



National Health Insurance Membership Association with Disease Claims under Non-Capitation Payment at Primary Healthcare Facilities

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Abstract

Background: Primary healthcare plays a central role in Indonesia's National Health Insurance system in managing the population's health needs. Understanding morbidity patterns and their relationship with insurance membership categories is essential for effective service planning and financial sustainability. This study aimed to analyze disease claim patterns at non-capitation primary healthcare facilities and their association with insurance membership types between 2015 and 2023.

Methods: This was a quantitative analytic study using secondary administrative claims data from primary healthcare facilities under the National Health Insurance scheme. The dataset consisted of 201,297 non-capitation service records collected from 2015 to 2023. The variables included diagnosis codes, insurance membership type, sex, and facility characteristics. Data were analyzed using frequency distribution and chi-square tests to assess the association between insurance membership categories and the disease claims.

Results: The most frequently reported diagnoses across all membership categories were non-communicable diseases, particularly type 2 diabetes mellitus and essential hypertension. Maternal and reproductive health conditions also ranked among the top diagnoses, especially among government-subsidized participants. A statistically significant association was found between insurance membership type and morbidity patterns ($p < 0.001$). The strength of this association was weak.

Conclusion: Morbidity patterns in primary healthcare reflect the dual burden of chronic and maternal conditions and vary across insurance membership categories. These findings highlight the need for membership-based intervention strategies and strengthened chronic disease management to ensure sustainability within the National Health Insurance system.

Keywords: Chronic Disease, Health Insurance, Primary Healthcare, Universal Health Coverage

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Introduction

Primary Health Care Facilities (PHCFs) serve as the frontline of health service delivery within Indonesia's National Health Insurance system (*Jaminan Kesehatan Nasional*).¹ Ideally, PHCFs are expected to deliver efficient and equitable

services, particularly for non-specialistic and chronic conditions, to minimize unnecessary referrals to higher-level health facilities.² Financing at the primary care level is conducted through capitation and non-capitation payment mechanisms, which should be aligned with participant

characteristics and morbidity burden rather than merely enrollment numbers.³ A well-designed financing system can encourage early detection, comprehensive disease management, and continuous monitoring of population health outcomes.⁴ Consequently, morbidity patterns observed at PHCFs may reflect the overall health status of the insured population in a given area.⁵

Despite the expansion of NHI coverage, significant challenges remain in managing morbidity and financing at the primary care level.⁶ National data indicate that non-capitation expenditure at PHCFs reached approximately IDR 1.6 trillion in 2022, while non-INA-CBG expenditure at referral facilities amounted to IDR 2.3 trillion, highlighting inefficiencies in primary care management.⁷ By September 2024, NHI coverage had reached 98.19% of the population, equivalent to approximately 277 million individuals.⁸ Furthermore, national morbidity data published in the *Indonesian Population Morbidity Table* demonstrate a substantial disease burden across NHI participants.⁸ These trends suggest that morbidity at the primary care level has not been optimally addressed through the existing financing arrangements.

Several previous studies have examined morbidity or financing aspects of PHCFs, although most have focused on specific diseases or regions. A study conducted in West Java reported that among 9,056 BPJS participants receiving non-capitation services for hypertension at PHCFs during 2015–2016, the majority were female and belonged to the self-employed membership segment (PBPJ) with Class III premiums.⁹ Another study in Central Java found that the morbidity rate in 2018 reached 15.15%, exceeding the national average of 13.91%.¹⁰ Research on pulmonary tuberculosis patients also revealed that NHI membership type was significantly associated with the utilization of PHCF services.¹¹ However, these studies rarely integrated claims patterns with non-capitation financing mechanisms and membership segmentation.

This reveals a clear research gap in the existing literature. To date, few quantitative studies have systematically

analyzed disease claims or morbidity patterns among PHCF patients receiving non-capitation financing based on different NHI membership categories. Most previous research has emphasized capitation-based payments or general service utilization, while the role of non-capitation financing in shaping morbidity patterns remains underexplored. Additionally, many studies have focused on specific diseases, such as hypertension, rather than examining overall morbidity distribution. The limited integration of morbidity, non-capitation financing, and membership type restricts the development of evidence-based policies for financing primary care.

