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Article

Mapping Research on BPJS Claims Management and Hospital Reimbursement: A Bibliometric Analysis

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Abstract. Universal Health Coverage is meant to ensure that expanded insurance enrolment translates into timely reimbursement and sustainable hospital financing. In Indonesia, however, the near-universal coverage achieved by BPJS Kesehatan has not been matched by efficient claims governance: reimbursement deficits and administrative bottlenecks persist, while evidence remains fragmented across separate epidemiological, economic, and administrative research streams that rarely intersect. This fragmentation is especially consequential during 2020-2025, the post-pandemic transition when claim volumes surged and digital verification expanded, yet no synthesis has mapped how research responded. Consolidating this evidence is therefore essential for guiding hospital management and BPJS Kesehatan policy. This study applied bibliometric analysis to Scopus-indexed, Indonesia-affiliated publications from 2020 to 2025, narrowing 25,270 initial records to 50 documents analysed in VOSviewer through keyword co-occurrence mapping. Unlike earlier Indonesian bibliometric studies on health policy or bibliometrics broadly, this study is the first to chart specifically the intellectual structure of BPJS claims and hospital reimbursement research. Five thematic clusters emerged: health outcomes and disease burden (32%), economic evaluation and cost analysis (21%), hospital reimbursement systems and financial management (19%), health policy and UHC (15%), and healthcare access and service delivery (13%), with annual publications rising from seven-eight to thirteen by 2025. Operational aspects, including digital claims verification and reimbursement governance, remain underexplored and should guide future research and hospital practice.

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1. Introduction

Health financing is a fundamental component of health system performance because it determines whether populations can access healthcare services without experiencing financial hardship. To achieve this objective, the World Health Organization (WHO) has consistently promoted Universal Health Coverage (UHC), which seeks to ensure equitable access to quality healthcare while protecting individuals from catastrophic health expenditures [1]. In many low- and middle-income countries (LMICs), however, achieving UHC remains challenging because high out-of-pocket (OOP) payments continue to limit healthcare utilisation and widen socioeconomic inequalities [2]. Consequently, national health insurance schemes have become an essential policy instrument for improving financial protection, expanding healthcare access, and strengthening health system resilience. Evidence from Indonesia demonstrates that participation in the National Health Insurance (Jaminan Kesehatan Nasional/JKN) programme has substantially reduced household OOP expenditure and improved healthcare utilisation, particularly among low-income populations [2-3].

Indonesia represents one of the largest and most ambitious implementations of Universal Health Coverage globally. Since its establishment in 2014, the JKN programme, administered by BPJS Kesehatan, has expanded rapidly and covered approximately 278.1 million people (98.45% of the national population) by the end of 2024, making it the world's largest single-payer health insurance system [4]. Hospital reimbursement under JKN is primarily conducted through the Indonesian Case-Based Groups (INA-CBGs) prospective payment system, which allocates predetermined tariffs according to diagnosis and treatment complexity. This payment mechanism was introduced to improve efficiency, encourage cost containment, and standardise hospital reimbursement. Nevertheless, as healthcare utilisation continues to increase, hospitals are required to process increasingly complex claims while simultaneously maintaining financial sustainability and service quality [5-6]. Consequently, effective claims management has become a critical determinant of hospital operational performance because reimbursement delays, claim rejection, and administrative inefficiencies directly influence hospital cash flow, resource allocation, and continuity of healthcare services.

Despite the remarkable achievement in expanding insurance coverage, maintaining the financial sustainability of JKN has become an increasingly complex challenge. Hospital reimbursement through the INA-CBGs system has generated persistent concerns regarding tariff adequacy, claim verification, and reimbursement efficiency. Several studies have consistently reported that actual hospital expenditures exceed INA-CBGs reimbursement rates for various high-cost conditions, including chronic kidney disease, sepsis, breast cancer radiotherapy, anterior cruciate ligament reconstruction, and caesarean section. These reimbursement deficits require hospitals to absorb substantial financial losses, potentially compromising service quality and long-term organisational sustainability[7-11]. Furthermore, delayed reimbursement reduces hospital liquidity, limits operational flexibility, and constrains investments in healthcare infrastructure and human resources, particularly among referral hospitals managing patients with complex medical conditions.

In addition to financial constraints, operational inefficiencies in claim administration remain a major challenge within Indonesia's health insurance system. Previous studies have shown that incomplete medical documentation, inaccurate ICD coding, administrative errors, and weak compliance with BPJS verification requirements contribute substantially to pending and rejected claims. Herey and Temesvari, for example, reported that approximately 80.25% of COVID-19

inpatient claims submitted by one Indonesian hospital were not approved because of incomplete documentation and coding inaccuracies [12]. Similarly, Mahardini and Dachyar demonstrated that integrating Business Process Reengineering (BPR), Electronic Medical Records (EMR), and Hospital Information Systems (HIS) reduced claim processing time by nearly 50% while substantially improving administrative efficiency [13]. More recently, machine-learning approaches have also been introduced to predict hospital Cost Recovery Rates, indicating that digital technologies have considerable potential to improve reimbursement governance and financial decision-making [14]. Nevertheless, the implementation of these innovations remains fragmented across hospitals, and empirical evidence regarding their broader application remains limited.

