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Patient prioritisation in current practice of Brazilian hospital clinical pharmacist: a cross-sectional survey

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Abstract

Objectives: To survey the insertion of patient prioritisation in the current practice of clinical pharmacists at Brazilian hospitals and describe the applicability of patient prioritisation criteria for clinical pharmacy developed in a Delphi study with clinical pharmacists. **Methods:** This was a cross-sectional, online survey. The authors developed the survey questionnaire based on studies published in the literature. Hospital pharmacists from all over Brazil were invited to participate in the survey. The authors adopted the snowball sampling strategy to replicate the questionnaire on social networks. **Results:** A total of 149 pharmacists agreed to participate in the survey. In clinical practice, 94 (63.1%) participants used prioritisation criteria to select patients for clinical pharmacy care, and 55 (36.9%) employed prioritisation using an interface with a computerised hospital system. Eighty-nine (74.2%) of the 120 evaluations of criteria/sub criteria assessed regarding their applicability in clinical practice obtained agreement above 70%. **Conclusions:** Patient prioritisation for clinical pharmacy services is frequently used in the clinical practice of pharmacists participating in the survey. Prioritization of patients for clinical pharmacy services integrated with the hospital's computerized system is a facilitator for incorporating prioritization into care practice. Information availability and accessible data collection are relevance for criterion be used for patient prioritisation for clinical pharmacy.

Keywords: Pharmacy Service, Hospital; Clinical Pharmacy, services, Patient Selection.

Priorização de pacientes na prática atual de farmacêuticos clínicos brasileiros: um survey transversal

Resumo

Objetivo: Pesquisar a inserção da priorização de pacientes na prática atual de farmacêuticos clínicos em hospitais brasileiros e analisar a utilidade dos critérios de priorização de pacientes para farmácia clínica desenvolvidos em um estudo Delphi com farmacêuticos clínicos. **Métodos:** Trata-se de um estudo transversal, *survey* online. Os autores elaboraram o questionário da pesquisa com base em estudos publicados na literatura. Farmacêuticos hospitalares de todo o Brasil foram convidados a participar do *survey*. Os autores adotaram a estratégia de amostragem bola de neve para replicar o questionário nas redes sociais. **Resultados:** Um total de 149 farmacêuticos concordaram em participar da pesquisa. Na prática clínica, 94 (63,1%) participantes usaram critérios de priorização para selecionar pacientes para cuidados de farmácia clínica, e 55 (36,9%) empregaram priorização na prática clínica usando uma interface com sistema computadorizado do hospital. Oitenta e nove (74,2%) das 120 avaliações de critérios/subcritérios avaliados quanto à sua aplicabilidade na prática clínica obtiveram concordância acima de 70%. **Conclusão:** A priorização de pacientes para serviços de farmácia clínica é frequentemente usada na prática clínica de farmacêuticos participantes do *survey*. Priorização de pacientes para serviços de farmácia clínica integrada ao sistema informatizado do hospital é um facilitador para incorporação da priorização na prática clínica. Disponibilidade de informações e coleta de dados acessíveis são relevantes para que o critério seja usado para priorização de pacientes para farmácia clínica.

Palavras-chave: Serviço de Farmácia Hospitalar; Serviço de Farmácia Clínica; Seleção de Pacientes.

Introduction

Clinical prioritisation has been proposed as a strategy to allow pharmacists to focus on patients most in need of optimised drug therapy and those whose placement in the clinical pharmacy service will significantly impact care outcomes[1–3]. Finding effective and efficient methods to identify high-risk patients for targeted pharmacist services is essential[3,4].

In today's busy hospitals with high patient throughput, increasingly complex patients, and constrained resources, it is essential to find effective and efficient methods to identify those at high risk for targeted pharmacist services[3,4]. The lack of available clinical pharmacists to meet demands, as in other countries, is also an issue in Brazil, and rationalising clinical pharmacist services is necessary[5]. Patient prioritisation is needed due to the required rationalisation of pharmaceutical clinical resources in health care centres[6,7]. Some patients may not receive clinical pharmacy services as regularly as needed during their inpatient stay due to a lack of clinical prioritisation, which may reduce medication use safety and effectiveness[8,9].

