

Quality management of the periodic medical examination at a university hospital, from the workers' perspective

Gerenciamento da qualidade do exame médico periódico de um hospital universitário sob a perspectiva do trabalhador

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ABSTRACT | Introduction: Implementation of quality assessment methodologies at healthcare services enables the results achieved to be monitored in terms of established objectives and standards of care delivery. **Objectives:** To assess the quality of the processes involved in provision of periodic medical examinations at a University Hospital, from the workers' perspective. **Methods:** This is a cross-sectional study using questionnaires to conduct quality assessment of the periodic medical examination processes, including Net Promoter Score satisfaction questions. Statistical analysis of the results was performed using SPSS version 18. Data on categorical variables are expressed as absolute frequencies and data on continuous variables as means and standard deviations. Chi-square tests and analysis of variance were used to identify associations. A significance level of 0.05 was adopted to determine the statistical relevance of findings. **Results:** A total of 381 respondents with a mean age of 45.25 years were included, 66% of whom were female. There was a statistically significant ($p < 0.001$) association between duration of consultations and the number of items assessed in the periodic medical examination. In general, the findings from application of the Net Promoter Score for self-scheduling (45%) and service at reception (42%) indicate a need for process improvement, whereas clinical care (50%) rated as a quality process. **Conclusions:** This study identified a set of information that can be used to describe, analyze, and improve the care delivered by the institution's occupational health service and to identify opportunities for improvement of periodic medical examination processes.

Keywords | medical examinations; occupational healthcare services; occupational medicine; healthcare administration; healthcare quality.

RESUMO | Introdução: A implementação de metodologias de avaliação da qualidade em serviços de saúde possibilita o monitoramento dos resultados obtidos em relação aos objetivos e padrões estabelecidos para o cuidado prestado. **Objetivos:** Avaliar a qualidade dos processos envolvidos na realização dos exames médicos periódicos em um hospital universitário sob a perspectiva do trabalhador. **Métodos:** Estudo transversal com questionário para a avaliação da qualidade dos processos do exame médico periódico e aplicação do Net Promoter Score. A análise estatística dos resultados foi realizada com o *software* SPSS versão 18. Para variáveis categóricas, os dados descritivos estão apresentados em frequências absolutas; para variáveis contínuas, como média e desvio padrão. Para avaliar a existência de associações, foram utilizados o teste do qui-quadrado e a análise de variâncias. O nível de significância de 0,05 foi considerado para determinar a relevância estatística dos achados. **Resultados:** Foram incluídos 381 respondentes, sendo 66% do sexo feminino, com idade média de 45,25 anos. A associação entre tempo de duração da consulta e o número de itens avaliados no exame médico periódico teve significância estatística ($p < 0,001$). No geral, os resultados obtidos pela aplicação da escala Net Promoter Score em relação ao autoagendamento (45%) e ao atendimento da recepção (42%) estão na zona de aperfeiçoamento dos processos, enquanto o atendimento clínico está na zona de qualidade (50%). **Conclusões:** Este estudo identificou um conjunto de informações que permite descrever, analisar e aperfeiçoar o cuidado realizado pela saúde ocupacional da instituição e identificar oportunidades de aprimoramento nos processos do exame médico periódico.

Palavras-chave | exames médicos; serviços de saúde do trabalhador; medicina do trabalho; administração de serviços de saúde; qualidade da assistência à saúde.

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INTRODUCTION

Occupational health is an area of public health that studies the relationships between work and health, with the objective of promoting and protecting workers' health.¹ In Brazil, the legislation that regulates occupational health was implemented in 1978, in the form of Ministry of Labor Ordinance nº 3.214, which set out eight Regulatory Standards (RS). Within the scope of the present study, the most important of these is RS-7, which mandated an obligation to develop and implement Medical Occupational Health Control Plans (MOHCP), including the provision of occupational medical examinations.² According to this RS, the MOHCP should prioritize clinical-epidemiological instruments in its approach to the relationship between health and work and must include, among other obligations, provision of periodic medical examinations (PME).

