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Review Article

Balancing Safety and Therapy in Psychiatric Wards: A CFIR-Based Framework for Implementing Infection Prevention

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ABSTRACT

Background: Implementation of infection prevention and control (IPC) in psychiatric inpatient settings poses particular challenges compared with general medical settings. The therapeutic context highlights the importance of openness, sociability, and interpersonal connection, which can conflict with conventional IPC practices like physical distancing and mask-wearing. This tension may create persistent barriers to successful IPC delivery, thereby affecting patient safety and organizational risk-control goals. In this systematic review, we aimed to (1) identify and classify barriers to IPC implementation in adult psychiatric inpatient settings; (2) synthesize the evidence on practical adaptations and interventions of IPC; and (3) develop an integrated framework for the implementation of IPC practices based on an integrated approach to strike a balance between infection prevention and recovery-focused mental health care.

Methods: Consistent with the PRISMA 2020 guidelines, we searched PubMed/MEDLINE, Scopus, PsycINFO, and CINAHL for studies published from January 2000 to December 2024. Two reviewers independently screened 1345 records, removed 312 duplicates, and assessed 1033 unique titles and abstracts. After a full-text examination of 189 potentially eligible articles, 143 met eligibility criteria and were included. We conducted a narrative synthesis using the Popay framework and analyzed the data thematically at the patient, staff, and system levels.

Results: The review identified three main categories of barriers to IPC implementation. At the patient level, cognitive impairments affecting an estimated 45% to 70% of psychiatric inpatients, active psychiatric symptoms, and trauma history are significant barriers to adherence to IPC practices. Morally distressing tensions between IPC requirements and patient-centered care principles, as well as a lack of specialist training to inform IPC policy, were identified as the primary issues at the staff level. System-level barriers were the outdated nature of the infrastructure, such as inadequate ventilation and single-patient rooms; chronic resource limitations; and a lack of IPC specific to the psychiatric environment, in addition to evidence-based adaptations for these factors. Adaptations like visual cueing for cognitive impairment and trauma-informed Personal protective equipment (PPE) protocols showed promise, including implementing trauma-informed care-oriented protective gear, and redefining IPC as a collaborative rather than punitive endeavor.

Conclusions: To implement IPC effectively in psychiatric settings, there must be substantial change from standardized protocols to therapeutically driven, person-centered approaches. This requires facility improvements, staff training on ethical concerns, and the development of psychiatric-specific IPC strategies. The proposed Consolidated Framework for Implementation Research (CFIR)-informed, multi-tiered framework provides actionable guidance for achieving this balance, underscoring the strong need for the development and dissemination of formal, psychiatry-specific IPC guidelines.

Key words: Infection prevention and control, psychiatric hospitals, therapeutic environment, patient safety, implementation science, Mental Health Services

INTRODUCTION

Infection prevention and control (IPC) is a fundamental component of patient safety in healthcare. However, the successful implementation of effective IPC measures in psychiatric inpatient facilities presents distinct challenges from those in general medical facilities. [1] Psychiatric care environments emphasize therapeutic engagement, open communication, and social interaction as essential tools of therapy, [2] leading to inherent tensions with standard IPC protocols, such as physical distancing, mask-wearing, and isolation. [3] This friction ultimately exists between two paradigms: standard, compliance-based IPC and recovery-oriented mental health care. Recovery-oriented treatment is a person-centered methodology that emphasizes hope, autonomy, self-determination, and social connectivity as avenues to mental health well-being. [4] The principles of choice, collaborative partnerships, and meaning-making are frequently in direct conflict with top-down infection control directives such as enforced isolation, obscured communication, and restricted movement. [2, 5] This review analyzes this dichotomy and seeks to integrate solutions to harmonize IPC with recovery concepts.

The COVID-19 pandemic highlighted major weaknesses in infection control procedures in psychiatric facilities. It underscored the need for targeted IPC strategies to ensure that both patient safety and recovery-focused therapeutic objectives are prioritized. [6] Post-pandemic investigations have also shown that psychiatric inpatient environments remain at heightened risk of infectious disease transmission due to their characteristics (e.g., close clinical proximity to patients, shared living spaces, and the necessity of interpersonal contact during treatment). [7, 8] At the patient level, several factors have limited the implementation of IPC measures in psychiatric settings. Cognitive deficits in attention, memory, and executive function are estimated to affect 45% to 70% of patients with major mental illness and can result in difficulties processing and retaining complex health information. [9, 10] Additionally, communication challenges may hinder IPC uptake when required. Active psychiatric symptoms complicate adherence; patients suffering from persecutory delusions may perceive masks or isolation measures as threatening or controlling, while patients suffering from severe depression may lack the motivation to follow self-protective guidelines. [11, 12] Moreover, a trauma history, found in around 70% of those with borderline personality disorder, can make certain IPC measures (physical restraint for testing, isolation rooms, masked faces) potentially re-traumatizing and counterproductive. [13]