Tools to support patient prioritisation for clinical pharmacy services in hospitals have been developed using consensus methods (Delphi technique) and predictive models (based on statistical determination)[7-11]. They could determine which patients would benefit from clinical pharmacist input[2,10]. This approach could enhance the delivery of clinical pharmacy services within a resource-limited healthcare service to improve patient care[2].

Few studies on patient prioritisation by pharmacists in a hospital setting in the Brazilian context have been published. Only one prioritisation tool developed in Brazil[7] was identified in the scoping review previously developed by the authors[11].One way of directing care is to define patient selection criteria for follow-up by clinical pharmacists to optimise drug therapy. The optimisation of drug therapy is one of six core hospital pharmacy activities recognised by the Brazilian Pharmacy Council[12].

This study aimed to survey the inclusion of patient prioritisation in the current practice of clinical pharmacists at Brazilian hospitals. The present study also aimed to analyse the Applicability of patient prioritisation criteria for clinical pharmacy developed in a Delphi study with clinical pharmacists.

Methods

Study design and population

A cross-sectional, online survey of Brazilian hospital pharmacists.

Survey Questionnaire

The survey questionnaire was developed by the authors based on studies published in the literature about clinical pharmacists' implementation and applicability of patient prioritisation in hospital settings[2-4,6]. The criteria and subcriteria of patient prioritisation identified in a Delphi study conducted by the authors were also used to design the questionnaire[13]. The questionnaire was plotted with five clinical pharmacists who work in hospital setting. All pharmacists had title of specialist in clinical pharmacy with expertise in medication-related problems and patient prioritisation. The pharmacists work with patients of surgery units and medical units. Their feedback was incorporated to improve questionnaire content and understanding. The survey questionnaire was available online from January 22, 2021 to March 19, 2021.

The four sections of the survey questionnaire (Appendix A) are as follows: i. participant identification—sociodemographic (gender, age); ii. Participants' professional information (academic degree, clinical pharmacy expertise, hospital type, main area of expertise, title of specialist, specific formation in clinical pharmacy). In the question "Specific in Clinical Pharmacy", the respondents indicated whether they had completed a residency or other course in clinical pharmacy (Ph.D., master's, or other postgraduate course) after graduation from the pharmacy course. ; iii. Patient Prioritisation in Clinical Practice-statements regarding the use of prioritisation in the daily clinical practice of hospital pharmacists to be evaluated by respondents and questions about satisfaction with patient prioritisation. iv. The prioritisation criteria were used to evaluate the applicability of patient prioritisation criteria and subcriteria identified in a Delphi study in the current practice of Brazilian pharmacists. Sections I to III consisted of dichotomous questions (yes and no), multiple-choice questions, and open-ended questions, where participants could leave their opinion or specify something related to the question previously answered.

In section IV, the participants evaluated the applicability of criteria and subcriteria for patient prioritisation in clinical pharmacy using four attributes, which were adapted from Lima, Aguiar, and Storpirtis (2019)[14]: (i) clinical relevance and importance: the criterion identifies an essential aspect regarding prioritising patients for clinical pharmacy; (ii) objectivity: the criterion allows for precise measurement, without subjective judgement; (iii) feasibility: information regarding the criterion is available at the hospital and is easily accessible, or measurement for use in routine clinical practice is feasible; and (iv) discrimination: the criterion can differentiate patients with a greater likelihood of having medication-related problems (MRPs). The following 5-point Likert scale was used to evaluate applicability: 1- strongly disagree; 2- disagree; 3- neither agree nor disagree; 4- agree; and 5- strongly agree.

Survey Administration

Pharmacists throughout Brazil working in hospitals (private, public, nonprofit networks) were invited by convenience to participate in the survey. The snowball method[15] was adopted to replicate the questionnaire on social networks. The invitation was made by several means of communication (messages, social networks, e-mail). Requests to disseminate the research were sent to associations, societies, and regional pharmacy councils. The hospital pharmacy directors were also contacted by e-mail and asked to circulate the survey to the hospital pharmacy staff. The survey link was sent along with the invitation. The link was resent 30 days later. The survey was administered online using a web-based *Google Form*. It was conducted in a single round. The main author conducted the data collection.