The occupational medical examinations (induction, periodic, return-to-work, change of role, and exit) provided for in RS-7 must include detailed investigation of habits, lifestyle, and occupational health risk factors, anticipating development of chronic or occupational diseases that could compromise the worker's capacity to work and quality of life. According to the World Health Organization (WHO), occupational risk factors are related to a substantial part of chronic disease load.² As such, by monitoring occupational health over time, a high-quality PME, capable of identifying occupational health risk factors, can enable the occupational physician to provide effective care, whether through referral for treatment of an incipient chronic disease, or through intervention in a risk factor inherent to the work environment that causes occupational disease. The PME should encompass clinical assessment, covering occupational patient history and physical and mental examinations, and supplementary tests, which are dependent on the risks to which workers are exposed.³

The spread of quality management began in the 1980s, and planning, process reviews, performance monitoring, and continuous improvement have become essential for organizational sustainability. The concept of quality in healthcare services encompasses a set of attributes that includes, among others, the possibility of resolution of health problems, reduction of factors prejudicial

to patients' dignity and autonomy, efficient resource utilization, the effectiveness of care, client satisfaction, and reduction of the variability of healthcare practice.⁴⁻⁷

Implementation of quality assessment methodologies within healthcare services enables the results achieved to be monitored in terms of objectives and standards established for the care provided.⁶ With relation to assessment of the quality of the examinations set out in the MOHCP, Hyeda et al.⁸ point out that it is essential to involve workers in service provision quality control and continuous process improvement. The Net Promoter Score (NPS) is an assessment methodology that measures the level of client satisfaction and is used by a wide range of firms. This metric measures the extent to which the respondent would recommend a solution and/or experience to their friends, relatives, or colleagues.⁹

Actions for the promotion and protection of occupational health encompass complex activities involving multidisciplinary and intersectorial participation focused on changing working processes.¹ In addition to being an obligation mandated by employment legislation, the PME provides an opportunity for workers to review their health status and receive guidance on prevention, screening, and early diagnosis of health problems.

Against this background, the objectives of this study are to evaluate the quality of the processes involved in delivery of PMEs at a University Hospital in the South of Brazil, from the workers' perspective and, secondarily, to assess factors associated with participants' satisfaction.

METHODS

STUDY DESIGN AND POPULATION

This is a cross-sectional study conducted within the Occupational Health Service (OHS) of a University Hospital in South Brazil, involving workers who attended a medical examination from June to August of 2019.

DATA COLLECTION

Data were collected from July to September of 2019 using a self-report questionnaire covering three dimensions: identification, PME items, and PME processes. It covers

the elements of the risk assessment, involving hospital-specific activities, in which biological risk and ergonomic factors predominate, and the main causes of absenteeism in this setting: chronic diseases and cardiovascular, musculoskeletal, and mental health disorders.

The identification section of the questionnaire covered data on the workers' age, sex, and hospital department. For the purposes of this study, respondents were divided into four major job types: healthcare, administrative, support (cleaning, nutrition, laundry, wardrobe, and security), and engineering and maintenance.

The section covering PME items contained 10 questions on the eight items that should be assessed in a PME, according to the literature and the relevant legislation. Items were adopted from a previous study conducted by Hyeda et al.⁸ covering weight and height, measurement of blood pressure, examination of the spine and upper limbs, and mental health status assessment. In order to adapt the questionnaire to the hospital setting, in which biological risk and ergonomic factors predominate, and in view of the main causes of absenteeism in this setting (chronic diseases and cardiovascular, musculoskeletal, and mental health disorders), items were also included on cardiorespiratory auscultation, review of vaccination status, and review of disease history.

The section on satisfaction with the processes involved in delivery of the PME identified three fundamental processes related to the service provided to workers by the hospital OHS: self-scheduling, the service at the OHS reception, and the medical consultation. The NPS was administered to quantify indicators of satisfaction with these processes, using the following questions:

- On a scale from 0 to 10, how likely would you be to recommend our periodic medical examination to a work colleague?
- On a scale from 0 to 10, how likely would you be to recommend the service at the OHS reception to another company?
- On a scale from 0 to 10, how likely would you be to recommend the PME self-scheduling service at the Hospital de Clínicas de Porto Alegre (HCPA) to another company?

The section covering PME processes also assessed the time spent waiting for the consultation and the duration of the consultation itself. An open question requesting suggestions for improvement of the PME was also included.

Workers who attended a PME from June to August of 2019 (the inclusion criterion) were informed that they would be invited to take part in the study the following month. The OHS provided a list of e-mails for the workers who attended a PME and all of them were sent an invitation to participate via their institutional e-mails.

