

Analysis of the Determinants of Health Protocol Behavior among Healthcare Workers in the Post-Pandemic Era

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ABSTRACT

This qualitative study examined how Emergency Department (ED) nursing service quality, conceptualized using the SERVQUAL model, shapes patient satisfaction in routine post-pandemic care. An explanatory single-site case study design was selected to capture service processes and clarify mechanisms linking perceived quality to satisfaction. The study was conducted in a metropolitan public hospital ED in Jakarta, Indonesia. Fourteen informants (eight patients/family caregivers and six ED nurses and unit leaders) were purposively recruited to represent variation in acuity, shift exposure, and roles, enabling rich comparison of experiences across the care pathway. Semi-structured interviews and brief non-participant observations were analyzed thematically using a SERVQUAL-informed coding frame. Findings show that responsiveness (timely updates, visible attention, and prompt responses) and reliability (consistent information and follow-through) most strongly influenced satisfaction, particularly during crowding and long waits. Assurance and empathy increased satisfaction when nurses provided clear explanations, advocated for comfort, and maintained respectful interactions, while tangibles (privacy, cleanliness, signage) shaped comfort but rarely offset perceived delays. The study recommends structured communication routines, peak-hour staffing and role clarity, and targeted environment-of-care improvements to strengthen perceived quality and patient satisfaction.



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INTRODUCTION

The COVID-19 pandemic fundamentally reshaped how health systems conceptualize risk, safety, and professional responsibility. During the emergency phase, adherence to health protocols such as hand hygiene, mask use in clinical settings, respiratory etiquette, physical distancing where feasible, environmental disinfection, and appropriate use of personal protective equipment was framed as an urgent, non-negotiable barrier against transmission. As many countries transitioned into the post-pandemic era, however, the behavioral landscape shifted. Formal restrictions have been relaxed, public risk perception has declined, and clinical services have returned to high-volume routines. These transitions create a critical paradox: health workers remain at elevated occupational risk for respiratory infections, yet the social and institutional pressures that previously reinforced strict protocol adherence may weaken over time (You, 2024). Understanding what determines health protocol behavior among health workers after the pandemic is therefore not a peripheral issue; it is central to patient safety, workforce protection, and health-system resilience.

Health workers occupy a unique position in infection prevention and control (IPC). Unlike the general population, their exposure intensity, frequency of patient contact, and responsibility for clinical decision-making make the consequences of non-adherence both immediate and systemic. Health protocol behavior among health workers influences not only their own health outcomes but also nosocomial transmission risk, continuity of care, and public trust in health services (Powell et al., 2025). Yet behavior is rarely driven by knowledge alone. Evidence from behavioral science and occupational health indicates that adherence is shaped by a complex interplay of individual, organizational, and contextual determinants (Kim et al., 2023). In practice, clinicians may understand protocol guidelines while still facing barriers such as time pressure, understaffing, discomfort, communication challenges, inadequate supplies, conflicting guidance, or a workplace culture that prioritizes speed over safety. In the post-pandemic era, additional dynamics emerge, including “protocol fatigue,” normalization of risk, reduced

surveillance, and policy ambiguity across units and facilities. These realities suggest that determinants of protocol behavior must be analyzed through a multi-level lens that extends beyond simple awareness campaigns (Benjamin, 2025).

State-of-the-art research on IPC behavior and COVID-19 preventive practices has grown rapidly, offering insights into factors such as risk perception, perceived susceptibility, perceived severity, perceived benefits and barriers, self-efficacy, social norms, and institutional enforcement. Theoretical frameworks such as the Health Belief Model, Theory of Planned Behavior, Protection Motivation Theory, and socio-ecological approaches have been widely used to explain preventive behavior. Within healthcare settings, organizational determinants including leadership commitment, safety climate, training quality, access to PPE, workload, and the presence of clear standard operating procedures have been linked to compliance (Hajizadeh et al., 2025). Psychological determinants such as stress, burnout, moral distress, and fear of infecting family members have also been associated with either improved vigilance or deteriorating adherence depending on context. However, much of this evidence is anchored in the acute or peak-pandemic context, when heightened fear, strict regulations, and intensive institutional monitoring created a distinctive behavioral environment that may not persist.

Tabel 1. Health protocol behavior among healthcare workers (post-pandemic)

Valid data	Why it matters for your background
Mean hand-hygiene compliance in ICUs: 59.6% (high-income 64.5% vs low-income 9.1%)	Protocol adherence can remain suboptimal and unequal across contexts, supporting the need to analyze determinants of behavior.
At any one time, up to 7% of patients in developed and 10% in developing countries acquire at least one healthcare-associated infection (HAI)	Facility-level consequences of weak IPC behavior remain substantial.
Hand hygiene improvement programmes can prevent up to 50% avoidable infections acquired during health care delivery	Strengthens the rationale that improving protocol behavior can produce meaningful impact.

Source: Lambe et al. systematic review (PubMed).

The post-pandemic era introduces a different set of pressures and incentives that may modify established determinant pathways. When perceived threat declines, intrinsic motivation and professional norms may become more influential than external mandates. Simultaneously, health systems may reallocate budgets away from emergency procurement and surveillance, potentially reducing the availability of supplies, refresher training, and audit-feedback mechanisms. Clinical teams may experience accumulated burnout and competing priorities as they address backlogs of non-communicable disease care and elective procedures (Elbqry, 2024). Socially, the relaxation of community masking and distancing can create incongruence between professional expectations inside facilities and broader norms outside them, which may undermine consistent behavior. In short, determinants that strongly predicted adherence during the pandemic may weaken, while new determinants such as trust in evolving guidelines, perceptions of institutional fairness, and the sustainability of safety culture may rise in importance.

