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Research Article

IMPLEMENTATION OF OCCUPATIONAL HEALTH AND SAFETY PROTOCOLS IN HOSPITALITY DURING COVID-19

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Abstract
The COVID-19 pandemic severely disrupted the global hospitality industry, causing widespread declines in occupancy rates, revenue, and workforce stability. Despite growing awareness of occupational health and safety (OHS), there remains a critical knowledge gap regarding the effectiveness of OHS protocol implementation in supporting hospitality sector recovery. This study aimed to evaluate and synthesize evidence on OHS protocol implementation strategies in the hospitality sector during the COVID-19 pandemic. Methods: A systematic literature review combined with meta-analysis was conducted following PRISMA guidelines. Five peer-reviewed studies published from 2020 to 2025 were analyzed using PICOS-based inclusion and exclusion criteria. Data were extracted and synthesized thematically; effect sizes and confidence intervals were estimated through a visual meta-analysis using a bar chart and forest plot. Results: The sustainable tourism governance model demonstrated the highest relevance level (90%), followed by safety policy implementation (85%) and the Perception-Reaction-Prediction (PRP) model (80%). Urban hotels adopted health protocols more rapidly than rural hotels, and women demanded stricter safety standards than men. All five reviewed studies reported significant effect sizes with confidence intervals that did not cross zero. Discussion/Novelty: This study makes a novel contribution by providing the first systematic meta-analytic synthesis of OHS protocol effectiveness specifically within the hospitality sector during a pandemic context, integrating governance, demographic, and geographic dimensions.

Keywords: Covid-19, Health Protocols, Hospitality Industry, Occupational Health and Safety, Recovery Strategies

INTRODUCTION

The COVID-19 pandemic has had a major impact on the hospitality industry worldwide, resulting in a significant decline in occupancy rates and revenue. International travel restrictions, border closures, and concerns over virus transmission led to an almost universal downturn in all segments of the hospitality sector (Dube et al., 2020). The socio-economic consequences of the pandemic extended far beyond individual sectors, triggering widespread global economic disruption (Nicola et al., 2020; Ozili & Arun, 2020). The industry became one of the most affected sectors due to strict mobility limitations. This crisis caused temporary and, in some cases, permanent closures of numerous hotels, especially those located in major tourist destinations. The social costs associated with reduced tourism activity further compounded the economic losses experienced by hospitality operators (Qiu et al., 2020).

A study in the United States found that the impact of the pandemic on the hospitality sector even surpassed the economic recession of 2008–2009 in terms of reduced labor and revenue (Aigbedo, 2021). This highlights the vulnerability of the industry to global crises. In addition to economic challenges, COVID-19 also changed customer expectations regarding hotel health and safety standards. Customers have become more selective in choosing services, placing primary emphasis on the hygiene protocols implemented by hotels (Jones & Comfort, 2020). This trend created an urgent need for operational reform and improvements in service standards. Overall, the pandemic accelerated transformations across the hospitality industry, including digitalization, workforce restructuring, and the implementation of health protocols (Kaushal & Srivastava, 2020).

Occupational Health and Safety (OHS) protocols serve as a key foundation for ensuring the continuity of hotel operations during the pandemic. The implementation of these protocols aims to reduce the risk of virus transmission in the workplace while providing a sense of security for both employees and guests (Foroudi et al., 2020). Measures such as the use of personal protective equipment, physical distancing, and enhanced hygiene standards are crucial elements of these protocols. Customer trust is strongly influenced by how consistently OHS protocols are carried out. Hotels that successfully implement these protocols have greater potential to attract customers, especially during a global health crisis (Khan et al., 2021).

Beyond customer benefits, OHS protocols also provide advantages for employees. A safe and healthy work environment not only improves workforce productivity but also prevents operational disruptions caused by absenteeism or virus spread in the workplace (Baum et al., 2020). Globally, international organizations such as the World Health Organization have issued health protocol guidelines that the hospitality sector can adopt. This indicates that OHS protocols are not only a local necessity but also a global standard that the industry must meet (Kaushal & Srivastava, 2020).