These operational challenges extend beyond hospital administration and have broader implications for health system performance. Delays in reimbursement have been associated with disruptions in hospital cash flow, reduced service capacity, and weakened referral systems, particularly during the COVID-19 pandemic [15]. At the policy level, fraudulent claims, inappropriate provider payment incentives, and weak governance mechanisms continue to threaten the financial sustainability of JKN while simultaneously reducing the effectiveness of healthcare deliver [5],[16-17]. Consequently, improving claim management should not be viewed solely as an administrative requirement but rather as a strategic component of health system governance that directly influences hospital performance, financial sustainability, and the quality of patient care.

Although the literature on JKN has expanded considerably, existing studies remain fragmented across three streams: epidemiological analyses of disease burden, economic evaluations of INA-CBGs tariffs, and policy studies of health system governance[5],[16]. Each stream is typically examined in isolation, rarely linking the administrative, financial, and clinical dimensions of a single claim. This fragmentation carries direct risks for policymaking: hospital managers exposed only to tariff-adequacy findings may overlook that documentation errors, not tariffs alone, drive most claim rejections, while regulators relying solely on epidemiological claims data may miss the operational bottlenecks that delay reimbursement. Integrating administrative, financial, and medical evidence is therefore essential now, when claim volumes and digital verification requirements are both expanding in the post-pandemic period, because piecemeal evidence cannot support the coordinated reforms hospitals and BPJS Kesehatan need.

Research on pending claims, verification, reimbursement governance, and digital transformation has therefore not matured into a coherent body of knowledge. Existing studies typically examine single hospitals or isolated problems, leaving the broader intellectual structure of this field unclear. Consequently, researchers and policymakers lack systematic evidence on dominant themes, emerging topics, and collaborative networks needed to prioritise reform [12-14].

Bibliometric analysis offers a systematic, quantitative method for tracing publication trends, thematic relationships, and the intellectual structure of a research field [18]. Beyond descriptive mapping, however, bibliometric evidence can directly support evidence-based decision-making: by revealing which problems are over-studied and which remain neglected, it helps hospital administrators and BPJS Kesehatan target scarce research and policy resources toward the operational gaps that most affect reimbursement performance, rather than replicating existing epidemiological or tariff-adequacy studies. This function is particularly relevant to BPJS claims research, where evidence spans hospital administration, health economics, epidemiology, and health policy, and where fragmented findings otherwise obscure where the next research or policy investment should be directed. Several bibliometric studies have already examined Indonesia's health sector, yet none has focused specifically on BPJS claims and hospital reimbursement.

Recent work has mapped diabetic kidney disease and haemodialysis research within Indonesian healthcare insurance claims databases [19], health insurance policy and public health governance trends across Southeast Asia [20], and the overall development of bibliometric research in Indonesia [21], but none has systematically charted the administrative and financial literature on claims

management itself. This study addresses that gap and, to the authors' knowledge, is the first bibliometric mapping dedicated specifically to BPJS Kesehatan claims and hospital reimbursement research.

Accordingly, this study applies bibliometric analysis to Scopus-indexed publications to map research trends, identify thematic clusters, and examine the knowledge structure of BPJS claims and hospital reimbursement research in Indonesia. By integrating evidence across research domains, the study highlights underexplored topics that may inform future investigations on claim management, reimbursement governance, and hospital financial sustainability, supporting researchers, hospital managers, and policymakers in identifying research priorities and developing evidence-informed strategies to improve the efficiency and sustainability of Indonesia's National Health Insurance programme.

2. Method

2.1. Study Design

This study utilised bibliometric analysis to map and evaluate the research landscape related to health insurance claims, hospital reimbursement systems, and health financing in Indonesia's national health insurance program (JKN/BPJS Kesehatan). This quantitative approach helps identify publication trends, thematic clusters, and collaboration networks in the field [18]. The methodology involved two stages: first, a structured keyword search in the Scopus database; second, analysis of the dataset using VOSviewer (version 1.6.19), which creates keyword co-occurrence network maps to visualise the literature's thematic clusters. Scopus was selected as the sole bibliographic source because it offers broader journal and conference coverage across health administration, economics, and clinical disciplines than comparable databases, applies consistent indexing and quality-control criteria, and is the database most widely recommended for bibliometric mapping in health services research [18].

2.2. Data Source and Search Strategy

A literature search was conducted on the Scopus database (scopus.com) in March 2025 to minimise retrieval bias. Using a structured keyword query, we targeted the title, abstract, and keyword fields (TITLE-ABS-KEY) with terms related to health insurance claims and healthcare settings. The final query was: TITLE-ABS-KEY (("health insurance claim" OR "claim management" OR reimbursement OR "health financing") AND (hospital OR "healthcare facility" OR "INA-CBGs")).