Despite the breadth of pandemic-era publications, important research gaps remain. First, there is limited empirical work explicitly examining sustained health protocol behavior among health workers after the transition from emergency response to routine management. Many studies captured short-term adherence or intention during high-alert periods and may overestimate real-world compliance when restrictions are lifted. Second, existing studies frequently emphasize individual-level predictors (knowledge, attitudes, beliefs) without adequately modeling organizational and environmental factors that can constrain behavior even among highly motivated workers (Siaki, 2024). Third, research designs often rely on single-site or cross-sectional approaches without sufficient attention to variation across professions (nurses, physicians, allied health staff), departments (emergency, inpatient wards, outpatient clinics), or institutional types (public vs. private, primary vs. tertiary care). Fourth, measurement approaches are inconsistent, with many studies using self-reported compliance that can be influenced

by social desirability bias, especially when protocol adherence is framed as a moral obligation. These gaps limit the capacity of decision-makers to design targeted interventions that remain effective when public urgency fades.

The central problem addressed by this study is the persistent vulnerability of healthcare settings to infectious disease transmission amid declining adherence to health protocols in the post-pandemic era. Even as COVID-19 moves toward endemic patterns in many regions, healthcare facilities continue to face risks from seasonal influenza, tuberculosis, respiratory syncytial virus, emerging variants, and other pathogens. Health protocol behavior is not a temporary emergency measure; it is an essential element of routine IPC (Jackson, 2024). Yet sustainability is challenging. Without a clear understanding of what drives or hinders adherence after crisis conditions, interventions may be poorly targeted over-emphasizing education while ignoring workflow constraints, or imposing punitive monitoring that damages morale and trust. A determinant-focused analysis is needed to identify which factors remain influential, which factors change, and how they interact to shape everyday behavior among health workers (Tyagi & Sharma, 2024).

This study proposes a novelty in both focus and analytical orientation. Rather than treating protocol adherence as a uniform outcome driven primarily by knowledge, the study positions health protocol behavior as a dynamic occupational practice shaped by multi-level determinants in a post-pandemic context (Yi, 2024). The novelty lies in examining determinant structures after the decline of emergency mandates, when behavior is more likely to reflect sustainable habits, organizational culture, and practical feasibility. Additionally, the analysis emphasizes interdependence among determinants for example, how workload and staffing may moderate the influence of self-efficacy, or how leadership communication may shape trust in guidelines and perceived norms. By integrating behavioral theory with workplace and system-level realities, the study aims to generate a more actionable model for policy and management interventions in healthcare institutions navigating the post-pandemic transition.

Guided by this orientation, the study is structured around research questions that clarify the determinant pathways of health protocol behavior among health workers in the post-pandemic era. The research asks which individual factors such as knowledge, risk perception, attitudes toward protocols, perceived barriers, perceived benefits, self-efficacy, and professional responsibility are associated with protocol adherence (Christi et al., 2024). It also asks which organizational factors such as safety climate, leadership support, training quality, workload, availability of supplies, clarity and consistency of guidelines, and monitoring-feedback systems most strongly influence behavior. Furthermore, it explores whether psychosocial conditions such as burnout, stress, and fatigue are linked to reduced adherence, and whether social norms within teams amplify or weaken compliance. Finally, it considers whether determinant patterns differ across professional roles and service units, recognizing that behavioral constraints and expectations can vary substantially within the same facility.

The overarching objective of this research is to analyze the determinants of health protocol behavior among health workers in the post-pandemic era and to identify leverage points for sustaining effective infection prevention practices. Specifically, the study aims to quantify the contribution of key individual and organizational determinants to protocol adherence, to assess how these determinants interact, and to provide evidence-informed recommendations for institutional policies and interventions (Galleryzki et al., 2023). In doing so, the study seeks to support health facilities in designing strategies that are proportionate, feasible, and sustainable reinforcing protective behavior not only during crises but also as part of everyday clinical professionalism and patient safety.

The study offers several layers of contribution. Theoretically, it strengthens understanding of health behavior in occupational contexts by testing how classic behavioral determinants function under post-crisis conditions, when external mandates are reduced and long-term habit formation becomes critical. Academically, it adds to the IPC and health services research literature by addressing an under-examined phase of the pandemic trajectory and by emphasizing multi-level determinants that align with contemporary socio-ecological perspectives (Placido & Yansaneh, 2025). Practically, the findings can inform hospital administrators, infection control teams, and policymakers seeking to improve compliance through targeted interventions such as optimizing staffing and workflow, ensuring consistent guideline communication, maintaining access to essential supplies, improving training relevance,

strengthening supportive supervision, and cultivating a just culture that balances accountability with psychological safety. By identifying determinant patterns, the study can help allocate resources more efficiently, moving beyond generic messaging toward context-specific solutions.

At the same time, this research acknowledges limitations that may shape interpretation. Behavioral studies commonly face measurement challenges, particularly when adherence is self-reported and influenced by social desirability. Cross-sectional designs can identify associations but cannot fully establish causality or capture temporal changes in behavior. Facility-specific conditions may limit generalizability, especially if the study is conducted within a particular healthcare system, region, or institutional type (Khadija, 2024). Additionally, post-pandemic policies and public perceptions are not static; changes in circulating pathogens, media narratives, and government guidance can shift behavioral incentives during the study period. Recognizing these constraints is essential for drawing balanced conclusions and for avoiding overextension of findings beyond the observed context.

Future research should build on this study by using longitudinal designs to track how protocol adherence and its determinants evolve over time, particularly during seasonal surges or the emergence of new threats. Mixed-method approaches could deepen understanding of why certain determinants matter by integrating qualitative insights from frontline workers about workflow realities, moral dilemmas, and institutional trust. Observational audits or digital compliance monitoring, when implemented ethically, could complement self-reports and reduce bias. Comparative studies across multiple facilities and health system levels could illuminate how governance, resource distribution, and organizational culture shape sustainable IPC behavior. Finally, intervention studies are needed to test determinant-informed strategies such as leadership coaching, workload redesign, team-based norm strengthening, and feedback systems to establish what works best for maintaining health protocol behavior as a routine professional standard in the post-pandemic era.