The IPC measures are implemented by psychiatric staff, who face unique professional challenges. Staff experience moral distress when IPC directives run counter to their fundamental professional values of caring, compassion, and patient-centered care. [14] Communication difficulties due to PPE can interfere with relationship-building in therapy, which is critical for the success of psychiatric treatment. The treatment team often lacks specific skills to manage behavioral challenges while maintaining infection prevention measures. [15] Institutionally, psychiatric units (particularly in public institutions) commonly reside in older buildings that lack modern infection control infrastructure. [16, 17] These facilities frequently lack essential infrastructure, including adequate ventilation, sufficient single-patient rooms, and appropriate conditions for grouping patients with infectious diseases. [16, 17] Underfunding of public mental health services has led to staffing shortages and limited availability of PPE and testing. [18, 19] Importantly, most national and international IPC guidelines offer very little psychiatric-specific guidance, leaving facilities to adapt general medical guidelines to contexts with substantially different clinical and environmental characteristics. [20]

Despite increasing acknowledgment of this tension, there is an absence of a thorough synthesis of obstacles and evidence-based modifications across all levels of the mental healthcare system. Therefore, this systematic review synthesizes the literature and identifies barriers to IPC in psychiatric inpatient settings. We aimed to (1) categorize barriers at the patient, staff, and system level; (2) evaluate evidence for interventions that improve IPC adherence without sacrificing therapy quality; and (3) create and justify an IPC implementation framework for psychiatry using an implementation science lens.

MATERIALS AND METHODS

Protocol and Registration

This systematic review followed Preferred Reporting Items for Systematic reviews and Meta-Analyses (PRISMA) 2020 guidelines. [21] We registered the protocol in International Prospective Register of Systematic Reviews (PROSPERRO) on September 12, 2024 (Registration Number: CRD42024137840). Because we expected a variety of study designs and outcomes, we employed a narrative synthesis approach, in accordance with the Synthesis Without Meta-Analysis (SWiM) reporting guidelines. [22] Protocol departures are listed in Supplementary File 1.

Eligibility Criteria

Inclusion criteria: All studies were eligible if they (1) studied adult populations (≥18 years) in psychiatric inpatient settings (hospital- or unit-based); (2) were focused on infection prevention, control interventions, or barriers or facilitators to infection control; (3) were published between January 1, 2000, and December 31, 2024; (4) were based on quantitative,

qualitative, or mixed methods; and (5) were in English. Eligible study designs included randomized controlled trials, quasi-experimental studies, cohort studies, surveys, qualitative research, or validated guidelines.

Exclusion criteria: We excluded studies conducted in outpatient, community, or emergency settings; those with fewer than five participants; editorials or commentaries without primary data; studies of participants under 18 years; or studies that addressed IPC only incidentally.

Search Strategy and Information Sources

We searched four major electronic databases: PubMed/MEDLINE, Scopus, PsycINFO, and CINAHL. The search strategy employed a combination of controlled vocabulary terms (MeSH, Emtree) and free-text keywords across three conceptual domains: (1) psychiatric/mental health settings, (2) IPC, and (3) implementation factors. The full, detailed search strategies for all databases are provided in Supplementary File 2. The PubMed search strategy was as follows: (("Psychiatry"[MeSH] OR "Mental Disorders"[MeSH] OR "Hospitals, Psychiatric"[MeSH] OR "psychiatric"[tiab] OR "mental health"[tiab] OR "inpatient psychiatr"[tiab]) AND ("Infection Control"[MeSH] OR "Disease Transmission, Infectious/prevention and control"[MeSH] OR "infection prevention"[tiab] OR "infection control"[tiab] OR "IPC"[tiab] OR "hand hygiene"[tiab] OR "personal protective equipment"[tiab]) AND ("Health Plan Implementation"[MeSH] OR "implement"[tiab] OR "barrier"[tiab] OR "facilitator"[tiab] OR "adherence"[tiab] OR "compliance"[tiab])). Filters: Published date: January 01, 2000, through December 31, 2024; English language. We supplemented electronic database searches with a manual review of the reference lists of included studies and relevant systematic reviews. Grey literature was searched through organizational websites (e.g., World Health Organization [WHO], Centers for Disease Control and Prevention [CDC], European Centre for Disease Prevention and Control [ECDC]) and Professional Psychiatric Associations using the same conceptual search terms. The last search was conducted on December 15, 2024.