These terms aimed to encompass literature on health insurance claims, reimbursement, and hospital financing, specifically regarding Indonesia's INA-CBGs payment system. Boolean operators (OR, AND) were used to enhance search specificity. Initially, no restrictions on language or document type were applied for comprehensive retrieval. The search results were then refined through a three-step filtering process to ensure relevance and recent scholarship, summarised in Figure 1.

The initial keyword search yielded 25,270 documents, highlighting the extensive global literature on health insurance claims and hospital financing. By applying a publication-year restriction from 2020 to 2025, the number of documents was reduced to 5,607. This ensures that the analysis reflects current scholarly discourse and addresses recent policy developments in JKN. Next, further narrowing the results to studies affiliated with Indonesia brought the final count down to 50 documents, which make up the analytical sample for this bibliometric study. This systematic narrowing process aligns with established bibliometric methodologies, ensuring that the dataset is both manageable and highly relevant to the specific research context.

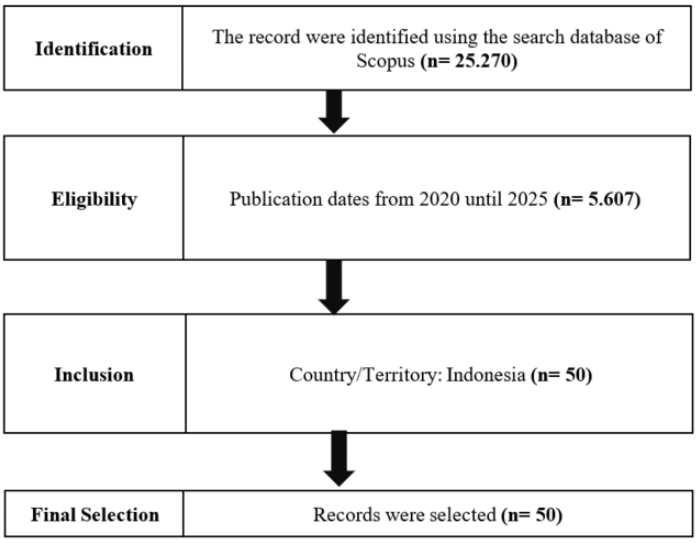

Figure 1. Literature Search and Screening Steps in Scopus

3. Results and Discussion

3.1. Publication Trends of BPJS Claims and Hospital Reimbursement Research

A total of 50 Scopus-indexed documents published between 2020 and 2025 were retrieved through the predefined search strategy. The dataset consists of journal articles, conference proceedings, and review papers focusing on health insurance claims, hospital reimbursement, and health financing within Indonesia's National Health Insurance (JKN) system. The selected publications represent research conducted during the transition from the consolidation of JKN implementation, the COVID-19 pandemic, and the post-pandemic recovery period, providing an overview of the recent development of BPJS claim management research.

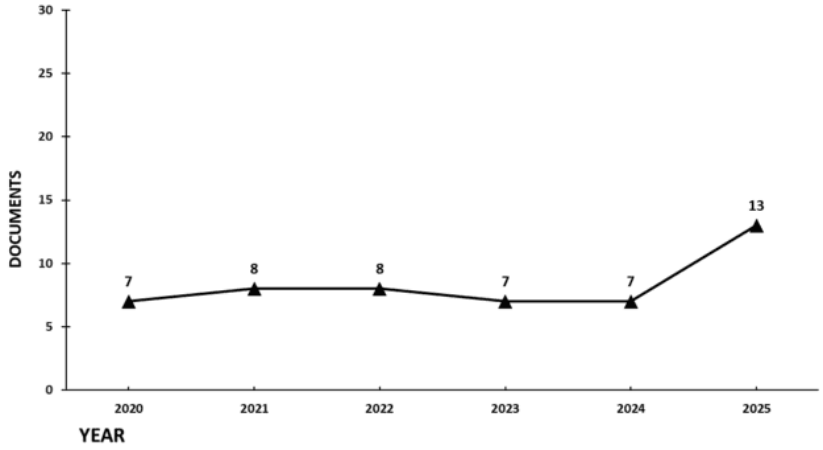

Figure 2. Annual Publication Frequency on Health Insurance Claims and Hospital Financing in Indonesia (2020–2025)
Source: Scopus Database (March 2025); analysed by the authors

Figure 2 shows that publication output remained relatively stable between 2020 and 2024, with an average of seven to eight publications annually. A marked increase occurred in 2025, reaching 13 publications, representing the highest annual output during the study period. Overall, the publication

trend demonstrates an Average Annual Growth Rate (AAGR) of approximately 13.2%, indicating a gradual expansion of scientific interest in BPJS claims management and hospital reimbursement.

The increasing publication trend reflects the growing importance of strengthening financial governance within Indonesia's health insurance system. Following the achievement of near-universal health coverage, research attention has gradually shifted from expanding insurance coverage toward improving claim management efficiency, reimbursement mechanisms, and hospital financial sustainability. This trend is consistent with the World Health Organization's recommendation that universal health coverage should be accompanied by sustainable financing mechanisms capable of ensuring equitable access to quality health services [22]. Likewise, Hasnida et al. emphasized that maintaining an effective health financing system requires not only broad population coverage but also robust governance and reimbursement mechanisms that support service quality [16].