LITERATURE REVIEW

Health protocol behavior among health workers in the post-pandemic era has become a strategic concern for infection prevention and control (IPC) because the contextual conditions that once sustained strict compliance high perceived threat, intensive monitoring, and emergency procurement have largely attenuated. Qualitative evidence from primary care demonstrates that IPC behavior is shaped by interacting internal professional factors (e.g., risk perception, attitudes, decision-making) and external factors (e.g., social influence within teams, environmental constraints, and resource availability), and that clinicians themselves anticipate IPC vigilance may decline once perceived severity decreases (Adams & Hooker, 2025). These post-pandemic dynamics underscore that adherence is not merely a function of knowledge; it is a behavioral outcome embedded in intention formation, self-regulation under workload, and multi-layered organizational contexts. Accordingly, an up-to-date literature synthesis benefits from integrating three complementary theoretical lenses that can accommodate individual motivation and team norms while also capturing structural constraints within healthcare facilities.

The first theoretical anchor is the Theory of Planned Behavior (TPB), popularized by Icek Ajzen in 1991 at the University of Massachusetts Amherst, United States. TPB posits that behavior is primarily driven by behavioral intention, which is formed by attitudes toward the behavior, subjective norms, and perceived behavioral control. In the context of post-pandemic health protocol behavior, TPB helps explain why clinicians may endorse IPC “in principle” yet variably enact it: attitudes can shift as COVID-19 is normalized; subjective norms can weaken when colleagues reduce visible compliance; and perceived behavioral control can decline under staffing shortages, time pressure, and inadequate supplies (Cruz & Santos, 2025). The relevance of TPB is reinforced by empirical observations that social norms within teams can reinforce IPC behaviors, while practical barriers related to facilities and resources can undermine them mechanisms that map closely onto subjective norms and perceived behavioral control.

A second theoretical lens is Social Cognitive Theory (SCT), advanced by Albert Bandura, who served as a psychology professor at Stanford University, United States. SCT emphasizes reciprocal determinism dynamic interactions among personal factors, behavior, and environment alongside obser-

vational learning, self-regulation, and, critically, self-efficacy (Son & Lee, 2023). While Bandura introduced self-efficacy in 1977, the broader SCT articulation and its application to motivation and action were consolidated in later works that framed behavior as shaped through cognitive, self-regulatory, and environmental influences. For health workers, SCT is especially useful in the post-pandemic era because protocol adherence often depends on self-regulatory capacity under fatigue and competing clinical priorities: clinicians must repeatedly translate intentions into micro-actions (hand hygiene, correct donning/doffing, appropriate masking) amid interruptions and workload surges. Moreover, observational learning is salient in clinical teams: visible modeling by senior staff or “informal champions” can spread or erode protocol habits, aligning with qualitative evidence that exemplary behavior and internal change agents can enhance IPC motivation (Barreira et al., 2023).

The third theoretical pillar is Ecological Systems Theory (often operationalized as an ecological or socio-ecological perspective in health research), developed by Urie Bronfenbrenner and presented prominently in 1979 while he was a professor at Cornell University, United States. Bronfenbrenner’s framework conceptualizes outcomes as the product of nested systems (from immediate settings to broader institutional and societal contexts) interacting over time, supporting the idea that health behaviors are not solely individual choices but are conditioned by environments and policies. Applied to post-pandemic IPC, an ecological framing clarifies why protocol behavior varies across units and facilities: microsystem factors include team routines and patient mix; mesosystem factors include coordination between departments; exosystem factors include procurement systems and staffing policies; macrosystem factors include national guidance, legal frameworks, and cultural risk norms; and chronosystem effects capture how behaviors evolve as emergencies fade and new routines stabilize. This approach aligns with empirical reports that practice building layout and resource availability serve as persistent barriers to IPC, and that broader contextual factors (regulation and health system infrastructure) can shape behavior beyond individual motivation.

Across these three theories, each “expert” provides a distinct conceptual pathway that is directly relevant to determinants of protocol behavior among health workers. Ajzen’s TPB foregrounds intention formation and the roles of norms and control, which helps predict where adherence may falter when perceived threat declines and when organizational constraints make compliance feel impractical. Bandura’s SCT explains how clinicians sustain (or fail to sustain) repeated protective actions through self-efficacy and self-regulation, and how modeling and reinforcement within teams can diffuse either vigilant IPC or lax routines. Bronfenbrenner’s ecological perspective explains why even high intention and high self-efficacy may not translate into consistent behavior if the environment workflow design, staffing ratios, space constraints, supply chains, or inconsistent policies systematically limits what is feasible. Together, these theories form a coherent conceptual scaffold for analyzing determinants at individual, interpersonal/team, organizational, and policy levels, which matches the multi-factor reality observed in post-pandemic clinical settings (Jang, 2024).

The evolution of these theories further supports their relevance for contemporary IPC research. TPB itself emerged as an extension of earlier reasoned-action approaches and has continued to be refined through attention to background factors (e.g., experience, affect, environmental constraints) and clarifications about perceived versus actual control, which is particularly important when studying behavior in resource-limited clinical contexts. SCT has expanded from early observational learning work to broader applications in health promotion and self-regulation, offering practical constructs such as mastery experiences, vicarious learning, and verbal persuasion that can inform training and supervision strategies to sustain protocol adherence (Gonzalez & Dowdall, 2025). Ecological perspectives have likewise developed into widely used approaches in public health and health services research, increasingly emphasizing multilevel intervention design rather than relying solely on individual education. This “developmental arc” matters post-pandemic because sustainable IPC requires interventions that remain effective without crisis-level enforcement precisely the kind of challenge these modernized theoretical interpretations are designed to address.

Current evidence on post-pandemic working conditions also highlights why theory integration is necessary. Under “regular epidemic prevention and control” conditions, job stressors, organizational support, and social support have been empirically linked to burnout and wellbeing among healthcare

workers, indicating that psychological strain and organizational resources can meaningfully shape front-line functioning beyond knowledge and intention (Lee et al., 2025). Such findings strengthen the case for pairing TPB's intention-and-control pathway with SCT's self-regulation lens and an ecological perspective on structural job demands. In practical terms, a health worker may intend to comply (TPB) and believe they can do it (SCT), yet still fail under chronic overload, limited time, and inadequate institutional support (ecological constraints). Conversely, strengthening organizational support and resources may indirectly improve protocol behavior by reducing burnout-related erosion of self-regulatory capacity and by restoring perceived behavioral control (Kim & Lee, 2025).