The questionnaire was made available online to all workers during the first week of the month after they had attended the PME and was also provided in printed format for those who worked in support or engineering and maintenance, with a text stating that if they had already completed the questionnaire online they did not need to complete it again. The printed questionnaires were made available in the areas visited and were returned via a ballot box that was collected by the research team after 7 days.

The sample size was defined on the basis of a study by Hyeda et al.,⁸ who employed an NPS scale in a PME satisfaction survey. It was estimated that, for 45% of respondents rating general satisfaction at 9 to 10 points on the NPS scale and considering a 95% confidence level and 5% margin of error, 381 respondents would be needed. Subset analysis employed the four types of job role.

The NPS scale results were used to divide respondents into three categories: detractors (from 0 to 6 points), neutrals (from 7 to 8 points), and promoters (from 9 to 10 points). The overall NPS result was calculated by subtracting the percentage of detractors from the percentage of promoters, and the results were distributed in the range of -100 to 100%, defined as follows: excellence (75-100), quality (50-74), improvement (0-49), and critical (-100 to -1).⁹

DATA ANALYSIS

SPSS version 18 was used for statistical analysis of the results. Descriptive data are expressed as absolute frequencies for categorical variables and as means and standard deviations (SD) for continuous variables. Chi-

square tests and analysis of variance (ANOVA) were used to identify associations. A significance level of 0.05 was adopted to determine the statistical relevance of findings.

ETHICAL CONSIDERATIONS

The study was approved by the hospital Research Ethics Committee (decision n° 3.407.401, GPPG HCPA project n°: 2019-0323/ Ethics Committee approval number 5327).

RESULTS

Questionnaires with missing responses to objective questions were excluded from the analysis (n = 13) and the final sample comprised 381 respondents, 42% of those eligible to take part. Of these, 61 replied using the printed forms made available in the support and engineering and maintenance departments.

The members of the sample were attached to the following functional departments: 45% were healthcare workers, 30% worked in administrative roles, 16% were support staff, and 9% were engineering and

maintenance personnel. The sample contained 66% of female respondents, who were the majority in all departments, except for engineering and maintenance (9%). The mean age of the sample was 45.2 years (SD: 9.7; median = 46, $P_{25} = 39$, $P_{75} = 54$) and 70% of respondents were more than 41 years old, 35% of whom were over the age of 51 years.

The results for the time spent waiting for the consultation were as follows: 57% of respondents waited less than 10 minutes; 31% waited 11 to 20 minutes; 7% waited 21 to 30 minutes; and 5% waited more than 31 minutes. In the assessment of the time spent on clinical care, 23% of respondents endorsed a duration of less than 10 minutes; 52% chose 11 to 20 minutes; 21% responded 21 to 30 minutes; and 2%, stated that the consultation lasted more than 30 minutes.

During the clinical assessment, an average of five (SD = 1.3) of the eight items established were actually assessed, according to the workers' memories of the PME. Figure 1 illustrates numbers of PMEs by number of items assessed. It can be observed that all eight criteria were assessed in just two PMEs.