The sharp increase in publications during 2025 also suggests an emerging research focus on operational challenges within BPJS claim management. Previous studies have identified multiple factors contributing to reimbursement inefficiency, including high claim rejection rates, incomplete clinical documentation, coding inaccuracies, and limited integration of hospital information systems [12]. At the same time, technological innovations such as Business Process Reengineering (BPR), Hospital Information Systems (HIS), Electronic Medical Records (EMR), and machine learning have been proposed to improve claim verification, shorten processing time, and enhance hospital cost recovery[13-14],[23].

The 2025 surge most plausibly reflects a policy-driven response rather than a simple gain in system efficiency. During 2024–2025, BPJS Kesehatan and the Ministry of Health mandated integration of hospital claim systems with the SATUSEHAT platform and introduced the Kelas Rawat Inap Standar (KRIS) tariff structure alongside an updated INA-CBGs grouper, changes that directly reshaped claim submission, verification, and coding practice. These regulatory shifts plausibly created new empirical opportunities, prompting researchers to document their effects on documentation accuracy, claim rejection, and hospital cash flow, whereas a genuine efficiency gain would be expected to reduce, rather than increase, research attention to reimbursement problems. Confirming this interpretation, however, requires future studies that explicitly link publication timing to specific regulatory milestones.

Although publication output has continued to increase, the relatively limited number of studies identified in this bibliometric analysis indicates that research on BPJS claims management remains relatively underdeveloped compared with broader studies on universal health coverage and health financing. This finding suggests that operational aspects, including pending claims, reimbursement governance, digital claim verification, and hospital financial management, remain important research gaps that warrant further investigation. Strengthening evidence in these areas is expected to support more efficient reimbursement systems and improve the long-term sustainability of Indonesia's National Health Insurance programme.

3.2. Keyword Co-occurrence Network and Thematic Development

The bibliometric analysis of the 50 retrieved documents was conducted using VOSviewer version 1.6.19 through keyword co-occurrence analysis. Applying a minimum occurrence threshold of five resulted in a network comprising 47 keywords that were grouped into five thematic clusters. The network visualization (Figure 3) illustrates the conceptual relationships among keywords.

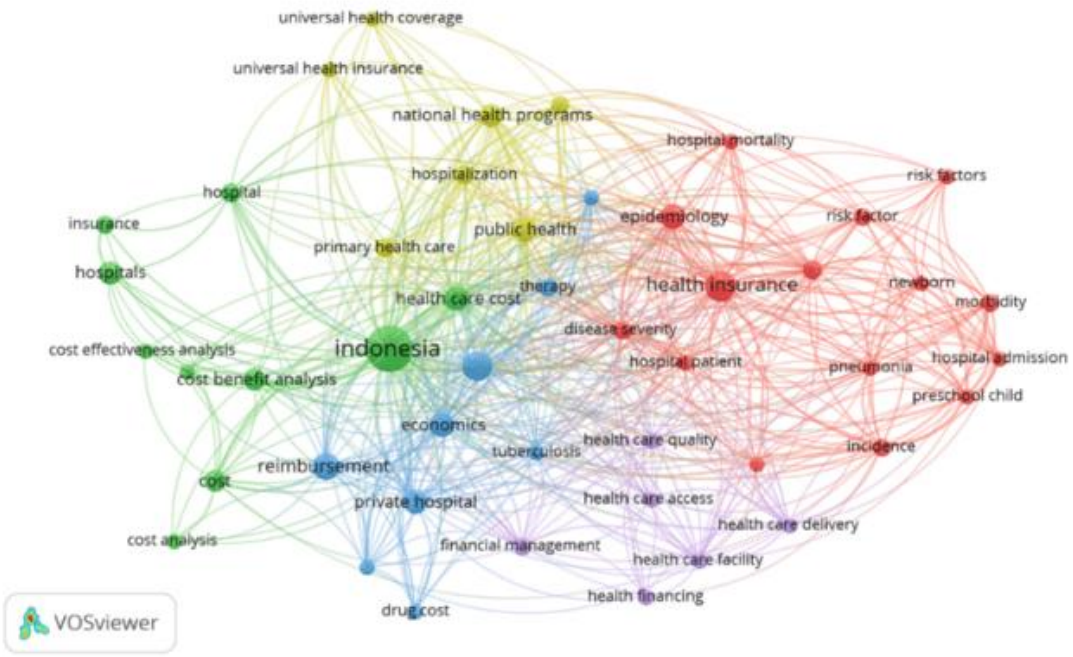

Figure 3. Keyword Co-occurrence Network Visualisation Map
Source: VOSviewer analysis of Scopus data (n = 50 documents; minimum co-occurrence = 5; 47 keywords in 5 clusters)

As shown in Figure 3, the keyword "Indonesia" occupies the most central position within the network, indicating that studies on health insurance claims and reimbursement remain highly contextualized within the national implementation of the JKN programme. The keywords "health insurance" and "reimbursement" also demonstrate high connectivity, linking multiple thematic clusters and suggesting that reimbursement systems constitute the core issue connecting studies on health financing, hospital management, and health service delivery.