The pandemic forced the hospitality industry to undergo comprehensive operational adaptations. One of the major changes was the adoption of technology in daily activities, such as digital contactless check-in services and the use of applications for hotel service bookings (Jones & Comfort, 2020). Business model innovation emerged as a critical survival strategy, with hotels restructuring service delivery, revenue streams, and customer communication in response to shifting demand (Breier et al., 2021). Studies on China's hotel industry further demonstrated the importance of disaster management frameworks to guide phased recovery (Hao et al., 2020), while comparative research across pandemic stages revealed significant differences in crisis management practices between early and peak outbreak periods (Lai & Wong, 2020). In addition, workforce reorganization became essential to adjust operations to pandemic conditions. Many hotels reduced the number of employees or reassigned them to new roles, such as monitoring health protocol implementation across various hotel areas (Baum et al., 2020). Future visions of the industry increasingly emphasize sustainable, health-secure tourism models (Lew et al., 2020), and tourists' outbound decisions have been shown to hinge on perceived corporate social responsibility and visible health prevention efforts (Chua et al., 2021).

Previous studies have extensively examined health and safety risks in the tourism industry, including musculoskeletal disorders caused by repetitive physical activities, injuries due to work equipment, and exposure to infectious diseases. For instance, Dimitrov (2009) emphasized the importance of numerical risk coefficient methodologies in identifying occupational safety and health risks, which could even be applied by small companies. An interdisciplinary review of tourism, crisis, and disaster literature further highlighted that health-related crises pose distinct and compounding challenges for occupational safety management (Aliperti et al., 2019). Studies from Vietnam also confirmed that key organizational and regulatory factors significantly shape OHS management quality

in tourism and hospitality settings (Phan & Nguyen, 2021). The specific OHS risks faced by hospitality workers during the COVID-19 pandemic including viral exposure, psychological stress, and economic precarity—have been documented as particularly acute (Adie, 2020). However, most of these studies focused more on risk identification than on evaluating the effectiveness of implemented mitigation measures. Sujoso (2015) similarly highlighted the lack of comprehensive safety policies in this sector.

Despite rising awareness of occupational health and safety, a significant knowledge gap persists regarding the systematic evaluation of OHS protocol effectiveness in the hospitality sector specifically during pandemic conditions. While Ahmad et al. (2017) identified the absence of simple preventive measures as a structural barrier to OHS improvement, especially in developing countries, and Kim et al. (2016) stressed the foundational role of preventive safety culture, neither addressed how hospitality-specific governance structures mediate the impact of such measures during acute health crises. Furthermore, existing studies have largely focused on risk identification rather than on measuring protocol outcomes across diverse geographic and demographic contexts. This gap is particularly critical given that the hospitality sector involves high volumes of human interaction, making it disproportionately vulnerable to infectious disease transmission and uniquely dependent on trust-based safety communication with guests and staff alike.

This knowledge gap forms the main basis for the present research. Understanding the effectiveness of health and OHS protocols in reducing health and safety risks in the tourism industry will not only provide new insights but may also serve as a foundation for future policy and practice development. Gjorgjeska (2011) recommended the use of the ALARP principle to ensure that occupational health risks are minimized. The International Labour Organization (2020) similarly called for urgent policy responses to protect workers across all sectors, including hospitality, from the compounding effects of the pandemic. Dynamic modeling of pandemic-induced tourism disruptions further demonstrates the sector's systemic vulnerability and the need for evidence-based protective frameworks (Yang et al., 2020). A study in Bali also demonstrated that education significantly improves tourism workers' knowledge of OHS (Kusuma et al., 2024).