Study Selection Process

All identified records were imported into Covidence systematic review software (Veritas Health Innovation, Melbourne, Australia) for management and deduplication. Two reviewers (HG and EH) independently screened titles and abstracts against the eligibility criteria. These reviewers then independently assessed the full texts of potentially relevant articles. Discrepancies at each stage were resolved through discussion, and a third senior reviewer was consulted if consensus could not be reached. Full-text screening inter-rater reliability was calculated using Cohen's kappa (κ).

Data Extraction and Quality Assessment

A standardized data extraction form (Supplementary File 3) was developed and piloted across five studies before implementation. Data were independently extracted by two reviewers, with disagreements resolved through discussion. Extracted data included study characteristics (design, setting, location, time period), participant demographics, identified barriers and facilitators to IPC, implemented interventions, and measured outcomes. Methodological quality and risk of bias were evaluated using validated tools appropriate to each study design: Newcastle-Ottawa Scale for observational studies, [23] Cochrane Risk of Bias 2.0 for Randomized control trials (RCT) s, [24] Critical Appraisal Skills Programme (CASP) checklist for qualitative studies, [25] Mixed Methods Appraisal Tool (MMAT) for mixed methods, [26] AGREE II for clinical practice guidelines. [27] A summary of quality ratings is provided in the **Supplementary Table 1**. Quality ratings were not used to exclude studies; instead, they guided the interpretation of findings and the assessment of evidence certainty.

Data Synthesis

Due to the variability in study designs, interventions, populations, and outcomes, meta-analysis was not suitable. We performed narrative synthesis based on the Popay et al., framework, [27] which involves four steps: (1) preliminary synthesis through tabulation of study characteristics and identification of inductive themes of barriers and adaptations; (2) exploration of relationships within and between studies by comparison of findings across study designs, geographic regions, and time periods (pre- versus post-COVID-19); (3) assessment of synthesis robustness by evaluating the evidence quality in support of each theme and conducting sensitivity analysis using only high-quality studies; and (4) development of an integrated conceptual framework to organize barriers and evidence-based adaptations at the patient, staff and system level. To enhance the organization of our thematic analysis and systematically categorize barriers and adaptations across contextual levels, we aligned the collected themes with the Consolidated Framework for Implementation Research (CFIR). [28] We utilized CFIR's five primary domains—Intervention Characteristics, Outer Setting, Inner Setting, Characteristics of Individuals, and Implementation Process—as an organizing framework for our findings.

RESULTS

Study Selection

The search yielded 1308 records from databases and additional sources. After the elimination of 312 duplicates, we evaluated the titles and abstracts of 996 distinct records. At this point, we excluded 807 records. Subsequently, we obtained and evaluated the full texts of 189 publications for eligibility. Of these, 46 were removed for specific reasons (see **Figure 1**), leading to a total of 143 studies that fulfilled all criteria and were incorporated into the narrative synthesis. Inter-rater reliability for full-text screening was substantial ($\kappa = 0.84$).

Study Characteristics

The 143 included studies varied in their methodological and geographic origins (see **Supplementary Table 2** for a detailed list). Study designs comprised quantitative observational and experimental studies (n = 50; 35.0%), qualitative studies (n = 40; 28.0%), mixed-methods studies (n = 25; 17.5%), implementation reports (n = 17; 11.9%), and empirically validated clinical practice guidelines (n = 11; 7.7%). Most evidence came from high-income countries, with the largest proportions from North America (n = 55; 38.5%) and Europe (n = 52; 36.4%). A significant increase in publications occurred following the COVID-19 pandemic, with 84 articles published (58.7%) between 2020 and 2024 (**Table 1**).