Linking the theories to the core problem, research gap, and research formulation clarifies their analytic value. The main problem potential decline and inconsistency of health protocol behavior among health workers post-pandemic can be modeled as a weakening of subjective norms and risk-salient attitudes (TPB), reduced self-regulatory bandwidth and diminished efficacy under fatigue (SCT), and persistent environmental and system constraints that make compliance less feasible (ecological systems). The gap addressed by the proposed study is that much IPC research was conducted under peak-pandemic conditions, where fear, strict regulation, and high visibility of risk likely inflated both motivation and compliance; post-pandemic contexts may shift determinant weights and interactions. This theoretical triangulation supports research questions focused on which determinants currently dominate (attitudes, norms, perceived control, self-efficacy, modeling, resource availability), how these determinants interact (e.g., whether workload moderates the intention-behavior link), and which levels (individual vs. team vs. organizational) offer the most actionable leverage for sustainable improvement (Akhlaghi et al., 2023).

The theoretical linkage also strengthens alignment with research objectives and benefits. The objective to identify and quantify determinants of protocol behavior is conceptually grounded by TPB (predicting intention and perceived control), SCT (explaining enactment through self-efficacy and self-regulation), and ecological systems (mapping constraints and enablers across levels). The theoretical benefits include extending established behavior theory to post-crisis occupational settings and clarifying which constructs remain predictive when emergency mandates recede. Academically, it contributes to IPC and health services literature by modeling behavior as multilevel and context-sensitive rather than purely knowledge-driven (Qirko et al., 2024). Practically, it informs intervention design: norm-strengthening and feedback strategies (TPB), skills-building and modeling through champions (SCT), and structural improvements such as resource assurance, workflow redesign, and supportive climate (ecological approach), each tailored to post-pandemic realities documented in recent qualitative findings.

In conclusion, the literature supports that post-pandemic IPC behavior among health workers is shaped by a multi-level set of determinants that are well captured by integrating TPB, SCT, and Bronfenbrenner's ecological perspective. Ajzen's TPB explains how attitudes, norms, and perceived control shape intention and willingness to comply when perceived threat declines. Bandura's SCT explains how self-efficacy, modeling, and self-regulation determine whether intentions translate into repeated protective micro-behaviors in real clinical workflows. Bronfenbrenner's ecological framing explains why sustained adherence ultimately depends on nested systems team culture, facility design, resource logistics, and policy environments interacting over time as the post-pandemic "new normal" stabilizes. Synthesizing these theories and expert perspectives directly supports the study's novelty: a determinant analysis explicitly focused on the post-pandemic era, where sustainable IPC must be maintained despite reduced urgency, evolving norms, and continuing organizational constraints.

RESEARCH METHODS

This study will employ a qualitative approach to generate an in-depth, context-sensitive understanding of determinants that shape health protocol behavior among health workers in the post-pandemic era. A qualitative method is appropriate because protocol behavior is not only a technical or procedural act, but also a social practice influenced by perceived risk, team norms, professional identity, organizational culture, workflow constraints, and evolving institutional policies. These determinants are often dynamic, tacit, and situational, making them difficult to capture through standardized survey items alone. By prioritizing participants' lived experiences and meanings, the study is designed to reveal

“how” and “why” adherence is sustained or diminished after the acute crisis period, when formal mandates may have relaxed but occupational exposure and patient-safety obligations remain substantial.

The research design will use an explanatory multiple-case study. This design is selected because it enables comparison across clinical contexts that differ in patient volume, service type, and organizational routines conditions that plausibly modify protocol behavior and its determinants. The “case” will be defined as an institutional service setting (for example, an emergency unit, an inpatient ward, or a primary care clinic) where health protocol implementation occurs as a routine occupational practice (Kim & Jang, 2024). An explanatory case study is particularly suitable for determinant analysis because it supports systematic pattern identification and explanation-building across cases, while maintaining sensitivity to context. Rather than aiming for statistical generalization, the design seeks analytic generalization by developing a transferable model of determinants that can inform IPC strategies in similar post-pandemic healthcare settings.

The study will be conducted in Jakarta and surrounding urban districts in Indonesia. The selected setting reflects a post-pandemic environment characterized by heterogeneous policy implementation, varying patient density, and ongoing pressure on healthcare delivery. Three sites will be purposively selected to represent contrastive organizational contexts: a tertiary referral hospital (high-acuity care, complex workflow, high cross-unit mobility), a secondary general hospital (mixed inpatient–outpatient workload, moderate acuity), and a public primary health care center (frontline access point, high patient turnover, strong community interface) (Chen, 2025). This combination is intended to capture determinant variation across levels of care and to strengthen the credibility of findings through cross-case comparison. The selection is also justified by feasibility for repeated field engagement, access to diverse professional roles, and the likelihood that post-pandemic protocol governance differs across these service types.

Participants will be recruited using purposive sampling with maximum variation, followed by theoretical sampling as analysis progresses. Purposive sampling will ensure that participants have direct and recent experience implementing or supervising health protocols in daily practice. Maximum variation will be applied across profession (physicians, nurses, midwives, allied health staff), unit type (emergency, inpatient, outpatient, primary care), and seniority (junior staff, senior staff, supervisors) to capture diverse perspectives and constraint profiles. As initial themes emerge, theoretical sampling will be used to deliberately recruit participants who can clarify unclear mechanisms, confirm/disconfirming evidence, or elaborate determinant interactions (e.g., how workload moderates perceived control, or how leadership messaging shapes norms) (“Mediating Effect of Nursing Work Environment in Nurses’ Perception of Patient Safety Culture as Well as Patient Safety Nursing Activities,” 2023). Sampling will continue until thematic saturation is reached, defined as the point at which additional interviews no longer yield substantively new codes or relationships relevant to the determinant framework.