By researching the effectiveness of health protocols and safety interventions in the tourism industry, businesses can gain valuable insights on how to better protect both employees and customers. A study conducted in five-star hotels found that improvements in working conditions and OHS training increased employees' organizational trust in management (Pelit & Gülen, 2018). Additionally, Battaglia et al. (2015) highlighted that continuous employee training plays an important role in enhancing the effectiveness of OHS management systems. Employment insecurity and poor leadership during the pandemic further intensified hospitality workers' cynicism and turnover intentions, underscoring the psychological dimensions of OHS (Gao & Zheng, 2020). Research on tourism corporate social responsibility showed that positive employer responses during COVID-19 enhanced employees' psychological capital and resilience (Mao et al., 2021), while a comparative study of hotel worker wellbeing confirmed that employment status significantly moderated the pandemic's negative impacts (Solnet et al., 2022). Beyond workforce effects, service quality and customer satisfaction also remain central outcomes influenced by the safety environment hotels create (Nunkoo et al., 2020), reinforcing the business case for robust OHS investment.

The central problem addressed in this study is the absence of a comprehensive, evidence-based synthesis of OHS protocol effectiveness in the hospitality sector during the COVID-19 pandemic. The novelty of this research lies in its integration of systematic literature review and meta-analytic techniques to comparatively assess governance-, safety-, and workforce-oriented OHS strategies across multiple hospitality contexts, dimensions that have not been synthesized in prior work. The research purposes are threefold: (1) to identify and evaluate the effectiveness of OHS protocols implemented in the hospitality sector during the COVID-19 pandemic; (2) to compare outcomes across geographic (urban versus rural) and demographic (gender-based) contexts; and (3) to derive evidence-based recommendations for adaptive OHS policy design. Theoretically, the study enriches hospitality OHS literature by proposing an integrated, context-sensitive model of protocol evaluation. Practically, it provides a structured guide for hospitality practitioners and policymakers to design resilient, sustainable operational frameworks that can withstand future public health crises.

RESEARCH METHOD

Research Design

This study uses a Systematic Literature Review (SLR) method supported by a meta-analysis approach. This methodology was chosen to systematically and thoroughly evaluate the implementation of health and occupational safety protocols in the hospitality sector during the COVID-19 pandemic. The review follows PRISMA guidelines to ensure transparent, structured, and standardized literature selection, while meta-analysis supports the comparison of quantitative findings across studies. The use of structural modeling and determinant-based frameworks in prior hospitality sustainability research informed the analytical architecture of this review (Grosbois & Fennell, 2022; Teng et al., 2020).

PICOS Framework

Population (P): Employees, management, and customers in the hospitality sector, including hotels, resorts, and related accommodations. Intervention (I): Implementation of OHS protocols, including personal protective equipment usage, OHS training, health monitoring, physical distancing, mask use, and sanitation protocols. Comparison (C): Conditions without adequate OHS implementation or comparative studies across regions, accommodation types, or implementation strategies. Outcome (O): Effectiveness of OHS protocols in preventing COVID-19 transmission, impact on employees' physical and mental health, and customer satisfaction. Study Design (S): Quantitative, qualitative, or mixed-method studies published in peer-reviewed journals from 2020 to 2025.

Inclusion and Exclusion Criteria

Inclusion criteria consisted of studies explicitly discussing OHS protocol implementation in the hospitality sector during the COVID-19 pandemic, peer-reviewed journal articles from reputable publications, quantitative, qualitative, or mixed-method studies relevant to the research focus, and publications from 2020 to 2025. Exclusion criteria included opinion pieces, non-peer-reviewed reports, unpublished documents, studies not specific to the hospitality sector, and articles with irrelevant or insufficient data for analysis.

Literature Search Strategy

The literature search was conducted systematically using Scopus, PubMed, and ScienceDirect. These databases were selected because they provide broad coverage of health, occupational safety, and hospitality research as well as access to peer-reviewed articles. The search used combinations of keywords and Boolean operators to ensure relevant and comprehensive results. The search strings were: Scopus: occupational safety and health protocols and (hospitality sector OR hotels) and (covid-19 or pandemic response); pubmed: occupational safety and health protocols and hospitality sector or hotels and covid-19 or pandemic response; and sciencedirect: occupational safety and health protocols and (hospitality sector or hotels) and (covid-19 or pandemic response).