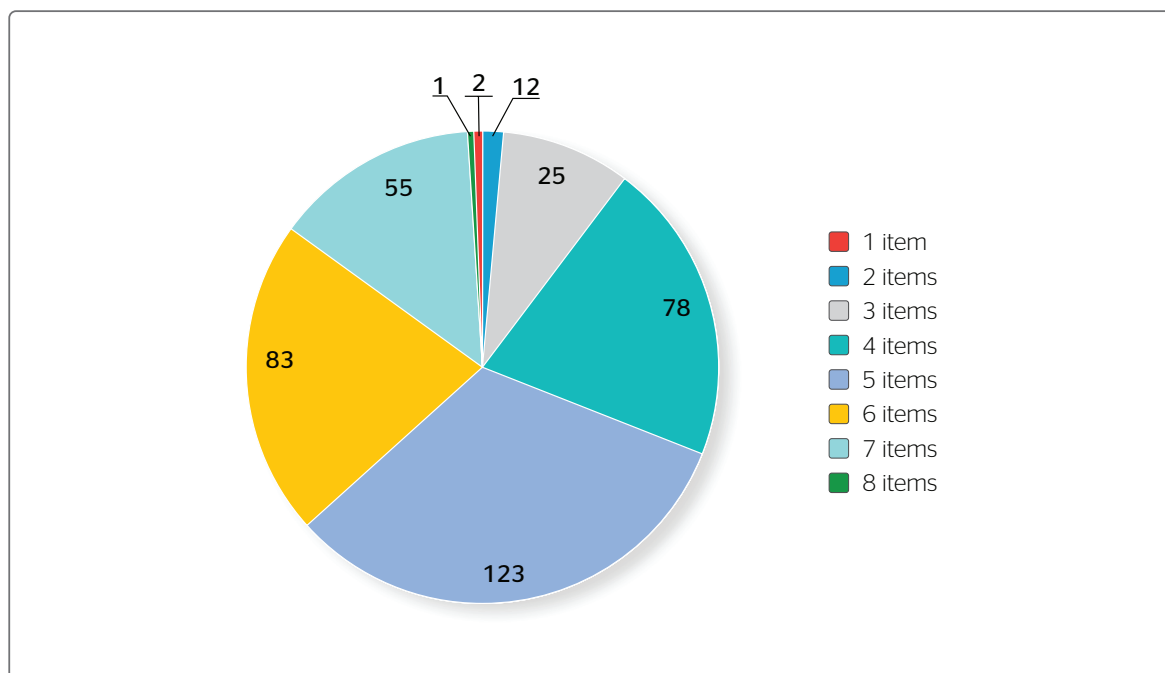


Figure 1. Total number of periodic medical examinations (PME) by number of items assessed.

The items assessed with greatest frequency, according to the workers' reports, were blood pressure (95%), cardiorespiratory auscultation (93%), previous disease history (93%), anthropometric data (83%), and vaccination status (82%). musculoskeletal assessment of the spine was the item least often assessed in the PME (22%). By functional department, support workers had the highest percentages of assessment of

the majority of the variables studied. Items assessed during the PME are shown in Table 1, broken down by workers' functional departments.

There was a statistically significant ($p < 0.001$) association between duration of consultation and number of items assessed during the PME, i.e., the longer the time spent on clinical care, the higher the number of assessment items that were covered during the examination (Table 2).

Table 1. Percentage of "yes" responses to periodic medical examination assessment items, overall and by workers' functional departments (overall total, n = 381)

	Overall (n = 381)	Care (n = 171)	Administrative (n = 115)	Support (n = 61)	Engineering and maintenance (n = 34)
Blood pressure measurement	95	94	98	86	97
Cardiorespiratory auscultation	93	91	98	83	97
Musculoskeletal upper limb assessment	52	50	52	48	67
Musculoskeletal spine assessment	22	23	23	22	12
Mental health review	54	55	59	37	52
Previous disease history review	93	92	95	90	94
Vaccination status review	82	81	85	76	82
Anthropometric data	83	76	85	79	85

Table 2. Number of items assessed during the periodic medical examination, by duration of consultation

Duration (minutes)	n	Mean	SD	SE	95%CI of mean		p-value*
					Minimum	Maximum	
≤ 5	5	4.4000	0.89443	0.40000	3.00	5.00	
6-10	88	4.5909	1.38661	0.14781	1.00	8.00	
11-20	197	5.0609	1.33491	0.09511	0.00	7.00	< 0.001
21-30	81	5.4938	1.15243	0.12805	2.00	7.00	
> 30	9	5.3333	1.22474	0.40825	4.00	7.00	
Total†	380	5.0421	1.33486	0.06848	0.00	8.00	

SD = standard deviation; SE= standard error; 95%CI = 95% confidence interval.

* Analysis of variance (ANOVA).

† Missing: n = 1.

Table 3. Net Promoter Score (NPS) results

	Overall	Administrative	Care	Support	Engineering and maintenance
Self-scheduling	45	63	51	16	13
Service at reception	42	46	49	27	18
Clinical care	50	62	60	14	27

Formula for calculating the NPS: (% scores of 9 and 10) - (% scores of 0-6).

In the overall assessment, the results of application of the NPS scale to assess workers' satisfaction with self-scheduling and with the service at the OHS reception were rated as in need of process improvement (scored in the range of 0 to 50), whereas clinical care was rated as a quality process (score greater than 50). However, when broken down by functional department, it can be inferred that these results were influenced by the low scores awarded by workers from the support and engineering and maintenance departments (Table 3). All workers are assessed by the same medical team.