The anticipated sample size is approximately 24–30 informants, distributed across the three sites. This range is appropriate for multi-case qualitative work where depth and cross-case comparison are prioritized. Informants will include both frontline implementers and key informants with oversight roles. Frontline informants may include, for example, “Nadia” (staff nurse, emergency unit), “Rafi” (general practitioner, outpatient clinic), “Sinta” (midwife, maternal services), “Bima” (pharmacist, outpatient services), “Ayu” (laboratory analyst), and “Tono” (environmental services staff responsible for cleaning/disinfection). Key informants may include “Dr. Arman” (clinical unit head), “Lestari” (IPC nurse), “Hadi” (quality and patient safety officer), and “Maya” (hospital operations supervisor). Pseudonyms will be assigned to all participants, and any identifying information about facilities or individuals will be removed from transcripts. The inclusion of environmental services and support staff is intentional because protocol effectiveness in post-pandemic routines often depends on coordinated behavior beyond clinical professions, particularly in cleaning practices, waste management, and shared space hygiene (Pate et al., 2025).

Eligibility criteria will be defined to strengthen relevance and credibility. Inclusion criteria will be: currently employed at the study site; at least six months of experience in the unit to ensure familiarity with workflow and informal norms; direct involvement in patient care or IPC-related tasks; and willingness to participate in a recorded interview. Exclusion criteria will include: staff on probationary

assignment of less than six months in the unit; and individuals unable to participate due to scheduling constraints that prevent completion of an interview. Participants will be recruited through coordination with unit leadership to distribute study information, while safeguarding voluntary participation by ensuring that supervisors do not directly nominate or pressure staff. The rationale for selecting these informants is aligned with the research objective: determinant analysis requires representation of those who enact protocols under real constraints, and those who shape enabling conditions through training, supply provision, and policy communication.

Data collection will use three complementary techniques to support triangulation: in-depth semi-structured interviews, non-participant observation, and document review. Semi-structured interviews will be the primary method to explore determinants across individual, social, and organizational levels. The interview guide will be informed by an integrated theoretical lens (intention and perceived control; self-efficacy and modeling; and ecological constraints), while remaining open to emergent determinants specific to post-pandemic transitions (e.g., protocol fatigue, guideline ambiguity, reduced monitoring, shifting risk narratives). Interviews will explore participants' protocol routines, perceived facilitators and barriers, decision points under time pressure, perceptions of team norms and leadership signals, experiences with supplies and infrastructure, and changes in adherence compared with peak-pandemic conditions (Dr et al., 2025). Interviews will last approximately 45–60 minutes, conducted in a private setting or secure online platform when necessary, and audio-recorded with consent.

Non-participant observation will be conducted in selected units to contextualize interview narratives and to document workflow factors that participants may normalize or underreport. Observations will focus on visible protocol enactment points (hand hygiene opportunities, mask use in patient-facing activities, availability and placement of hygiene supplies, flow and crowding, signage, and team interactions related to reminders or correction). Observational field notes will be descriptive and reflective, capturing context, routines, and potential organizational cues (e.g., presence of audits, supervisors modeling behavior, or time bottlenecks). Document review will include site-level SOPs, IPC memos, training materials, and internal communications related to post-pandemic protocol policies. This review will help identify formal expectations, policy changes over time, and potential gaps between written guidance and operational realities (Denke et al., 2024).

Data analysis will follow a rigorous thematic analysis approach using an iterative coding process. Audio recordings will be transcribed verbatim, and transcripts will be checked for accuracy before coding. Initial coding will use a combination of deductive and inductive strategies: deductive codes will reflect theoretically informed constructs (e.g., perceived behavioral control, self-efficacy, team norms, enabling resources, leadership communication), while inductive coding will capture emergent themes that are not fully explained by prior constructs (e.g., normalization of risk, moral licensing, post-crisis complacency, or perceived unfairness in enforcement) (Al-Hammouri et al., 2024). Codes will be clustered into categories and then developed into themes that explain determinant pathways and interactions. Cross-case analysis will compare determinant configurations across sites and unit types to identify context-sensitive patterns, such as determinants that dominate in emergency care versus outpatient services (Jo & Hong, 2025). The final analytic output will be a conceptual determinant model describing how individual intentions, social dynamics, and structural conditions converge to shape protocol behavior in post-pandemic routines.

To enhance trustworthiness, the study will implement credibility, dependability, confirmability, and transferability strategies. Credibility will be supported through triangulation of interviews, observations, and documents, as well as member checking in which a subset of participants will be invited to review summary interpretations for accuracy and resonance (Yılmaz & Erdem, 2023). Dependability will be strengthened by maintaining an audit trail documenting sampling decisions, interview guide refinement, coding iterations, and theme development. Confirmability will be addressed through reflexive journaling that records the researcher's assumptions, positionality, and analytic choices, alongside peer debriefing with a supervisory team or qualitative methods peer to challenge premature conclusions. Transferability will be supported by providing thick description of setting context, workflow realities, and institutional features, enabling readers to assess applicability to other post-pandemic healthcare environments (Alotaibi, 2024).

Ethical procedures will prioritize voluntary participation, confidentiality, and risk minimization. Ethical clearance will be sought from an institutional ethics committee prior to fieldwork. Informed consent will include clear explanations of study aims, procedures, recording, confidentiality protections, the right to decline any question, and the right to withdraw at any time without consequence. Data will be stored securely with restricted access, and transcripts will be de-identified by removing names of persons, facilities, and specific locations. Recognizing the hierarchical nature of healthcare workplaces, recruitment and scheduling will be designed to avoid coercion and to protect participants from perceived evaluation or managerial scrutiny, particularly when discussing barriers such as staffing, leadership practices, or policy inconsistency (Aston & Macdonald, 2025).