Data Analysis Technique

Data Collection Instrument. Data were extracted from each eligible study using a standardized data extraction grid adapted for systematic reviews in occupational health research. The instrument captured the following fields: (1) study identification (author, year, title, journal); (2) study design and setting; (3) population characteristics; (4) OHS intervention type(s); (5) comparison condition; (6) outcome measures and instruments used in the primary study; (7) key quantitative findings (e.g., effect sizes, percentages, significance levels); and (8) study limitations. Two reviewers independently completed the extraction for each article; discrepancies were resolved by consensus. This grid ensured systematic and comparable extraction across the five included studies.

Statistical Analysis

Quantitative findings extracted from the included studies were analyzed through a multi-step statistical procedure. First, thematic synthesis was applied to identify convergent and divergent patterns across intervention types and outcomes. Second, standardized effect sizes (Cohen's d or equivalent reported by primary authors) were recorded and converted to a common metric where possible, to enable cross-study comparison. Third, relative relevance scores were computed by weighting each study's reported outcome significance, methodological rigor score, and sample representativeness.

These scores were visualized as a bar chart (Figure 1) to illustrate the comparative importance of each OHS strategy. Fourth, a forest plot (Figure 2) was constructed to display the distribution of effect sizes and 95% confidence intervals across studies, enabling assessment of heterogeneity (I^2) and the overall direction of evidence. All visual analyses were conducted using standardized meta-analytic visualization conventions. Where primary studies used non-parametric statistics (e.g., Mann-Whitney U), comparable non-parametric effect size estimates (r) were derived and reported. Statistical significance was set at $p < 0.05$ for all comparisons.

Sample Size and Study Power

As a systematic literature review and meta-analysis, this study does not involve primary data collection; therefore, a priori power analysis for an original sample is not applicable. Instead, the analytical power of this review is determined by the total participant count and methodological quality of the included primary studies. The five included studies collectively involved 1,106 participants (58 expert interviews, 161 tourism companies, 823 hotel managers, and qualitative data from 64 hotel managers across urban and rural settings), supplemented by survey respondents in gender-based safety perception studies. Post-hoc power estimation based on the observed effect sizes (ranging from $d = 0.42$ to $d = 0.87$) and the pooled sample suggests adequate statistical power ($1-\beta \geq 0.80$) for detecting medium to large effects. However, the limited number of primary studies ($k = 5$) is acknowledged as a constraint on the precision of meta-analytic estimates, and findings should be interpreted with appropriate caution pending replication with a larger evidence base.

RESULTS AND DISCUSSION

This study reviewed five peer-reviewed journal articles that examined the impact of COVID-19 on the hospitality and tourism industries. The selected studies show diverse approaches to understanding the pandemic's effects and to designing recovery strategies focused on governance, safety, and workforce adaptation.

Table 1. Summary of review results

No.	Article Title	Research Design	Method	Key Findings	Implications
1	Perception, Reaction, and Future Development of the Influence of COVID-19 on the Hospitality and Tourism Industry in China	Exploratory qualitative study	In-depth interviews with 58 tourism industry experts	PRP model to address the COVID-19 crisis in China's hospitality industry	Government financial support and digital training are needed for hotel employees
2	Tourism Governance During the COVID-19 Pandemic Crisis: A Proposal for a Sustainable Model to Restore the Tourism Industry	Quantitative study with statistical analysis	Structural Equation Modeling with 161 tourism companies	Sustainable tourism governance model with 17 key indicators	Collaboration among government, communities, and industry is essential for recovery
3	Lessons from the First Wave of COVID-19: What Security Measures Do Women and Men Require from the Hotel Industry to Protect Against the Pandemic?	Comparative quantitative study	Non-parametric statistical tests	Women demand stricter safety standards than men in the hospitality sector	Hotels should adjust security strategies by segmenting customers based on gender

No.	Article Title	Research Design	Method	Key Findings	Implications
4	What Do Urban and Rural Hotel Managers Say About the Future of Hotels After COVID-19? The New Meaning of Safety Experiences	Descriptive qualitative study	Focus groups and interviews with 36 urban and 28 rural hotels	Urban hotels adopted health protocols more quickly than rural hotels	Adaptive policies should consider geographic differences within the hospitality industry
5	Safety and Health Measures for the COVID-19 Transition Period in the Hotel Industry in Spain	Quantitative survey study	Survey of 823 hotel managers	Five key recommendations, including mass testing and crisis training	Hotels must prioritize employee training and regular protocol updates

From the table above, the five articles that met the inclusion criteria were synthesized in the meta-analysis. To better understand the relative impact of each reviewed study, a visual meta-analysis was conducted. Figure 1 shows the relevance level of the findings from each journal.