Data Analysis

The data were analysed using SPSS software (IBM SPSS Statistics for Windows, Version 25.0. Armonk, NY: IBM Corp.). We adopted a descriptive analysis using the total number of respondents for each question as the denominator. Frequencies and proportions were calculated. Responses to questions about applicability assessment were collapsed from a 5-point Likert scale into three categories: agreement ('agree' and 'strongly agree'), neither agree nor disagree, and disagreement ('disagree' or 'strongly disagree').

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Responses to open-ended questions were reviewed to identify key terms or concepts.

Ethical Approval

The Federal University of Minas Gerais Research Ethics Committee approved the research, and the participants signed an informed consent form. The survey was voluntary and anonymous (CAAE 07491119.8.0000.5149).

Results

A total of 149 pharmacists agreed to participate in the survey. Most participants had a postgraduate degree (34.9%), master's degree (27.5%), or Ph.D. (16.1%). Among the pharmacists, 63.7% had some clinical pharmacy specialisation. The most frequent area of expertise was intensive care and emergency services (27.5%), followed by medical or surgical clinics (13.4%) and specialised clinics (10.1%), encompassing hematology, transplantation, nephrology, cardiology, gastroenterology, pneumology, and palliative care. The other activity areas are shown in Table 1.

Table 1. Survey participant characteristics

Participant Characteristics	
Expert participants, n	149
Gender	
Female, n (%)	129 (86.6%)
Male, n (%)	20 (13.4%)
Age	
≤34 years	80 (53.7%)
> 34 years	69 (46.3%)
Years of degree completion	
≤10 years	80 (53.7%)
> 10 years	69 (46.3%)
Highest academic degree	
Ph.D., n (%)	24 (16.1%)
Master's degree, n (%)	41 (27.5%)
Postgraduate course, n (%)	52 (34.9%)
Residence Specialisation, n (%)	21 (14.1%)
Graduate, n (%)	11 (7.5%)
Title of Specialist	
Clinical Pharmacy Specialist certificated by BSHP*	13 (8.7%)
Hospital Pharmacy Specialist certificated by BSHP*	19 (12.8%)
Specific formation in clinical pharmacy	
Ph.D., n (%)	7 (4.7%)
Master's degree, n (%)	8 (5.4%)
Postgraduate course, n (%)	54 (36.2%)
Residency Specialisation, n (%)	26 (17.4%)
None	54 (36.2%)
Hospital type	
Public	100 (67.1%)
Private	37 (24.8%)
Nonprofit	12 (8.1%)
Main Speciality	
Urgent and Emergency/Intensive Care, n (%)	41 (27.5%)
Nonspecific, n (%)	32 (21.5%)
Medical/Surgical Clinic, n (%)	20 (13.4%)
Specialised Clinics (Haematology, Transplantation, Nephrology, Cardiology, Gastroenterology, Pneumology, Palliative Care), n (%)	15 (10.1%)
Geriatrics, n (%)	12 (8.0%)
Oncology, n (%)	11 (7.4%)
Neonatology/Paediatrics, n (%)	9 (6.0%)
Administrative, n (%)	7 (4.7%)
Academic/Research, n (%)	2 (1.3%)

*Brazilian Society of Hospital Pharmacy and Health Services

The prioritisation criteria for selecting patients for clinical pharmacy care in clinical practice were used by 94 (63.1%) of the 149 participants, and prioritisation was performed using an interface with a computerised hospital system by 55 (36.9%) participants.

The knowledge of hospital pharmacists participating in the survey on the main prognostic prediction models and clinical tools based on consensus to support patient prioritisation for clinical pharmacy services in hospitals is displayed in Table 2. Out of 149 participants, 98 reported not being familiar with any of the presented tools. Twenty-seven participants were aware of the 'Risk Score for Hospitalized Patients for Clinical Pharmacy Rationalization in a High-Complexity Hospital', twelve were familiar with the 'Prediction Model for Identifying Patients with the Possibility of Pharmacotherapy Improvement', and ten knew the 'Score to Identify Hospitalized Patients at risk of DRP[10].