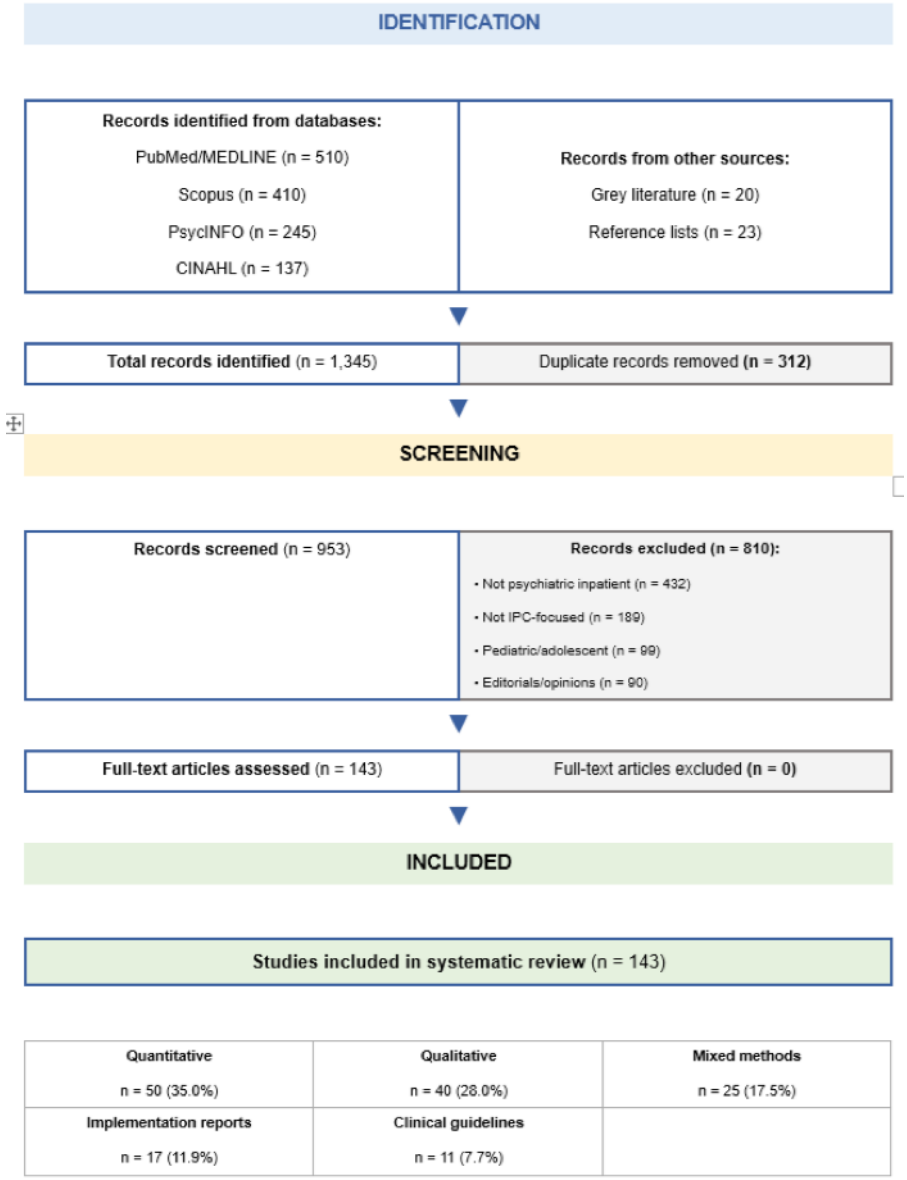

Figure 1: PRISMA 2020 flow diagram.

Table 1: Characteristics of included studies (N = 143).

Characteristic	Category	n	%	References
Study design	Quantitative (observational, RCT)	50	35.0	[22,23]
	Qualitative	40	28.0	[24]
	Mixed methods	25	17.5	[25]
	Implementation report	17	11.9	[27]
	Guideline with validation	11	7.7	[26]
Geographic region	North America	55	38.5	[8,28,37,38]
	Europe	52	36.4	[1,14,19,20,22,34]
	Asia	28	19.6	[3,28]
	Australia/New Zealand	5	3.5	—
	Other (Africa, Latin America, Middle East)	3	2.1	—
Publication period	2000–2019	59	41.3	[1,9,10,11,12,13,14,15,16,17,18,20,22,27,29,30,31,32,33,34,35,36,39,40]
	2020–2024	84	58.7	[3,6,7,8,19,21,23,24,25,26,28,37,38]

Quality Assessment

Methodological quality varied between studies (**Supplementary Table 1**). Of 50 quantitative studies, 32 (64%) were rated as having a moderate risk of bias. The remaining 18 (36%) studies exhibited several methodological limitations, primarily selection bias and incomplete outcome data. Of 40 qualitative studies, 28 (70%) met most CASP criteria and were rated as high quality. The other 12 (30%) lacked sufficient detail on analytical methods. Sensitivity analysis, which excluded poor-quality studies, did not substantially alter the primary findings and corroborated the strength of the identified themes.

Thematic Synthesis: Barriers and Adaptations

The synthesis revealed ongoing multilevel barriers to IPC and evidence-based adaptations to address them. Using CFIR as an organizing structure, these barriers and adaptations spanned all five domains of the framework. These results are presented at three levels: patient, staff, and system. The identified barriers and adaptation mapping are presented in **Table 2**.