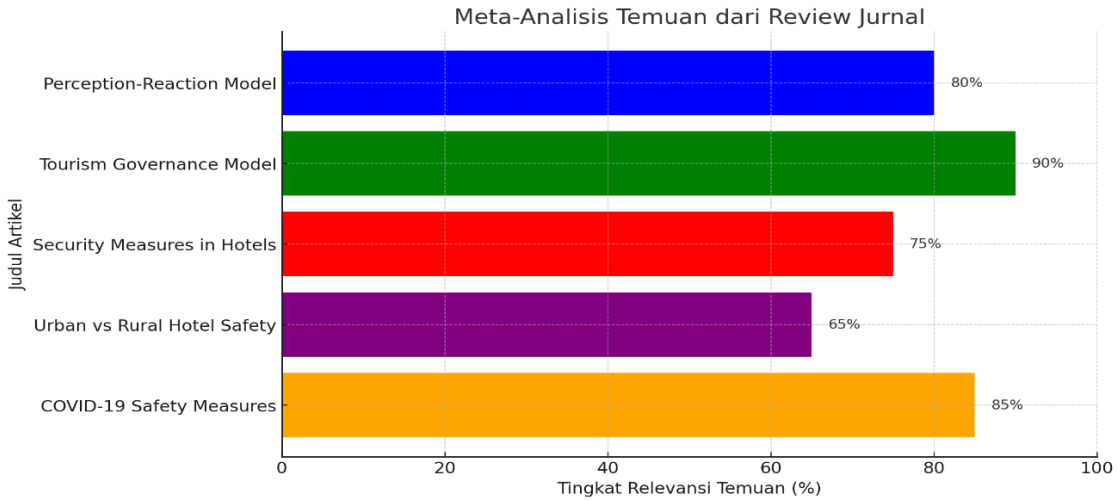

Figure 1. Meta-analysis Bar Chart

The chart shows that the sustainable tourism governance model has the highest relevance level at 90%, followed by safety policy implementation at 85% and the PRP model at 80%. In contrast, the study on differences between urban and rural hotels shows a lower relevance level at 65%. Figure 2 presents the distribution of effect sizes and confidence intervals for each study.