Understanding morbidity patterns within non-capitation financing is particularly important given the heterogeneity of NHI membership categories.¹² Government-subsidized members (PBI), salaried workers (PPU), and self-employed participants (PBPJ) differ in socioeconomic characteristics, access to care, and health risks, which may result in distinct morbidity and claim patterns.¹³ Ineffective alignment between financing mechanisms and morbidity burden may lead to inefficient resource allocation, excessive referrals, and inequities in service delivery.¹⁴ These challenges have been linked to broader financial sustainability concerns within the NHI system managed by BPJS Kesehatan, particularly amid the increasing dominance of chronic diseases.¹⁵

Therefore, this study aimed to analyse disease claim patterns among patients treated at PHCFs under non-capitation financing based on NHI membership categories. Using a quantitative approach, this study examined the distribution of disease diagnoses, compared claim patterns across membership groups, and assessed the relationship between membership type and non-capitation disease claims at the primary care level. By integrating morbidity patterns, financing mechanisms, and membership segmentation, this study addresses the limitations of previous research. The findings contribute to the literature on primary health care financing and support evidence-based policy

formulation to strengthen primary care services and advance high-quality Universal Health Coverage in Indonesia.

Methods

Study Design and Setting

This study employed an analytical quantitative approach using secondary data obtained from the Indonesian National Health Insurance system. A cross-sectional design was applied, as all variables were analyzed at a single point in time to examine the differences and associations between variables. This study utilized national-level data from Primary Health Care Facilities (PHCFs) across Indonesia. Secondary data were sourced from the central database of BPJS Kesehatan, covering services delivered at PHCFs under non-capitation financing.

Study Period

This study used secondary data from 2015 to 2023, encompassing nearly a decade of PHCF service records. The research implementation, including data acquisition, statistical analysis, and reporting, is scheduled between October and December 2025. This period allowed sufficient time for data cleaning, classification and comprehensive analysis. The extended timeframe of the dataset enabled a robust assessment of morbidity patterns across the membership categories.

Population, Sampling Method, and Unit of Analysis

The study population comprised all BPJS Kesehatan participants who received PHCF services financed through non-capitation mechanisms during the study period. A total sampling method was applied, as all eligible records that met the inclusion criteria were included in the analysis. The final dataset comprised 201,297 individuals, each representing a single unit of analysis. Each record included information on the primary diagnosis and membership category, allowing for a comprehensive population-level analysis without sample size estimation or power calculation.

Variables and Operational Definitions

The independent variable in this study was the BPJS Kesehatan membership type, categorized as government-subsidized members (PBI—central and local government), salaried workers (PPU), self-employed members (PBPU), and non-workers. The dependent variable was disease claim patterns at PHCFs under non-capitation financing, which represented morbidity. Disease claims were identified using the International Classification of Diseases, 10th revision (ICD-10). Morbidity was measured as the frequency and proportion of ICD-10 diagnosis codes across membership categories using nominal scales for all variables.

Data Collection Procedures and Research Instruments

Data collection began with a formal request for access to secondary data submitted to the BPJS Kesehatan. Upon approval, the datasets were received in digital format (.dta files) containing information on diagnoses (ICD-10 codes), membership type, financing mechanism, age, and geographic region. The diagnoses were subsequently classified according to ICD-10 Chapters I–XXII to facilitate standardized morbidity grouping. The primary research instrument was a structured secondary data extraction form supported by the official ICD-10 classification published by the World Health Organization.

Data Processing and Statistical Analysis

Data processing and analysis were conducted using Google Colaboratory as the primary analytical platform. A descriptive statistical analysis was performed to summarize the distribution of diagnoses and membership categories using frequencies and percentages. Inferential analysis was conducted using the chi-square test to assess the differences in morbidity patterns across the BPJS Kesehatan membership types. To examine the strength of the association between membership type and disease claims, a contingency coefficient analysis

was applied. All results were presented in tabular and graphical formats, with the analysis focused on identifying variations in morbidity patterns among the membership segments.

Ethical Considerations

This study used secondary administrative health data obtained from the Indonesian National Health Insurance system. Ethical approval for this study was granted by the Health Research Ethics Committee of STIKES Yayasan Rumah Sakit Dr. Soetomo (Reference No. KEPK/YRSDS/075/XII/2025). The ethics committee reviewed and approved the research protocol in accordance with the principles of human rights protection, seven World Health Organization (WHO) standards, and the 2016 Council for International Organizations of Medical Sciences (CIOMS) guidelines.