The dominance of reimbursement-related keywords reflects the persistent challenges faced by hospitals in implementing the INA-CBGs payment system. Previous studies have reported that reimbursement processes are frequently constrained by incomplete documentation, inaccurate diagnostic coding, claim rejection, and limited interoperability between hospital information systems and BPJS administrative systems [12-13]. These operational barriers not only delay claim settlement but also reduce hospital cash flow and financial sustainability, making reimbursement governance an increasingly important research topic.

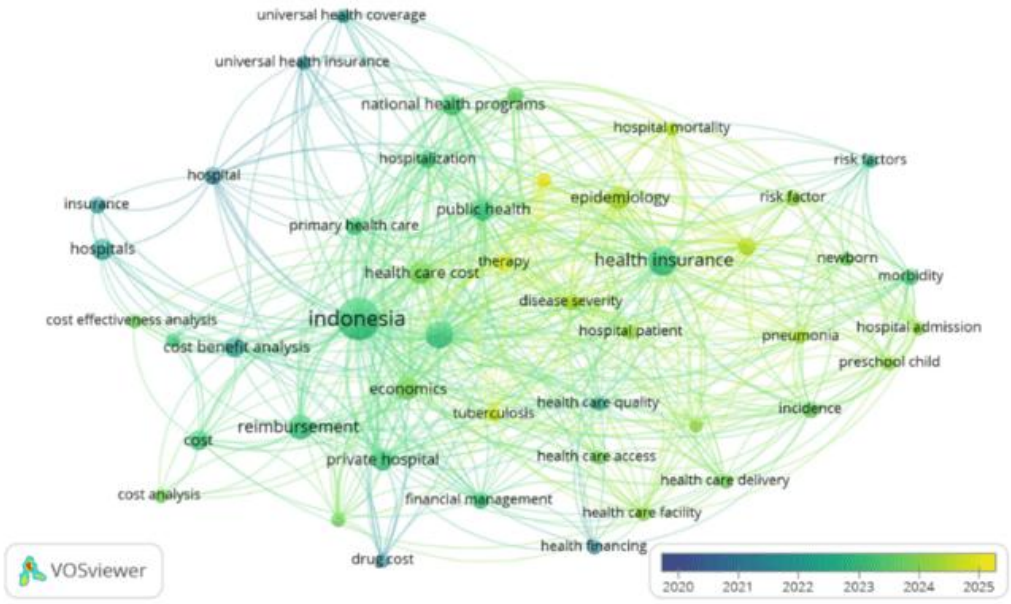

Figure 4. Keyword Co-occurrence Overlay Visualization Map (Temporal Distribution)
Source: VOSviewer analysis of Scopus data (colour scale: blue = 2020 → yellow-green = 2025)

The overlay visualization presented in Figure 4 reveals a gradual shift in research priorities over time. Publications during 2020–2022 were primarily associated with economic evaluation, reimbursement mechanisms, and cost analysis, reflecting concerns regarding the adequacy of INA-CBGs tariffs and hospital financing. In contrast, studies published during 2024–2025 increasingly emphasized disease burden, health outcomes, and insured populations, indicating that researchers have begun to utilize BPJS claims data as an important source for epidemiological and health services research. Meanwhile, healthcare access and service delivery remained relatively consistent research themes throughout the observation period.

This temporal evolution demonstrates that BPJS claims data have gradually expanded beyond their administrative function to become an important source of evidence for health policy evaluation. For example, recent studies have employed national claims databases to investigate disparities in diabetes outcomes, cancer care, malaria burden, and access to haemodialysis services across different regions and insurance membership categories [24-27]. These findings indicate that reimbursement databases are increasingly recognized as valuable resources for evaluating equity, quality of care, and health system performance.

Despite this development, the keyword network also demonstrates that operational aspects of hospital claim management remain relatively peripheral compared with epidemiological and economic evaluation topics. Keywords directly related to pending claims, claim verification, clinical coding, digital claims processing, and hospital financial governance appear less dominant within the network, suggesting that these issues have not yet become major research themes. This finding supports the research gap identified in the Introduction, namely that although numerous studies have explored Universal Health Coverage and health financing, relatively few have comprehensively examined the operational management of BPJS reimbursement and pending claims. Consequently, future research should prioritize digital claim verification systems, predictive analytics for claim approval, artificial intelligence-assisted coding, and integrated hospital financial management to strengthen the sustainability of Indonesia's National Health Insurance system[14],[23],[28].