Analysis of the results indicated that the number of items assessed during the PME had an influence on workers' perceptions of the quality of medical care provided, i.e., the greater the number of items assessed, the greater the workers' satisfaction (Figure 2).

DISCUSSION

Occupational PME's have certain peculiarities in hospital settings, since the hospital structure and also the stressful and complex environment of a hospital that is part of the Unified Health System (SUS - Sistema Único de Saúde) can contribute to trigger pathologies related to carrying out work activities.

Work can contribute to improve human health and quality of life, since, in addition to ensuring sustenance, it is part of a worker's identity. In order to assess the quality of a PME, it is necessary to conduct a situational diagnosis to identify the extent to which the examination conforms to established standards.

The items assessed with greatest frequency according to the study participants' reports enable early identification of risks and harms affecting occupational health, such as arterial hypertension, cardiovascular and pulmonary diseases, pathologies that cause sudden illness and risk of falling, pathologies related to excess weight and obesity, and infectious diseases. Considering the importance of these items and of the positive results of the hospital's PME, it suggested that planning activities focus on increasing the medical team's compliance with assessment of these items.

Measurement of blood pressure is an important marker for identification of systemic arterial hypertension (SAH), the principal modifiable risk factor for cardiovascular and cerebral diseases, which increases with age and is highly prevalent in Brazil.^{10,11} A study by Malta¹² analyzed information from the 2013 National Health Survey (NHS) by region and state, estimating a 39.3% prevalence of SAH (confidence interval [95%CI] 36.8-41.8) in the state of Rio Grande do Sul, which was the highest prevalence in Brazil.

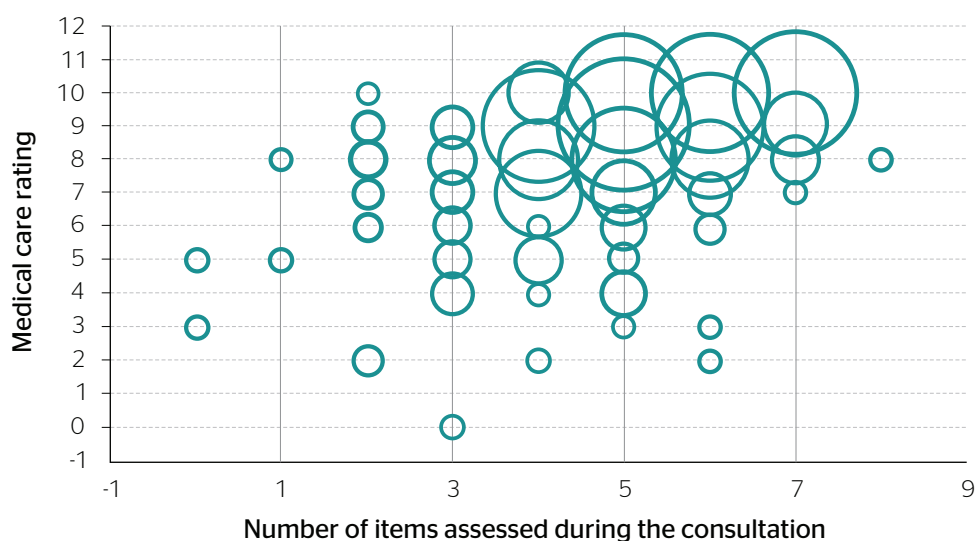


Figure 2. Satisfaction with the medical care provided at periodic medical examinations, by number of items assessed during the examination.

Considering that 35% of the hospital's workers are aged over 51 years, the results of this PME criterion could contribute to future studies designed to assess the institution's occupational health profile.

Studies demonstrate that work-related illness has increased, particularly mental and behavioral disorders and musculoskeletal diseases, which are responsible for long periods of worker absence and impose personal, social, and economic burdens on a global scale.^{13,14} Mental disorders, repetitive stress injuries (RSI), and work-related musculoskeletal diseases (WRMD) are among the most prevalent chronic occupational diseases in Brazil.

According to the Ministry of Health, there was a significant increase in notifications of RSI and WRMD from 2007 to 2016, triggering an alert with regard to occupational health, since 11.19% of all benefits awarded were caused by some type of disease related to RSI or WRMD in 2017.¹⁵ According to data from the WHO, mental diseases, substance use, specific neurological diseases, and suicide are the greatest causes of incapacity and mortality and are responsible for an elevated proportion of quality-adjusted years of life lost because of a disability or disorder. It is predicted that this burden will increase significantly over the coming years.