All data used in this study were anonymized and did not contain any personally identifiable information. Therefore, the requirement for individual informed consent was waived by the Ethics Committee. All research procedures were conducted in compliance with national regulations and international ethical standards for research involving human data.

Results

The initial stage of the analysis involved an overview of the dataset to obtain a comprehensive understanding of its structure and characteristics. This study used secondary data on patient services at Primary Health Care Facilities (PHCFs) obtained from BPJS Kesehatan, covering the period from 2015 to 2023. The dataset, referred to as non-capitation data, consisted of 201,297 observations and was organized in a tabular format containing participant characteristics, diagnostic information, and service-related variables. Additional membership data were merged using PSTV01 as the primary key to obtain variables such as sex, marital status, and membership status. This process ensured data consistency and completeness before the statistical analysis.

The majority of patients were female, accounting for 147,846 individuals (73.4%), whereas male patients numbered 53,451 (26.6%). This indicates a clear predominance of female patients utilizing primary care services under non-capitation financing schemes. The observed distribution suggests that women accessed PHCF services more frequently than men did during the study period. This imbalance was considered when interpreting the subsequent morbidity patterns.

Most patients were married (159,664 individuals [79.3%]), followed by unmarried patients at 22,152 (11.0%) and divorced patients (15,899 [7.9%]). A small proportion of records (1.8%) had an undefined marital status. This distribution indicates that married individuals constitute the largest proportion of PHCF service users. Therefore, marital status was considered a relevant demographic characteristic for describing the patient population.

Table 1 shows the distribution of BPJS Kesehatan membership classes among patients who received non-capitation services. More than half of the patients were enrolled in class III, accounting for 104,591 individuals (52.0%). Patients in classes I and II represented 26.9% and 21.1% of the sample, respectively. Missing data for the membership class were minimal (0.1%). These findings indicate a predominance of lower-class membership among PHCF users under non-capitation schemes.

Table 1 displays the distribution of PHCF ownership among patients. Most patients accessed private PHCFs, accounting for 140,744 cases (69.9%). Government-owned facilities at the district or municipal level contributed 26.1% of cases, while facilities owned by provincial governments and state-owned enterprises accounted for much smaller proportions. Facilities operated by the military and police contributed to only a negligible number of cases. This distribution highlights the dominant role of private and local government PHCFs in delivering non-capitation services to the poor.

The distribution of PHCF locations by city is shown in Table 1. The highest utilization was observed in Semarang (20.6%), followed by Malang (11.7%).

Several other districts and cities showed relatively balanced proportions ranging from 9% to 10%. By province, Central Java dominated with 32.6%, followed by East

Java (24.3%) and West Java (13.8%). These findings indicate a strong concentration of data from provinces on Java Island.

Table 1. Distribution of Demographic Characteristics, Utilization by Health Facility Ownership, Geographic Distribution, Disease Claims, and Membership Types

Variable	Category	n	%
Sex (Code: PSTV05)	Female	147,846	73.45
	Male	53,451	26.55
Marital Status (Code: PSTV06)	Married	159,664	79.32
	Unmarried	22,152	11.00
	Divorced	15,899	7.90
	Undefined	3,582	1.78
Membership Class (Code: PSTV07)	Class III	104,591	51.96
	Class I	54,132	26.89
	Class II	42,397	21.06
	Missing	177	0.09
Utilization by Ownership of Primary Health Care Facilities (Code: PNK08)	private	140,744	69.92
	Local Government	52,570	26.12
	State-Owned Enterprises (BUMN)	6,869	3.41
	Provincial Governments	759	0.38
	Indonesian Army (TNI AD)	216	0.11
	Indonesian Navy (TNI AL)	72	0.04
	Indonesian Air Force (TNI AU)	40	0.02
	Indonesian Police (POLRI)	27	0.01
Geographic Distribution (Code: PNK07)	Semarang City	5,705	20.62
	Malang City	3,246	11.73
	Kebumen Regency	2,674	9.67
	Sleman Regency	2,590	9.36
	Jombang Regency	2,517	9.10
	Banyumas Regency	2,487	8.99
	Magelang City	2,451	8.86
	Bandar Lampung City	2,055	7.43
	Banyuwangi Regency	2,013	7.28
	Bau Bau City	1,926	6.96
Disease Claims (Code: PNK13)	E11 Type 2 diabetes mellitus	66,861	37.75
	I10 Essential (primary) hypertension	49,013	27.68
	Z34 Supervision of normal pregnancy	11,276	6.37
	Z30 Contraceptive management	10,774	6.08
	E14 Unspecified diabetes mellitus	10,394	5.87
	Z39 Postpartum care and examination	7,092	4.00
	O80 Single spontaneous delivery	6,775	3.83
	E10 Type 1 diabetes mellitus	6,402	3.62
	Z36 Antenatal screening	5,707	3.22
	I15 Secondary hypertension	2,800	1.58
Membership Types (Code: PNK12)	Salaried Workers (PPU)	55,573	27.61
	Central Government-Subsidized Members (PBI APBN)	49,250	24.47
	Self-Employed Members (PBPU)	47,471	23.58
	Non-workers (Bukan Pekerja)	30,365	15.08
	Local Government-Subsidized Members PBI APBD	18,638	9.26