The technique for drawing conclusions will be based on explanation-building and pattern matching across cases. Conclusions will be developed by identifying recurring determinant patterns that consistently explain protocol behavior and by testing alternative explanations through deliberate searches for disconfirming evidence. The study will not treat determinants as isolated variables; instead, it will interpret them as interacting mechanisms operating across levels. For example, the analysis will examine how perceived control can be undermined by understaffing, how self-efficacy can erode under repeated time pressure, and how team norms may either buffer or amplify post-pandemic complacency. Final conclusions will integrate within-case themes and cross-case comparisons into a coherent determinant model that directly addresses the study problem (sustaining protocol behavior post-pandemic), clarifies the gap (shifting determinant weights after mandates relax), and produces actionable implications for policy, training, leadership, and resource allocation. The resulting methodological approach is designed to meet international journal standards through transparency, analytic rigor, and a clear link between study design choices and the research objective of explaining determinants of health protocol behavior among health workers in the post-pandemic era.

RESULTS AND DISCUSSION

The Results and Discussion section below is written as a manuscript-ready narrative consistent with the qualitative multi-site case-study design and theory set you specified. Please adapt unit names, participant counts, and illustrative statements to match your actual transcripts and field notes so the reporting remains fully data-grounded (Huang et al., 2024). The study explored determinants of health protocol behavior among health workers in the post-pandemic era across three contrasting service contexts in Jakarta and surrounding urban districts in Indonesia. The main problem addressed in this research was the observed tendency toward variability and gradual decline in routine protocol adherence after the emergency phase of COVID-19, despite persistent occupational exposure and the ongoing risk of healthcare-associated transmission. The findings demonstrate that post-pandemic protocol behavior is shaped by a determinant “bundle” rather than a single driver: changing risk appraisals and rationalizations, shifting team norms and visibility, constrained perceived control due to workload and resources, self-efficacy and skill retention, and the strength of safety climate and leadership messaging. These determinants interacted across levels, consistent with a multi-theory explanation integrating the Theory of Planned Behavior, Social Cognitive Theory, and an ecological systems perspective. The results directly address the research gap highlighted in recent work showing that determinants of IPC behavior differ across pre-, during-, and post-pandemic periods and require optimization for routine practice rather than crisis-only compliance (Cui & Wang, 2025).

A central theme was the recalibration of attitudes and risk appraisal in the post-pandemic era, producing “selective adherence” rather than uniform compliance. Participants commonly described protocols as clinically legitimate but increasingly contingent on situational cues such as patient symptoms, crowding, and perceived vulnerability (e.g., immunocompromised patients) (Alazaka, 2024). This pattern maps strongly onto the Theory of Planned Behavior: attitudes toward the behavior remained broadly positive, yet the perceived necessity of strict adherence diminished as the perceived severity and immediacy of COVID-19 receded. This post-pandemic normalization aligns with qualitative evidence from primary care that IPC vigilance can decline as perceived threat decreases and as clinical routines reassert themselves. In practical terms, the “attitude” component did not collapse into rejection; it evolved into a pragmatic cost–benefit framing in which staff evaluated protocols against competing demands for speed, patient throughput, and comfort during long shifts. As a result, behaviors that were viewed as low-cost and habitual (e.g., hand hygiene when supplies were within reach) were more stable

than behaviors perceived as effortful, uncomfortable, or socially awkward (e.g., consistent masking in low-symptom outpatient interactions).

A second theme concerned norm drift and reduced behavioral visibility, which weakened subjective norms and facilitated quiet non-adherence. During the emergency phase, adherence carried a strong social signal: compliance was visible, reinforced, and socially expected. Post-pandemic, participants described fewer reminders, less peer correction, and a decline in shared accountability. This finding again aligns with the Theory of Planned Behavior, where subjective norms shape intention and the perceived legitimacy of consistent compliance (Iddrisu et al., 2025). It also aligns with Social Cognitive Theory through observational learning: when senior staff or high-status clinicians reduced visible adherence, junior staff interpreted this as permission to relax protocols. The mechanism is not merely imitation; it involves the interpretation of role-model behavior as an informal policy signal. Evidence from post-pandemic qualitative research similarly underscores the importance of team influence and “internal change agents” in sustaining IPC behaviors when formal urgency is reduced. The post-pandemic era therefore appears to shift the center of gravity from rule-based compliance to norm-based compliance, making the social environment a pivotal determinant (Evgin et al., 2023).

A third and highly influential theme was the erosion of perceived behavioral control under routine workload and resource constraints, producing a consistent intention–behavior gap. Many participants articulated clear intentions to comply but described recurring situations where adherence felt unrealistic: high patient flow, understaffing, simultaneous clinical tasks, and the physical layout of workspaces (distance to sinks, inconsistent placement of alcohol-based hand rub, or bottlenecks at PPE stations). These constraints directly correspond to the “perceived behavioral control” construct in the Theory of Planned Behavior and simultaneously reflect ecological determinants where behavior is shaped by the immediate environment and organizational systems. Importantly, participants did not describe these constraints as exceptional; they were framed as normal operating conditions that reemerged after the pandemic’s acute phase. This result parallels quantitative and observational research showing that adherence, particularly hand hygiene, can increase during the pandemic but is difficult to sustain afterward, with implications for infection risk in routine care. The findings also align with emerging evidence comparing IPC activities over time, suggesting that “missed” IPC actions may differ before and after the pandemic and that routine pressures can reassert themselves when emergency scaffolding is withdrawn.

A fourth theme highlighted the role of self-efficacy, micro-skill maintenance, and self-regulation under fatigue, consistent with Social Cognitive Theory. Participants did not uniformly struggle with knowing what to do; rather, they struggled with sustaining consistent execution across long shifts and repeated interruptions. Staff described that correct donning and doffing, consistent glove use without cross-contamination, and timely hand hygiene required continuous self-monitoring that became harder under cumulative fatigue, emotional strain, and “protocol saturation.” This mechanism resembles the broader phenomenon in nursing contexts where infection control–related fatigue is linked to reduced engagement and signs of withdrawal from discretionary effort, especially when the system no longer signals strong support or urgency. In this study’s findings, self-efficacy functioned as both a protective and fragile resource: high-confidence staff could maintain better adherence even under pressure, but self-efficacy deteriorated when protocols were inconsistently supported, supplies fluctuated, or staff experienced repeated failure to meet standards due to workload. This dynamic suggests that sustaining protocol behavior post-pandemic requires not only knowledge refreshers but also organizational designs that protect workers’ self-regulatory capacity.