Table 2. Pharmacists' knowledge about tools used to prioritisation in the daily care practice

Patient Prioritisation Tool	n
Don't know any of the tools.	98
Risk Score to Hospitalised Patients for Clinical Pharmacy Rationalisation in a High Complexity Hospital[6].	27
Prediction model for identifying patients with the possibility of pharmacotherapy improvement[13].	12
Score to identify hospitalised patients at risk of drug-related problems[14].	10
Electronic screening of medical records to detect inpatients at risk of drug-related problems[15]	9
Medicines Optimisation Assessment Tool (MOAT)[9]	7
Drug-Associated Risk Tool (DART)[16]	7
Obstetrics triage tool for clinical pharmacists[17]	6
Pharmaceutical Assessment Screening Tool (PAST)[18]	3

Among the 94 participants who reported use prioritisation in care practice, 45(47.9%) performed prioritisation using criteria predefined by the health establishment, 21 (22.3%) reported using patient prioritisation tools, 26 (27.7%) defined their criteria for use, and 2 (2.1%) responded 'not applicable', The use in care practice of 'Risk score to hospitalised patients for clinical pharmacy rationalisation in a high complexity hospital[6] was reported by six of 21 hospital pharmacists who using patient prioritisation tools. Twelve participants reported using risk scores without specifying the score's name or authors. The use of tools developed by research groups at the teaching hospital where they worked was mentioned by three hospital pharmacists.

Regarding the degree of satisfaction with the patient prioritisation system adopted in care practice of 94 hospital pharmacists who performed priotisation, only 6 (6.3%) were very satisfied. and 36 (38.3%) considered satisfied. On the other hand, 26 (27.7%) reported some level of dissatisfaction, and another 26 (27.7%) were neutral (neither satisfied nor dissatisfied).

The pharmacists' opinions on prioritisation in hospital clinical pharmacy are displayed in Table 3. The level of agreement for statement that patient prioritisation is a strategy to streamline the work of hospital clinical pharmacists was 95 %. In opinion of 87% of participants patient prioritisation is feasible in Brazilian hospitals. For statements regarding the effectiveness of patient prioritisation when integrated with computerised systems (prescription, medical records, laboratory medicine) the level of agreement ranged from 70 to 89%. However, we should emphasise that only 32% of hospital pharmacists agreed that the pharmacist could perform patient prioritisation without integration with computerised systems (Table 3)

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Table 3. Pharmacists' opinions on hospital clinical pharmacy prioritisation

About prioritisation	Disagree	Neither agree nor disagree	Agree
Patient prioritisation is a strategy to streamline the work of the hospital clinical pharmacist.	2%	3%	95%
Patient prioritisation is feasible in Brazilian hospitals.	5%	7%	87%
Patient prioritisation can be performed by the pharmacist without integration with the pharmacy and hospital computer systems.	50%	18%	32%
The lack of integrated computerised systems hinders patient prioritisation for clinical pharmacy services.	5%	7%	89%
The patient prioritisation strategy must be integrated into the pharmacy's computerised system (prescription) to be effective.	7%	11%	82%
The patient prioritisation strategy must be integrated into the computerised patient admission system (medical records) to be effective.	5%	9%	86%
The patient prioritisation strategy must be integrated into the computerised laboratory medicine system to be effective.	11%	18%	70%
The participation of pharmacists in clinical meetings and rounds facilitates patient prioritisation for clinical pharmacy services.	0%	4%	96%
The work process with the clinical pharmacist linked to the inpatient unit (decentralised clinical pharmacy) facilitates the patient prioritisation process.	3%	14%	83%
The patient prioritisation instrument must serve patients of different age groups.	4%	10%	86%
A patient prioritisation instrument developed for specific age groups or patients hospitalised in specific clinical specialties has greater clinical applicability.	7%	15%	78%
Prioritisation can generate conflict between the team's or the pharmacist's expectations and the definition identified by the selection instrument adopted in the hospital.	27%	31%	42%

Pharmacist's participation in clinical meetings and rounds facilitates prioritising patients for clinical pharmacy services in opinion of 96 % of respondent. The clinical pharmacist linked to the inpatient unit (decentralised clinical pharmacy) is also a clinical prioritisation facilitator for clinical pharmacy services for 83% of them.

Approximately 86% of hospital pharmacists affirmed that the patient prioritisation instrument must serve patients of different age groups, and 78% believe that instruments developed for specific age groups or patients hospitalised in specific clinical specialties have greater clinical applicability. We found that 27% of the pharmacists disagreed, 31% were neutral, and 42% agreed vis-à-vis the statement that clinical prioritisation of clinical pharmacy services could generate conflict between the team's or the pharmacist's expectations and the definition identified by the selection instrument adopted at the hospital (Table 3).