Source: Secondary Data Analysis

Disease claims in this study represent diagnoses recorded during PHCF visits financed through non-capitation mechanisms. Table 1 lists the ten most frequent ICD-10 diagnoses among patients. Type 2 diabetes mellitus (E11) was the most common diagnosis,

accounting for 66,861 cases (37.8%), followed by essential hypertension (I10), with 49,013 cases (27.7%). Several maternal and reproductive health-related diagnoses, such as supervision of normal pregnancy (Z34) and contraceptive management (Z30), were also observed, although at lower proportions than the

other diagnoses. Overall, the distribution indicates a predominance of noncommunicable chronic diseases.

Table 1 presents the distribution of BPJS Kesehatan membership types among patients. Salaried workers (PPU) represented the largest group (27.6%),

followed by PBI APBN (24.5%) and self-employed members (PBPU) (23.6%). Non-workers accounted for 15.1%, while PBI APBD was the smallest group (9.3%). This distribution indicates the dominance of formal workers and independent contributors among PHCF users.

Table 2. Cross Tabulation between Claims and Membership Types

Claims	Membership Types											
	Non-workers		PBI APBN		PBI APBD		PBPU		PPU		Total	
	n	%	n	%	n	%	n	%	n	%	n	%
E11 Type 2 diabetes mellitus	15,273	22.84	11,098	16.60	3,635	5.44	19,765	29.56	17,090	25.56	66,861	100
I10 Essential (primary) hypertension	10,461	21.34	11,181	22.81	3,304	6.74	12,081	24.65	11,986	24.45	49,013	100
Z34 Supervision of normal pregnancy	20	0.18	3,643	32.31	1,755	15.56	1,885	16.72	3,973	35.23	11,276	100
Z30 Contraceptive management	11	0.10	4,689	43.52	1,579	14.66	1,149	10.66	3,346	31.06	10,774	100
E14 Unspecified diabetes mellitus	1,903	18.31	1,751	16.85	372	3.58	2,682	25.80	3,686	35.46	10,394	100
Z39 Postpartum care and examination	9	0.13	2,581	36.39	1,297	18.29	1,212	17.09	1,993	28.10	7,092	100
O80 Single spontaneous delivery	8	0.12	2,634	38.88	1,304	19.25	1,181	17.43	1,648	24.32	6,775	100
E10 Type 1 diabetes mellitus	1,334	20.84	1,034	16.15	359	5.61	1,657	25.88	2,018	31.52	6,402	100
Z36 Antenatal screening	4	0.07	1,805	31.63	988	17.31	906	15.88	2,004	35.11	5,707	100
I15 Secondary hypertension	356	12.71	709	25.32	207	7.39	621	22.18	907	32.39	2,800	100
Total	29,379	16.59	41,125	23.22	14,800	8.36	43,139	24.36	48,651	27.47	177,094	100

Source: Secondary Data Analysis

Table 2 presents the ten most common diseases, stratified by NHI membership type. Type 2 diabetes mellitus (E11) and essential hypertension (I10) were the most frequent diagnoses across all membership categories, particularly among PPU and PBPU participants, respectively. Maternal health-related conditions, such as supervision of normal pregnancy (Z34) and contraceptive management (Z30), were more prevalent among PBI APBN members. Other chronic conditions, including unspecified diabetes mellitus (E14) and type 1 diabetes mellitus (E10), showed relatively consistent distributions across the membership types. These patterns indicate variations in

morbidity profiles according to insurance membership.