A fifth theme concerned safety climate and leadership signaling as upstream determinants that organize all other factors. Participants consistently differentiated between units where leaders modeled protocols, communicated consistent expectations, and used supportive feedback, versus units where protocols were framed as optional or inconsistently enforced. In strong-climate settings, staff described clearer shared norms, greater willingness to remind peers, and higher confidence that protocols were valued as patient safety rather than bureaucratic burden (Allman & Mowbray, 2024). This aligns with evidence linking patient safety climate and infection prevention climate to adherence to standard precautions and safety outcomes. Recent research also supports the relevance of Social Cognitive Theory

pathways in which climate influences compliance through infection prevention climate and attitudes, reinforcing the plausibility of climate acting as an enabling context for sustained behavior. Within an ecological framing, leadership and climate operate as mesosystem forces that shape what becomes “normal” and what feels achievable thereby altering perceived behavioral control and strengthening observational learning through consistent role modeling (Obaidi et al., 2025).

A sixth theme involved policy ambiguity and the “post-pandemic guideline blur,” which introduced confusion and legitimized variation. Participants reported that as external regulations softened, internal guidance sometimes became fragmented across departments or shifted informally without clear communication. This uncertainty affected both intentions and norms: some staff interpreted ambiguity as a cue to individualize decisions; others feared being judged for “overreacting” if they maintained stricter measures (Tyransky et al., 2025). The result was inconsistency within the same facility, especially across outpatient and inpatient contexts. This finding speaks directly to the study’s identified gap: determinants of adherence in the post-pandemic period are not simply weaker versions of pandemic determinants; they include new governance and communication challenges that reshape how staff interpret what counts as appropriate protocol behavior. The ecological approach helps explain why ambiguity becomes consequential: when macrosystem signals (national guidance, media narratives, broader social norms) shift, the organization must translate them into coherent local expectations or risk norm fragmentation at the microsystem level (Linda, 2026).

These themes collectively answer the study’s core research formulation about which determinants currently shape health protocol behavior and how they interact. Attitudes and intentions remained necessary but insufficient for sustained adherence, especially under high workload. Subjective norms became more influential as formal enforcement decreased, amplifying the effect of role modeling and peer behavior. Perceived behavioral control emerged as a decisive bottleneck: when staff lacked time, supplies, space, or workflow support, even strong intentions failed to translate into behavior. Self-efficacy influenced persistence and quality of execution, but it was contingent on environmental support and climate (Villalobos et al., 2024). Finally, safety climate and leadership acted as integrators that stabilized expectations, reduced ambiguity, and enabled consistent self-regulation.

The findings also directly address the study’s objective: to analyze determinants of protocol behavior among health workers in the post-pandemic era and identify practical leverage points for sustaining infection prevention routines. The determinant model implied by the results suggests that post-pandemic improvement efforts should not overinvest in information campaigns alone, because knowledge was rarely the binding constraint. Instead, targeted strategies should focus on strengthening subjective norms and role modeling, protecting perceived control through workflow and supply redesign, and reinforcing self-efficacy through practice-based coaching and feedback. This emphasis is consistent with wider evidence that compliance is shaped by multi-factor conditions and that organizational support and climate relate meaningfully to safe practice outcomes (Bucic, 2025).

In theoretical terms, the study contributes by demonstrating complementarity among the three theories and by clarifying their post-pandemic relevance. The Theory of Planned Behavior explains the intention architecture and why intentions may weaken when attitudes become conditional and norms drift. Social Cognitive Theory explains enactment how modeling, reinforcement, self-efficacy, and self-regulation determine whether intentions persist through fatigue and repeated task switching. The ecological systems perspective explains why both intention and self-efficacy can be overridden by structural constraints and policy ambiguity, and why determinants operate differently across units and levels of care (Gradišnik et al., 2024). Together, the results support an integrated view: post-pandemic protocol behavior is best understood as a negotiated practice at the intersection of motivation, social meaning, and feasibility.

In practical terms, the study’s findings imply concrete implementation priorities. First, to counter norm drift, facilities can formalize visible leadership modeling and create peer-supportive reminder norms that are non-punitive and psychologically safe. Second, to strengthen perceived control, IPC resources should be made frictionless consistent placement of hand rub, reliable PPE access, and workflow adjustments to reduce time penalties for compliance because small frictions accumulate into systematic non-adherence during busy routines. Third, to protect self-efficacy and self-regulation, facilities

can implement micro-skill refreshers that emphasize real workflow scenarios rather than generic lectures, paired with supportive feedback. Fourth, to reduce guideline blur, organizations should translate post-pandemic policies into clear, unit-tailored standards and communicate changes consistently, minimizing informal “rule drift.” These implementation implications align with broader evidence that post-pandemic adherence is difficult to sustain without supportive systems and that compliance is shaped by both individual and organizational determinants (Mohamed et al., 2024).

From an academic contribution perspective, the study addresses a documented gap in the literature: much IPC compliance research is anchored in peak-pandemic conditions and may not reflect the stable determinant structure of routine post-pandemic practice. By foregrounding how determinants shift particularly norms, perceived control, fatigue, and policy ambiguity this research supports more accurate theory testing and more transferable intervention design for the post-pandemic era. The findings also add nuance to existing studies that quantify compliance and its associated factors by offering plausible mechanisms for why the same predictor (e.g., knowledge or training) may show variable effects depending on climate, workload, and the strength of informal norms.

In discussion with prior studies, the results converge with recent qualitative evidence that IPC behavior is influenced by internal professional factors and external contextual factors, and that sustaining IPC post-pandemic requires renewed attention to structural and social determinants rather than assuming crisis-era vigilance will persist. The observed intention–behavior gap and the prominence of workload and environment are consistent with broader post-pandemic concerns about sustaining hand hygiene and other precautions after pandemic-driven improvements (Hutami et al., 2025). The emphasis on safety climate and leadership is also consistent with studies linking patient safety climate to standard precaution adherence and exposure outcomes, supporting the argument that post-pandemic protocol behavior is a patient safety climate issue as much as it is an individual compliance issue. Finally, the role of fatigue and diminished discretionary effort resonates with emerging nursing research describing infection control–related fatigue and its relationship to disengagement, suggesting that sustainable compliance must be designed for human limits rather than idealized expectations.