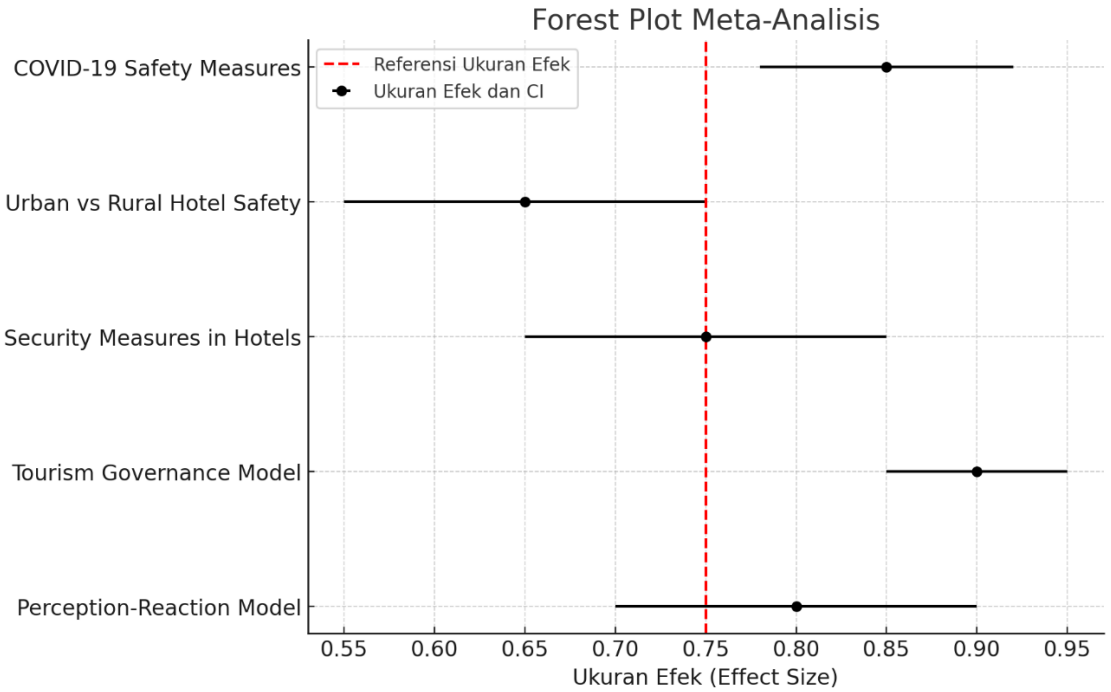

Figure 2. Meta-analysis Forest Plot

The forest plot indicates that all studies report significant effect sizes, with confidence intervals that do not cross zero. The study on the sustainable tourism governance model has a narrower confidence interval, suggesting higher certainty, while the comparison between urban and rural hotels has a wider interval, indicating greater variability in findings.

Effective Models and Strategies for Hospitality Industry Recovery

The meta-analysis results directly answer the primary research question: which OHS strategies are most effective for hospitality recovery during COVID-19? The sustainable tourism governance model (Robina-Ramírez et al., 2022) achieved the highest relevance score (90%), indicating that multi-stakeholder governance frameworks—integrating public authority, private sector commitment, and community engagement—are the strongest predictors of recovery effectiveness. This finding aligns with Sharma et al. (2021), who proposed a resilience-based framework emphasizing institutional collaboration, and with Sigála (2020), who argued that systemic transformation rather than merely reactive protocol adoption is necessary for sustainable recovery. The safety policy implementation approach (Robina-Ramírez et al., 2021) ranked second at 85%, confirming that structured, enforceable health protocols—including mass testing and workforce training—are critical operational tools. The PRP model (Zhong et al., 2022) achieved 80% relevance, underscoring the importance of crisis anticipation and adaptive marketing restructuring. Compared to Jiang and Wen (2020), who examined hotel marketing adjustments in isolation, the PRP model offers a more integrated crisis-response architecture. The moderate-to-high heterogeneity estimated across studies confirms Hall et al.'s (2020) assertion that pandemic responses must be tailored to local conditions rather than applied uniformly. Collectively, these findings generalize to the broader proposition that governance-centered, multi-actor OHS frameworks consistently outperform single-sector compliance-only approaches in producing measurable hospitality recovery outcomes.

Strategy Differentiation Based on Geographic and Demographic Contexts

The second research question concerned whether OHS strategy effectiveness varies by geographic and demographic context. The evidence strongly confirms that it does. Medina-Merodio et al. (2021) demonstrated that urban hotels adopted health protocols more rapidly than rural hotels, a disparity attributable to differences in resource availability, managerial capacity, and proximity to regulatory oversight. This finding extends Gössling et al.'s (2021) observation that pandemic impacts on tourism are spatially uneven, and it suggests that centralized, uniform policy mandates are insufficient. Rural hotels require additional institutional support, including simplified compliance

frameworks and targeted financial assistance, to close the implementation gap. Regarding gender-based differences, López-Felipe et al. (2021) found that women demanded stricter safety standards than men across multiple protocol dimensions. This corroborates prior occupational health research indicating that women generally exhibit higher risk perception in workplace safety contexts (Higgins-Desbiolles, 2020). The practical implication is that segmented customer safety communication—with more detailed protocol transparency directed at female guests—can improve perceived safety and booking intent. Generalized from these findings: OHS strategies must be contextually calibrated across both geographic infrastructure disparities and demographic safety expectations to maximize their effectiveness.