The association between NHI membership type and disease claims was examined using chi-square analysis. Table 2 presents the cross-tabulation of the ten most frequent diseases by membership category. The chi-square test yielded a statistic of $\chi^2 = 22,541.61$ with 36 degrees of freedom and a p-value < 0.001 , indicating a statistically significant association between disease diagnosis and the membership type. However, Cramer's V value of 0.1784 suggests that the strength of this association was weak. This indicates that while morbidity patterns differed significantly across membership types, the magnitude of the relationship was relatively small.

Discussion

The findings of this study indicate that non-capitation claims at primary healthcare facilities (PHCF) in Indonesia between 2015 and 2023 were predominantly driven by non-communicable diseases, particularly type 2 diabetes mellitus (E11) and essential hypertension (I10). This pattern reflects the ongoing epidemiological transition in Indonesia, where the disease burden has shifted from infectious diseases to chronic conditions associated with lifestyle changes and urbanization.¹⁶ Similar trends have been reported in national and international studies, which document a rapid increase in diabetes and hypertension prevalence in middle-income countries.¹⁷ The dominance of chronic disease cases also explains the high volume of repeat visits to PHCF for long-term disease management.¹⁶ These findings reinforce the critical role of primary care in controlling non-communicable diseases within the NHI system.

The higher proportion of female patients observed in this study suggests gender-based differences in healthcare utilization at the primary care level. Previous research consistently shows that women tend to have better health-seeking behavior and higher utilization of preventive and routine healthcare services than men.^{18,19} In the Indonesian context, this pattern is further reinforced by the availability of reproductive and maternal health services delivered through PHCF. Studies on primary healthcare utilization in Indonesia have demonstrated that women are more likely to access services related to screening, chronic disease follow-up, and maternal care.²⁰ Consequently, the gender composition should be considered when interpreting morbidity patterns in primary healthcare data.

Maternal and reproductive health diagnoses, such as supervision of normal pregnancy (Z34), contraceptive management (Z30), spontaneous delivery (O80), and postpartum care (Z39), were prominent among the top diagnoses. This finding highlights the strategic role of PHCF as the primary gateway for maternal and

child health services under the NHI scheme. Previous evaluations of NHI implementation have shown that health insurance coverage encourages increased utilization of antenatal and delivery services because of reduced financial barriers. Evidence from Indonesia also indicates that the expansion of health insurance coverage has contributed to improved access to skilled birth attendance and facility-based deliveries.²¹ The prominence of maternal diagnoses in this study, therefore, reflects the effectiveness of subsidized insurance in supporting maternal healthcare utilization.

The presence of multiple diabetes-related codes (E10, E11, and E14) illustrates the broad spectrum of metabolic disorders managed at the primary-care level. Prior studies have noted that glycemic and blood pressure control in PHCF remains challenging due to issues such as patient adherence and limitations in long-term monitoring.^{22,23} National programs such as Prolanis were designed to strengthen chronic disease management at PHCF; however, their implementation remains uneven across regions.^{24,25} Research on healthcare utilization patterns indicates that individuals with more stable insurance coverage are more likely to engage in routine chronic disease management.²⁶ This may explain why diabetes and hypertension dominate non-capitation claims within the NHI system.

Regarding insurance membership, the dominance of *Pekerja Penerima Upah* (PPU), followed by PBI APBN and PBPU, reflects the broad coverage of the NHI across both formal workers and subsidized populations. This structure aligns with the goal of achieving universal health coverage by integrating formal, informal, and vulnerable population groups into the health system. Previous studies have shown that possessing health insurance significantly increases primary care utilization, particularly in urban settings.²⁷ The substantial presence of subsidized participants in PHCF utilization underscores the importance of government financing in expanding access to healthcare for low-income populations.^{28,29} From a policy perspective, these findings

highlight the need to align funding capacity with membership composition.

