al.* Systematic literature review of hospital medication administration errors in children. *Integr Pharm Res Pract* 2015;:153. doi:10.2147/iprp.s54998

22. Bedouch P, Sylvoz N, Charpiat B, *et al.* Trends in pharmacists' medication order review in French hospitals from 2006 to 2009: Analysis of pharmacists' interventions from the Act-IP© website observatory. *J Clin Pharm Ther* 2015;40:32–40. doi:10.1111/jcpt.12214

23. Pogue RE, Cavalcanti DP, Shanker S, *et al.* Rare genetic diseases: update on diagnosis, treatment and online resources. *Drug Discov Today* 2018;23:187–95. doi:10.1016/j.drudis.2017.11.002

24. Behera S, Xavier A, Gunaseelan V, *et al.* Drug information center as referral service in a South Indian tertiary care hospital. *Int J Pharm Investig* 2017;7:182. doi:10.4103/jphi.jphi_90_17

25. Ashenef A, Reshid E, Yilma Z, *et al.* Assessment of the Use and Status of New Drug Information Centers in a Developing Country, Ethiopia: The Case of Public University Hospital Drug Information Centers. *Biomed Res Int* 2018;2018. doi:10.1155/2018/3840976