3.3. Thematic Clusters of BPJS Claims and Hospital Reimbursement Research

The keyword co-occurrence analysis identified five major thematic clusters representing the intellectual structure of research on BPJS claims, hospital reimbursement, and health financing in Indonesia. These clusters comprise health outcomes and disease burden in insured populations (32%), economic evaluation and cost analysis (21%), hospital reimbursement systems and financial management (19%), health policy and universal health coverage (15%), and healthcare access, quality, and service delivery (13%). Collectively, these findings indicate that research has predominantly focused on epidemiological outcomes and economic evaluation, whereas operational aspects of claims management remain comparatively underexplored. These clusters can be shown in table 1.

Table 1. Thematic Clusters Identified by VOSviewer Keyword Co-occurrence Analysis

Clusters Themes	Items	Total	Percentage
Health outcomes and disease burden in insured populations	Disease severity, epidemiology, health insurance, hospital admission, hospital mortality, hospital patient, incidence, morbidity, mortality, newborn, outpatient, pneumonia, preschool child, risk factor, risk factors	15	32
Economic evaluation and cost analysis in healthcare	Cost, cost analysis, cost benefit analysis, cost effectiveness analysis, health care cost, hospital, hospital cost, hospitals, Indonesia, insurance	10	21
Hospital reimbursement systems and financial management	Drug cost, economics, health care personnel, health equity, national health insurance, private hospital, reimbursement, therapy, tuberculosis	9	19
Health policy and universal health coverage (UHC)	Health care utilization, hospitalization, national health programme, primary health care, public health, universal health coverage	7	15
Healthcare access, quality, and service delivery	Financial management, health care access, health care delivery, health care facility, health care quality, health financing	6	13

The largest cluster, health outcomes and disease burden in insured populations, reflects the extensive utilization of BPJS claims data for epidemiological research. Studies within this cluster have examined disparities in mortality among patients with type 2 diabetes mellitus, differences in cancer outcomes according to insurance membership categories, regional inequalities in haemodialysis access, and the burden of malaria using national claims databases [24-27]. These findings demonstrate that BPJS claims data have evolved into an important resource for evaluating disease burden and health inequities. Nevertheless, they also reveal that universal insurance coverage has not automatically translated into equitable health outcomes across geographical regions and socioeconomic groups.

The second cluster, economic evaluation and cost analysis, highlights the growing concern regarding the adequacy of INA-CBGs reimbursement tariffs. Several studies consistently reported that the actual costs of treating chronic kidney disease, sepsis, breast cancer, anterior cruciate ligament reconstruction, and other high-cost conditions exceeded the reimbursement provided under INA-CBGs [7-10]. These findings suggest that persistent discrepancies between hospital expenditures and

reimbursement rates may threaten hospital financial sustainability, particularly for referral hospitals managing complex cases. Consequently, periodic tariff evaluation based on actual service costs remains essential to ensure adequate reimbursement and maintain service quality.

The third cluster, hospital reimbursement systems and financial management, is directly related to the operational challenges of BPJS claim administration. The thematic synthesis indicates that reimbursement processes are frequently affected by incomplete medical documentation, inaccurate clinical coding, high claim rejection rates, and limited integration of hospital information systems. Recent studies have further demonstrated that Business Process Reengineering (BPR), Electronic Medical Records (EMR), Hospital Information Systems (HIS), and machine learning algorithms have the potential to improve claim verification, accelerate reimbursement processes, and predict hospital cost recovery [12-14][28]. Despite these technological developments, the relatively smaller proportion of this cluster (19%) indicates that operational claim management remains less explored than epidemiological and economic issues.

The fourth cluster focuses on health policy and universal health coverage (UHC). Studies within this cluster primarily discuss governance issues affecting the sustainability of JKN, including fraudulent claims, inappropriate referral patterns, payment system design, and medicine quality assurance [11],[16-17],[29]. These findings emphasize that achieving universal health coverage requires not only broad population enrolment but also effective governance mechanisms capable of ensuring accountability, transparency, and financial sustainability within the reimbursement system.

Finally, the fifth cluster addresses healthcare access, quality, and service delivery. Although this cluster contains the fewest keywords, it highlights important operational issues, including reimbursement delays, weak claim verification, infrastructure limitations, and referral coordination problems that directly influence hospital cash flow and service quality. Previous studies have suggested that strengthening digital verification systems, improving interinstitutional coordination, and investing in health information infrastructure are essential strategies for enhancing service efficiency and preventing financial disruption in hospitals [30-32].

Overall, the thematic mapping demonstrates an imbalance in the current research landscape. While considerable attention has been devoted to disease burden, health outcomes, and economic evaluation, comparatively fewer studies have investigated operational claim management, pending claims, reimbursement governance, and digital innovation in hospital financial administration. This imbalance indicates that future research should place greater emphasis on integrated claim management systems, predictive analytics, digital reimbursement governance, and policy evaluation to strengthen the long-term sustainability of Indonesia's National Health Insurance programme.