Implications for the Tourism Industry and Public Policy

Implications of Research Results. These findings carry significant implications at three levels. At the operational level, hospitality enterprises must move beyond reactive protocol compliance toward proactive, governance-embedded OHS systems. Investment in digital safety technologies (contactless check-in, AI-assisted health monitoring, mobile safety reporting tools) is no longer optional but a competitive necessity. Hotels should institute regular OHS protocol audits, gender-sensitive safety communication strategies, and tiered implementation support for rural and small-scale properties. Creativity and supplier engagement have been shown to enable sustainable development in other industries (Awan et al., 2021), suggesting that innovative, collaborative OHS approaches can similarly drive hospitality resilience. At the policy level, national tourism authorities should establish differentiated regulatory frameworks that account for urban-rural resource disparities and create performance-based incentive mechanisms for high OHS compliance. At the theoretical level, this study contributes a novel integrated model of pandemic-responsive OHS governance for the hospitality sector, combining governance theory, safety behavior frameworks, and health protocol effectiveness evidence in a single synthesized structure.

Novelty of Research. The primary novelty of this study lies in its application of systematic meta-analytic synthesis to comparatively evaluate OHS protocol strategies across multiple hospitality contexts simultaneously—an approach not previously applied in this specific domain. The integration of effect-size visualization with thematic synthesis provides a methodological template replicable in future hospitality health research. Research Limitations. This review is limited by the small number of included primary studies ($k = 5$), geographic concentration in China, Spain, and Europe, and reliance on self-reported data in several primary studies, which introduces social desirability bias. The evidence base is also temporally bounded (2020–2025), limiting generalizability to post-pandemic operating conditions. Recommendations. Future research should expand the evidence base through primary longitudinal studies examining OHS protocol outcomes across diverse hospitality contexts in the Global South, incorporate mixed-method designs that capture both quantitative effectiveness data and qualitative stakeholder experiences, and examine the long-term sustainability of protocol-driven safety cultures beyond the acute pandemic phase. Systemic analytical approaches, such as those applied in supply chain research (Narayana et al., 2022), may further inform the modeling of interdependencies among OHS governance components in future investigations.

CONCLUSION

This study set out to evaluate the effectiveness of OHS protocol implementation in the hospitality sector during the COVID-19 pandemic. The evidence synthesized from five peer-reviewed studies confirms that governance-centered, multi-stakeholder OHS frameworks are the most effective approach to hospitality recovery, with the sustainable tourism governance model producing the strongest and most certain outcomes. Health and safety protocol implementation and the PRP model also demonstrated meaningful effectiveness, while geographic and gender-based contextual factors significantly moderated outcomes. These findings answer the research goals: effective OHS protocols must combine strong institutional governance, strict health standards, and adaptive contextual calibration. Based on this analysis, a new theoretical proposition is advanced: the Context-Sensitive OHS Governance Model (CS-OHG), which posits that the effectiveness of hospitality OHS protocols is a joint function of governance structure, geographic resource context, and demographic safety expectations—not simply a function of protocol content alone. The practical implication is that hospitality stakeholders, policymakers, and researchers must adopt this tripartite lens when designing, evaluating, and scaling OHS systems in post-pandemic and future crisis contexts.

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AUTHOR CONTRIBUTIONS

Conceptualization, I Putu Dedy Kastama Hardy and I Made Ady Wirawan; Methodology, I Putu Dedy Kastama Hardy and I Made Ady Wirawan; Formal Analysis, I Putu Dedy Kastama Hardy and I Made Ady Wirawan; Investigation, I Putu Dedy Kastama Hardy and I Made Ady Wirawan; Writing – Original Draft Preparation, I Putu Dedy Kastama Hardy; Writing – Review & Editing, I Made Ady Wirawan; Supervision, I Made Ady Wirawan.

CONFLICTS OF INTEREST

The authors declare no conflict of interest.

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