The finalist 31 criteria/subcriteria of the Delphi study previously conducted by the authors[13] were evaluated for their applicability in clinical practice using four attributes, generating 124 assessments.. Eighty-nine (71.7%) of the 124 assessments obtained agreement greater than 70% considering the four attributes evaluated. Of the 31 assessments that obtained an agreement below 70%, 11 (35.5%) were related to feasibility, 7 (22.6%) to discrimination, 7 (22.6%) to objectivity, and 6 (19.3%) to importance and clinical relevance. All details regarding the percentage agreement criteria evaluated are presented in Appendix B.

The criteria/subcriteria for which the pharmacists' agreement was less than 70% regarding the feasibility of use in clinical practice were clinically significant for severe drug allergy history; diagnostic before hospitalisation or diagnostic/diagnostic hypothesis on admission; Charlson's comorbidity index; glycated haemoglobin A1C >7%; natremia above or below the reference value limit; diagnosis of liver disease K70-K77 codes; liver dysfunction in medical records and tests outside the reference value; patients with clinical, assistance, and pharmacotherapeutic risk factors (including two subcriteria); patients with nonadherence to drug therapy at home; and patients with recent readmission.

Regarding discrimination, the criteria/subcriteria whose agreement ranged from 63 to 69.8% were Charlson's comorbidity index, natremia above or below the reference value limit, glycated haemoglobin A1C >7%, blood glucose <70 mg/dL, blood glucose >140 mg/dL, transfer to a medical or surgical clinic ward from an intensive care unit, and nonadherence to drug therapy at home.

When assessing objectivity, hospital pharmacists reported less than 70% agreement for the following criteria/subcriteria: diagnostic before hospitalisation or diagnostic/diagnostic hypothesis on admission; Charlson's comorbidity index; natremia above or below the reference value limit; blood glucose >140 mg/dL; transfer to a medical or surgical clinic ward from an intensive care unit; nonadherence to drug therapy at home; and recent readmission.

Considering the importance and clinical relevance, hospital pharmacists agreed with values below 70% for the following criteria: natremia above or below the reference value limit; glycated haemoglobin A1C >7%; blood glucose <70 mg/dL; blood glucose >140 mg/dL; transfer to a medical or surgical clinic ward from an intensive care unit; and nonadherence to drug therapy at home. Two descriptors had less than 70% agreement on all four attributes: natremia above or below the reference value limit and nonadherence to drug therapy at home.

Discussion

Patient prioritisation for clinical pharmacy services is a strategy that allows the appropriate and effective use of the hospital pharmacy workload, streamlining drug therapy and promoting patient safety, in addition to reducing hospitalisation time and care costs[2,3,18]. This is Brazil's first survey on patient prioritisation in a hospital clinical pharmacy. This survey showed that patient prioritisation for clinical pharmacy services is a frequent practice in hospitals among the pharmacists who participated in the survey and identified opportunities to improve hospital clinical prioritisation.

Although more than half of the pharmacists who participated in the survey reported using clinical prioritisation in professional practice, the use of predictive instruments or models available in the literature for identifying patients at risk of developing DRP was reduced. Thus, the frequency of pharmacists who did not know any tool used for patient prioritisation for clinical pharmacy services was high.

The insufficient clinical education and training during an undergraduate degree in pharmacy could explain the low knowledge of pharmacist participants in a survey about tools for patient prioritisation. This finding can be explained by the historical difficulties that pharmacy schools have in adapting to the new role of pharmacists in the patient care process, particularly in Brazil and other emerging countries such as India and China[5]. Therefore, it is essential to provide Brazilian pharmacists and students with resources and continuous training opportunities to improve their skills in the care of patients because clinical prioritisation and decision-making is a skill requiring training and continuous development. This strategy will contribute to the effective implementation of clinical pharmacy services.

Notably, the most commonly used instrument was the risk score for hospitalised patients for clinical pharmacy rationalisation in a high-complexity hospital, which was developed by Brazilian researchers[7] and validated only for a paediatric infectious disease unit[19]. However, the preference for using this instrument can be favourable since it is an instrument developed in Brazil, representing the country's reality, in addition to covering a broad profile of patients to be evaluated, as it is geared toward infants, children, adults, and older adults[7].