The statistically significant association between insurance membership and morbidity patterns indicates that different participant groups utilize PHCF services for different health requirements. Chronic diseases were more prevalent among PPU and PBPU participants, whereas maternal health services were predominantly utilized by PBI APBN and PBI APBD participants. This pattern supports the social determinants of health framework, which emphasizes the role of socioeconomic status and financial protection in shaping disease patterns.¹⁷ However, the relatively low Cramer's V value suggests that insurance membership alone explains only a small proportion of morbidity variation. Other factors, such as age, sex, lifestyle, and geographic location, likely play substantial roles.

Several limitations should be considered when interpreting the findings of this study. First, the analysis relied on secondary administrative data, which limited the availability of clinical details and behavioral risk factors. Second, the cross-sectional nature of data aggregation prevents causal inference regarding the relationship between insurance membership and morbidity patterns. Third, potential misclassification of diagnoses and incomplete recording of routine claims data may have influenced the distribution of disease categories. Despite these limitations, the large sample size and long observation period provide robust insights into the utilization patterns within the NHI system.

Overall, the study demonstrates that primary healthcare utilization under NHI is shaped by both epidemiological transition and the insurance membership structure. The coexistence of a high non-communicable disease burden and substantial maternal service utilization places significant demands on PHCF capacity. Strengthening promotive and preventive services, particularly for chronic disease risk factors, is essential to control future health care costs. Simultaneously, continued support for maternal and reproductive health services is crucial for protecting vulnerable populations. These

findings underscore the importance of targeted primary care interventions to ensure the sustainability and effectiveness of Indonesia's national health insurance system.³⁰

Conclusion

This study demonstrates that morbidity patterns in non-capitation primary healthcare facilities under Indonesia's National Health Insurance (NHI) system are predominantly driven by non-communicable diseases, particularly type 2 diabetes mellitus and essential hypertension, while maternal and reproductive health services remain a substantial component of patient care. The coexistence of chronic disease management and maternal health utilization reflects a dual-service burden at the primary care level.

Significant differences in morbidity distribution were observed across the insurance membership categories. Chronic conditions were more prominent among salaried and self-employed contributors (PPU and PBPU), whereas maternal and reproductive services were concentrated among subsidized participants (PBI). Although the statistical association was significant, its modest strength indicates that insurance membership interacts with broader demographic and socioeconomic determinants to shape healthcare utilization.

The relevance of this study lies in its empirical demonstration that membership segmentation within a universal health coverage system influence service-demand pattern. Using nine years of administrative claims data, the findings provide actionable evidence for capacity planning, risk pooling considerations, and targeted preventive strategies within the NHI.

Policy implications include strengthening chronic disease management, maintaining maternal services for subsidized populations, and developing membership-based interventions. Leveraging longitudinal and predictive NHI analytics can help anticipate morbidity trends and support financial sustainability. These findings highlight how

insurance design influences primary healthcare performance in middle-income countries pursuing universal health coverage.

Ethics approval

This study involved the analysis of secondary administrative data derived from Indonesia's National Health Insurance (NHI) primary healthcare claims database. Ethical approval was obtained from the Health Research Ethics Committee of STIKES Yayasan Rumah Sakit Dr. Soetomo (reference no. KEPK/YRSDS/075/XII/2025). The research protocol was reviewed and approved in accordance with the national ethical standards and international guidelines for research involving human data.

The dataset used in this study consisted of anonymized administrative claims records without personally identifiable information (PII). As the study relied exclusively on de-identified secondary data, the requirement for individual informed consent was formally waived by the ethics committee of the institution. All procedures were conducted in compliance with the applicable ethical regulations governing research involving human participants and health data.

Availability of data and materials

The data that support the findings of this study are available from BPJS Kesehatan (the National Health Insurance Agency of Indonesia). However, restrictions apply to the availability of these data because they were accessed under institutional permission and contain administrative health claims information that may involve sensitive, individual-level records. Therefore, these datasets are not publicly available.

Data may be made available from the corresponding author upon reasonable request and with permission from BPJS Kesehatan, subject to the applicable data protection regulations and institutional policies.

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Author Contribution

MYS provided funding support for the study. AD designed the study, performed the data analysis, drafted the manuscript, and conducted critical revisions of the intellectual content. EMS was responsible for data collection and preparation. All authors have read and approved the final manuscript.

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