The current scenario may be a consequence of the changes to the organization and processes of work over recent decades, resulting in increased musculoskeletal and psychosocial risk factors at work, such as contact with pain and suffering, task overload, time and responsibility pressures, working day and shift characteristics, harassment and/or violence, use of new technologies, and workplace conflict.¹⁶ In this context, standard investigation of complaints and symptoms related to mental health and musculoskeletal diseases is an essential part of a quality PME process. In our study, mental health was covered in 54% of the PMEs and musculoskeletal upper limb and spine assessments were conducted in 52% and 22%, respectively.

Possible reasons for these results may be related to ignorance of the items that should be assessed in a PME, to a lack of formalization and distribution of the institutional PME standards, to the need for specific training of examining physicians in conducting these

assessments, and to the duration of consultations, when under pressure to meet OHS demand. In order to plan actions to improve these results, it is suggested that a dedicated study be conducted involving the occupational medicine physicians to identify the causes.

The data on consultation duration demonstrated that the shorter the time spent waiting for the consultation, the greater the workers' satisfaction with the quality of the process. Along similar lines, it was observed that the longer the duration of the medical consultation itself, the higher the number of items reviewed by the occupational physician, suggesting a better standard of medical care during the PME. This finding could suggest that there is a need to increase the time allocated to the PME consultation, which is currently 20 minutes, and also a need to standardize and monitor the items assessed by the occupational medicine physicians, since, according to the participants' recollections, 24.5% of examinations had shorter duration than the time available for consultations.

In this study, The NPS for medical care was 50%, which is within the range for a quality process. However, the NPS results for self-scheduling and the OHS reception service were 45 and 42% respectively, indicating a need for process improvement. A prior study of PMEs conducted in Brazil by Hyeda et al.⁸ found an NPS of 32.4% for medical care, which was considered a satisfactory value by the authors.

The results of this study underscore the importance of concerns with the quality of PMEs, revealing a need for a standardized conduct model for the occupational health team, which would enable a uniform analysis of PME data, without failing to consider the peculiarities of each worker and each department. The results of the satisfaction survey employing the NPS scale, in which the support and engineering staff gave lower ratings, may be related to higher expectations among these workers with regard to the PME, because of differences in access to information on health self-care, primarily in comparison to the health professionals, or, possibly, to difficulties with access to healthcare. Other hypotheses raised include the respondents' characteristics in relation to understanding of the items

assessed, or to the importance attributed to them, in addition to occurrence of memory bias.

A high-quality PME, involving analysis of the risk factors of the subject's job and of the physical and mental demands of their work processes can make it possible to prevent work from causing illness. Occupational medicine physicians should know workers' epidemiological profiles, acting effectively in situations that could compromise occupational health and adopting conduct focused on health promotion. The present study values worker participation in management of care in the work environment.

The most important study limitation is related to memory bias, since data were collected during the month after the PME, and there is also a possibility of non-response bias, because of the small number of study participants. It is worth pointing out that the study was not widely publicized, with explanations about the aspects assessed on the questionnaire administered to study participants, and also that the results are subject to the subjectivity of respondents' perceptions and comprehension.

CONCLUSIONS

Quality assessment based on the NPS results from this study enabled identification of situations of fragility that involve the PME processes (self-scheduling, reception, and clinical care) from the workers' perspective and provides a foundation for planning continuous improvement of processes. This

study identified a set of information that can be used to describe, analyze, and improve the care provided by the institution's occupational health service, enabling the opportune and high-quality decision-making needed to ensure monitoring of occupational health over time. Involving workers in the PME quality assessment made it possible to identify opportunities for improvement of processes. Generation of hypotheses for the low NPS scores awarded by workers from the support and engineering and maintenance departments should contribute to the design of future studies at the institution.

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Author contributions

SCCT was responsible for study conceptualization, data curation, formal analysis, funding acquisition, investigation, methodology, project administration, resources, software, validation, visualization, and writing - original draft and review & editing. MCBB and RPS participated in the study conceptualization, data curation, formal analysis, funding acquisition, investigation, methodology, project administration, resources, software, validation, visualization, and writing - original draft and review & editing. VNH participated in data curation, methodology, visualization, and writing - original draft and review & editing. All authors have read and approved the final version submitted and take public responsibility for all aspects of the work.

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