Satisfaction with clinical prioritisation was proven to be a problem since the frequency of very satisfied pharmacists was low among survey participants. Expanding pharmacists' knowledge of the instruments available in the literature can contribute to selecting more appropriate instruments and increasing patient satisfaction[2,3]. Another strategy to facilitate better patient prioritisation and increase pharmacist satisfaction is a team-based approach, where pharmacists participate in ward rounds and discuss patient needs with physician and allied health staff[4].

In institutions with a computerised system, the system's interface with the prioritisation tool can facilitate its use and application, in addition to providing fast access to real-time data since the most common barriers to effective clinical prioritisation are lack of time and readily available information[3,4,20,21]. Aligned with what is described in the literature, the pharmacists participating in the survey considered that the interface with computerised systems is a strategy that facilitates the prioritisation process.

Communicating with and working directly within the multidisciplinary team is essential to ensure consensus on who should be prioritised[4]. Pharmacists affirm that clinical prioritisation can be integrated into their work and that a multidisciplinary team can facilitate the implementation of clinical pharmacy services. However, regarding the hypothesis that tool prioritisation can generate conflict between the team's or the pharmacist's expectations, pharmacists' opinions are not uniform, but the answer "agree" prevails among them. One study with Australian pharmacists identified mismatched expectations as barriers to prioritisation[4]. The Australian pharmacists included discussed the issues of competing priorities and a mismatch of expectations between how hospital pharmacists view their role and what other health care professionals may expect related to patient prioritization[4].

Prioritisation must be a swift process that assimilates and analyses pertinent patient-specific issues to assign a degree of pharmaceutical risk to a patient. Based on the data discussed above, the definition of a patient prioritisation tool for the hospital clinical pharmacy requires selecting variables that can prioritise patients but are clear, feasible, or objective[4,22].In this sense, we should underscore that the lowest rates of agreement regarding feasibility, applicability, and objectivity covered criteria whose availability is not immediate, demanding an interview with the patient and searching the medical records.

One of the strengths of this survey was the participation of clinical pharmacists who mainly worked in care practice in inpatient units of different clinical specialties. This profile incorporated different views, contributing to the knowledge of prioritisation in the professional practice of Brazilian clinical pharmacists and the analysis of the applicability of sets of criteria for prioritising patients for clinical pharmacy services.

The limitations of our study include its cross-sectional nature and the use of an online questionnaire disseminated via social media. The use of social media for snowball sampling precluded the calculation of the response rate. In addition, the small number of participants prevented generalisation because the results did not reflect the number of practising hospital pharmacists in Brazil. However, the demographic characteristics of the pharmacists included in our study are in line with the report of the Pharmacist in Brazil published in 2015 by the Brazilian Federal Council of Pharmacy (Conselho Federal de Farmácia)[24].This report shows a predominance of females, and the prevalent age group was between 29 and 38 years old[24,25]. Response bias is plausible because respondents were more comfortable completing the survey when pharmacists worked with clinical prioritisation. Although the survey items were pretested, some definitions and questions may have generated inconsistent responses.

Future research with qualitative approach will contribute to better investigate perspectives of Brazilian pharmacist related to patient prioritisation and understand barriers to incorporate this strategy in care practice. The contribution of artificial inteligence to patient prioritizaton is also relevant be investigated.

Conclusion

Patient prioritisation for clinical pharmacy services is frequently used in the clinical practice of pharmacists participating in the survey. Clinical pharmacy services integrated with a computerised system is a facilitator for incorporating prioritization into care practice, in opinion of pharmacists partucipating in survey . The applicability analysis of the prioritisation criteria showed the relevance of information availability and accessible data collection for a criterion be used in clinical practice.

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Author contributions

Botelho SF; Reis AM contributed substantially to the conception and design of the study. Botelho SF; contributed substantially to the data collection. Botelho SF; Reis AM , Pantuzza LL analysed and interpreted the data. All the authors contributed substantially to the draft of the manuscript. All the authors approved the final version of the manuscript.

Conflict of interest

The authors declare no conflicts of interest.

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