Facilitating this transition from predominantly clinical to operational research requires deliberate collaboration rather than incidental interest. Embedding informatics and financial-management academics within hospital claim units, for example through joint research appointments, capstone projects linked to postgraduate hospital administration programmes, or data-sharing agreements between hospitals and university research centres, could translate routine claim data into publishable evidence while directly improving verification and coding practice. Professional associations and BPJS Kesehatan could further support this shift by funding operational research grants and hosting shared, de-identified claims datasets for academic use.

3.4. Thematic Synthesis and Research Implications

The keyword co-occurrence analysis identified five major thematic clusters representing the conceptual structure of BPJS claims and hospital reimbursement research. To provide a more comprehensive understanding of these clusters, the retrieved publications were further synthesised according to their primary research focus, principal findings, and scholarly influence. This thematic synthesis complements the bibliometric mapping by demonstrating how individual studies contribute

to each research domain and by identifying areas where empirical evidence remains limited. Table 2 presents the thematic summary of the retrieved publications based on the five clusters generated through the VOSviewer analysis.

Table 2. Document Publication on BPJS Kesehatan / JKN Health Insurance Claims Thematic Summary

Theme	Summary of Key Findings	Citations	Future Research Questions
Health outcomes and disease burden in insured populations	NHI claims data showed disease burden and disparities in insured populations, including in-hospital mortality among T2DM patients, cancer outcome differences by BPJS membership type, regional inequities in hemodialysis access, malaria-related costs and mortality, and hypertension control compliance variation.	Local: 0; Global: 11	How can claims-based disease-burden surveillance be extended to routinely monitor regional and socioeconomic disparities rather than single-disease snapshots?
Economic evaluation and cost analysis in healthcare	Real hospital costs consistently exceeded INA-CBGs tariffs across CKD, caesarean section, breast cancer radiotherapy, sepsis, and ACLR, highlighting underfunding and the need for tariff revision and procedure-specific reimbursement updates.	Local: 0; Global: 30	What mechanism could support periodic, evidence-based revision of INA-CBGs tariffs as real hospital costs change over time?
Hospital reimbursement systems and financial management	Hospital reimbursement under JKN was affected by deficits, high claim rejection rates, incomplete documentation, poor clinical coding, and limited system integration. BPR, EMR, HIS, and machine learning showed potential to improve claim processing and cost recovery.	Local: 0; Global: 30	Which digital claim-verification and coding-support tools produce measurable reductions in claim rejection across different hospital types and sizes?
Health policy and universal health coverage	Governance and policy challenges included fraudulent claims, inappropriate referrals caused by capitation-based payment structures, and risks to medicine quality under UHC scale-up. Payment reform, anti-fraud governance, and medicine quality protection are needed.	Local: 0; Global: 30	How can capitation-based payment design be adjusted to reduce inappropriate referral incentives without compromising primary-care access?
Healthcare access, quality, and service delivery	Reimbursement delays, weak verification systems, infrastructure gaps, and poor referral coordination affected hospital cash flow and service quality. Digital misconduct prevention, timely reimbursement, infrastructure investment, and collaborative governance were identified as key strategies.	Local: 0; Global: 0	What governance arrangements between hospitals, BPJS Kesehatan, and regulators most effectively shorten reimbursement cycles while curbing misconduct?

Source: Scopus Database (March 2026); analyzed by the authors

The thematic synthesis demonstrates that research on BPJS Kesehatan claims has evolved into a multidisciplinary field encompassing epidemiological studies, economic evaluation, hospital reimbursement, health policy, and healthcare delivery. Nevertheless, these themes have largely developed independently, resulting in fragmented evidence regarding the operational management of BPJS claims. While substantial attention has been devoted to disease burden and financing mechanisms, considerably fewer studies have examined how claim submission, verification, reimbursement, and hospital financial management interact to influence the overall performance of the National Health Insurance (JKN) system [16],[33].

The first thematic cluster highlights the increasing use of BPJS claims databases for population health research. Administrative claims data have enabled large-scale analyses of diabetes mellitus, cancer, chronic kidney disease, malaria, and hypertension, demonstrating their value for evaluating disease burden, healthcare utilisation, and disparities in clinical outcomes across membership categories and geographical regions [24-27],[34]. These studies indicate that although JKN has substantially expanded insurance coverage, important inequalities in healthcare access and outcomes remain evident, particularly among vulnerable populations and residents of eastern Indonesia. Such findings reinforce the role of claims databases as strategic resources for evidence-based health policy and population health monitoring rather than merely administrative reimbursement records.

The second and third thematic clusters reveal that financial sustainability remains one of the principal challenges within Indonesia's health insurance system. Numerous studies consistently reported discrepancies between INA-CBGs reimbursement tariffs and actual hospital expenditures, particularly for chronic kidney disease, breast cancer, sepsis, caesarean section, and anterior cruciate ligament reconstruction [7-11]. At the operational level, claim rejection, delayed reimbursement, incomplete documentation, and inaccurate clinical coding continue to reduce hospital revenue and prolong reimbursement cycles [12]. Furthermore, technological innovations such as Business Process Reengineering, Electronic Medical Records, Hospital Information Systems, and machine-learning approaches have demonstrated promising results in improving claim verification efficiency and predicting hospital cost recovery [13-14],[35].