Overall, the findings support the study’s novelty claim: determinants of health protocol behavior in the post-pandemic era are not a simple continuation of pandemic-era compliance drivers. Instead, they reflect a rebalanced system in which social norms, feasibility under routine workload, leadership climate, and the management of fatigue become central. This integrated interpretation answers the research questions, aligns with the study objective, and provides a coherent rationale for the theoretical, practical, and academic benefits (Mastuti et al., 2025). Theoretically, it refines how TPB, SCT, and ecological perspectives can be combined to explain sustained IPC behavior after crisis mandates fade. Practically, it identifies actionable levers norm reinforcement, workflow and resource redesign, skill and self-efficacy support, and clear policy translation to improve adherence without relying on emergency enforcement. Academically, it strengthens the evidence base for post-pandemic IPC by specifying mechanisms that can be tested, compared across facilities, and used to design interventions that remain effective in routine healthcare delivery.

CONCLUSION

This study concludes that nursing service quality in the Emergency Department (ED), assessed through a SERVQUAL lens, is a decisive and multi-dimensional driver of patient satisfaction, particularly in the post-pandemic period when ED crowding and complex patient flow remain common. The findings synthesized from the Results and Discussion indicate that patient satisfaction is shaped less by a single “good or bad” impression and more by how patients experience the ED as a sequence of service encounters triage, initial assessment, ongoing monitoring, pain relief, information exchange, and discharge or referral. When these encounters feel coherent, timely, and respectful, satisfaction increases even under constrained conditions; when they feel uncertain, inconsistent, or unresponsive, dissatisfaction becomes pronounced, regardless of clinical outcomes.

Across SERVQUAL dimensions, responsiveness emerged as the most influential determinant of satisfaction. Patients and families tended to interpret long waits as more acceptable when nurses provided timely updates, explained triage priorities, and responded visibly to requests. Conversely, per-

ceived silence no updates, delayed responses to call bells, or unclear next steps was frequently experienced as neglect, intensifying anxiety and dissatisfaction. This suggests that responsiveness in the ED is not only a matter of speed but also of communication behaviors that signal attentiveness. Post-pandemic conditions amplified this dimension because high patient volume and staff fatigue increased the likelihood of delayed feedback, making communication-based responsiveness a crucial “buffer” that protects satisfaction when time-based responsiveness is limited.

Reliability was the second dominant determinant and often operated through the consistency of information and follow-through on promised actions. Satisfaction declined when patients received conflicting explanations from different staff, when medication or procedures were delayed without clarification, or when reassessment intervals felt unpredictable. Reliability problems were rarely framed as purely technical failures; rather, they were understood as service breakdowns that undermined trust and created uncertainty. In contrast, when nurses demonstrated consistent monitoring routines, delivered on stated timelines (or transparently revised them), and coordinated clearly with physicians, patients perceived the service as dependable and professionally organized. The post-pandemic ED context made reliability more fragile because frequent handovers, shifting task priorities, and intermittent resource constraints increased the risk of discontinuities in service delivery.

Assurance contributed strongly to satisfaction through perceived competence, safety, and confidence in care. Patients reported higher satisfaction when nurses communicated with clarity, demonstrated clinical vigilance, and provided explanations that matched the patient’s level of understanding. Assurance was not limited to technical skill; it included the ability to convey calm, explain risks, and articulate what the team was doing and why. In the post-pandemic era, assurance carried added meaning because patients remain sensitive to infection risk and overall safety, especially in crowded ED environments. Where reassurance was supported by visible professional conduct appropriate clinical checks, clear documentation behaviors, and consistent procedural explanations patients experienced stronger trust and greater tolerance for delays.

Empathy functioned as a differentiator that transformed ED care from merely adequate to genuinely satisfactory. Empathy was perceived through respectful greeting, privacy protection, patient-centered explanations, and attention to pain, fear, and family concerns. Importantly, empathy did not require long interactions; patients emphasized small behaviors tone of voice, nonverbal attentiveness, and acknowledgment of discomfort as strong indicators of caring. However, empathy also appeared vulnerable to workload, fatigue, and the cognitive burden of rapid triage decisions. In practice, this means empathy is both a relational skill and an organizational outcome: staffing levels, teamwork, and workflow design either enable or erode empathic engagement.

Tangibles cleanliness, comfort, signage, privacy screens, and the visible orderliness of the ED shaped satisfaction by influencing perceived dignity and safety. Tangibles rarely compensated for low responsiveness or unreliable service, but they contributed to baseline trust and reduced distress, especially when patients had to wait. In crowded post-pandemic settings, limitations in space, noise control, and privacy were interpreted as service quality deficits even when clinical care was perceived as competent. Therefore, tangibles should be understood as a supportive dimension that strengthens satisfaction when paired with high-quality interaction and communication.

Taken together, the conclusion addresses the study’s central problem: variability in perceived ED nursing service quality that translates into uneven patient satisfaction. The study also clarifies the research gap by demonstrating that SERVQUAL is not merely an instrument for scoring service; it is a practical framework for explaining how patients interpret service quality in real time, particularly in high-pressure ED contexts. The novelty of this work lies in its qualitative explanation of *why* certain SERVQUAL dimensions especially responsiveness and reliability carry disproportionate weight in post-pandemic ED experiences, and how communication behaviors can protect satisfaction even when structural constraints cannot be immediately eliminated.

The study further concludes that service quality improvements should prioritize (1) structured, real-time communication practices to strengthen responsiveness, (2) continuity mechanisms and standardized updates to improve reliability, (3) competence signaling and clear explanations to reinforce

assurance, (4) workload-sensitive strategies that preserve empathy, and (5) targeted environment-of-care improvements to strengthen tangibles. Overall, patient satisfaction in the ED is most effectively improved through integrated interventions that combine interpersonal nursing behaviors with operational redesign, rather than relying on infrastructure changes or training alone.

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