From a governance perspective, the fourth thematic cluster demonstrates that the sustainability of JKN depends not only on adequate financing but also on effective institutional oversight. Fraudulent claims, inappropriate referral patterns, weaknesses in provider payment mechanisms, and concerns regarding medicine quality continue to threaten programme efficiency [5], [11], [16], [17]. These findings indicate that expanding insurance coverage alone is insufficient to achieve Universal Health Coverage unless accompanied by transparent reimbursement systems, stronger regulatory enforcement, and payment mechanisms that promote efficiency without compromising service quality.

The final thematic cluster further illustrates that reimbursement management directly affects healthcare delivery. Delayed claim payments, limited digital verification systems, inadequate referral coordination, and insufficient infrastructure have disrupted hospital cash flow and reduced service continuity, particularly during the COVID-19 pandemic [15], [31], [32]. These findings indicate that claim management should be regarded as a strategic component of health system governance rather than merely an administrative procedure. Therefore, strengthening digital verification, integrating hospital information systems, and improving collaboration between hospitals, BPJS Kesehatan, and policymakers are essential to enhance reimbursement efficiency and support the long-term sustainability of Indonesia's National Health Insurance programme.

Overall, the bibliometric mapping reveals a clear imbalance within the current body of literature. Existing research has primarily concentrated on clinical outcomes, epidemiological analysis, and health financing, whereas operational aspects of pending claims, reimbursement governance, predictive analytics, and digital claim management remain relatively underrepresented. Future studies should therefore integrate administrative, financial, technological, and policy perspectives to develop evidence-based strategies that improve hospital claim management efficiency and strengthen the sustainability of Indonesia's National Health Insurance system [16], [33].

3.5. Practical Implications for Hospital Management

For hospital managers, this bibliometric map has direct operational value. Because reimbursement-related keywords cluster tightly around incomplete documentation, coding inaccuracy, and claim rejection, finance and medical-record units can use these findings to prioritise coding audits, staff

training, and information-system upgrades in the areas most associated with claim rejection, rather than distributing limited resources evenly across all reimbursement functions. The relative scarcity of research on digital claim verification also signals an opportunity for hospitals to document and publish their own experience piloting electronic medical record and business-process-reengineering solutions, converting internal quality-improvement work into evidence that benefits the wider JKN system. For BPJS Kesehatan, the concentration of the literature on tariff adequacy and disease burden, alongside the scarcity of governance-focused studies, suggests that commissioning applied research on claim verification and anti-fraud systems would fill a gap that individual hospitals cannot address alone.

3.6. Study Limitations

This study has limitations that should be considered when interpreting its findings. First, the final analytical sample of 50 documents, while consistent with the structured, multi-step screening process recommended for bibliometric research[18], is relatively small; the resulting keyword network and thematic clusters should therefore be read as an indicative map of a still-developing literature rather than an exhaustive or statistically generalisable account of all Indonesian research on BPJS claims and hospital reimbursement. Second, reliance on a single database, Scopus, may have excluded relevant studies indexed only in Web of Science, national repositories such as Garuda, or grey literature, potentially under-representing practice-oriented or Indonesian-language research on operational claim management. Future studies could strengthen generalisability by combining Scopus with complementary databases and by updating the search as the literature continues to expand beyond 2025.

4. Conclusion

This bibliometric analysis mapped 50 Scopus-indexed publications (2020-2025) on BPJS Kesehatan claims, hospital reimbursement, and health financing in Indonesia, identifying five thematic clusters: health outcomes and disease burden (32%), economic evaluation and cost analysis (21%), hospital reimbursement systems and financial management (19%), health policy and Universal Health Coverage (15%), and healthcare access, quality, and service delivery (13%). Annual output rose from an average of seven to eight publications between 2020 and 2024 to thirteen in 2025 (AAGR approximately 13.2%), reflecting growing scholarly attention to reimbursement sustainability during the post-pandemic transition. Even so, research has predominantly examined epidemiological outcomes, healthcare utilisation, and economic evaluation, while operational aspects, including pending claims, claim verification, reimbursement governance, digital transformation, and hospital financial management, remain comparatively underexplored, indicating that strengthening reimbursement governance requires administrative and digital capacity alongside adequate financing.

For hospital managers and BPJS Kesehatan, these results point toward practical priorities rather than purely academic ones: directing quality-improvement effort toward documentation and coding accuracy, piloting and publishing digital verification tools, and commissioning applied research on reimbursement governance and fraud prevention would address the specific gap this mapping has identified. Future studies should integrate administrative claim processes, hospital financial performance, digital governance, and patient outcomes within a single analytical framework, and should evaluate emerging technologies such as artificial intelligence-assisted claim verification and predictive analytics as they mature beyond 2025. Overall, sustaining Indonesia's National Health Insurance programme will depend as much on closing this operational research gap as on the financing reforms that have so far dominated scholarly attention.

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