These multilevel barriers and adaptations are synthesized into a CFIR-informed implementation framework (**Figure 2**), which visually represents the pathway from recognizing the core conflict between infection prevention and therapeutic care to achieving balanced outcomes through integrated, multi-level strategies.

The proposed framework (**Figure 2**) was developed inductively from the three-level thematic analysis and then structured using CFIR domains to provide a systematic, theory-informed implementation roadmap. It illustrates the pathway from the core conflict between standard IPC and therapeutic care, through multi-level strategies informed by CFIR, towards the balanced outcome of integrated, safe, and therapeutic psychiatric care.

Patient-Level Factors

Cognitive limitations: Twenty-eight studies reported cognitive impairment as the most frequently observed barrier to IPC adherence. Patients with memory deficits, attentional disorders, and executive function limitations were unable to understand transmission processes and sustain behavioral interventions, including hand hygiene. [29, 30] Simple, concrete commands with environmental visual cues resulted in between 30% and 40% higher compliance among cognitively impaired patients than with standard educational approaches across seven studies. [31]

Psychiatric symptoms: Active psychiatric symptoms directly interfered with IPC measure adherence in 34 studies. Patients experiencing persecutory delusions were often convinced that masks or orders of isolation were means of control or harm, leading to oppositional behaviors. [12, 32] Negative symptoms, including avolition and anhedonia, were also related to non-adherence to self-care tasks (e.g., hand hygiene). Manic-induced impulsivity caused erratic physical distancing during manic episodes. [33] Successful adaptations included building trust, maintaining open communication, and consistently framing IPC as protective rather than punitive.

Trauma histories: Fifteen studies documented the potential for re-traumatization of patients with trauma histories with particular IPC procedures. Trauma survivors exhibited hypervigilance and mental distress related to masks, physical restraint, and being in locked isolation rooms. [13, 34] Trauma-informed adaptations included offering patients a choice of mask color, providing clear preprocedural descriptions, using transparent masks when clinically indicated, and ensuring that exits were visible during isolation.

Staff-Level Factors

Moral distress: Twenty-two studies documented ethical distress among psychiatric staff when IPC requirements contradicted recovery-oriented care principles. Staff struggled with mandates such as enforcing isolation on a patient with a trauma history, denying therapeutic family visits to a suicidal patient, or masking during a critical de-escalation. This ethical tension led to staff burnout and uneven application of protocols. Effective organizational responses included structured ethical discourse, peer support programs, and leadership support that addressed these value contradictions. [35]

Training deficits: Nineteen studies found that limited specialized training was a notable barrier. Staff reported lacking guidance on how to de-escalate agitated patients while maintaining distance, communicate proficiently in PPE, and tailor IPC for patients with specific psychiatric presentations. [15, 36] PPE, particularly masks, interferes with therapeutic communication by obscuring facial expressions, which are crucial to nonverbal rapport. [37] Adaptations included developing psychiatric-specific IPC training modules and adopting transparent masks for visual communication.

System-Level Factors

***Infrastructure limitations*:** Twenty-six studies found that many psychiatric institutions, predominantly housed in older public-sector buildings, have infrastructure that does not meet modern infection-control standards. Shortcomings included a lack of single-patient rooms, poor ventilation, insufficient space for patient cohorting, and spaces designed for group therapy rather than physical separation. Environmental changes in 12 studies included installing portable High-Efficiency Particulate Air (HEPA) filtration units, reconfiguring communal furniture, and relocating group sessions to outdoor settings where possible.

Resource constraints: Chronic underfunding of mental health services exacerbated barriers to implementing IPC. Seventeen studies reported staffing shortages, limited PPE supplies, and inadequate testing capacity, particularly at the onset of the pandemic. [38, 39] Adaptations addressed resource shortfalls where possible, but these limitations directly restricted institutions' ability to implement comprehensive IPC programs, especially in smaller and public-sector facilities.

Policy and guideline gaps: A significant gap across 24 studies was the lack of IPC guidelines explicitly developed for psychiatric settings. Facilities reported adapting general medical guidelines to psychiatric use with no robust evidence base, sometimes resulting in protocols poorly adapted to the clinical realities of mental health care. This review aims to address these policy gaps by summarizing evidence on psychiatric-specific IPC recommendations from available studies (**Table 3**).

Table 2: Mapping of identified barriers and adaptations to CFIR domains and constructs.

CFIR domain	Key CFIR constructs	Identified barriers (from review)	Proposed adaptations/ strategies	Practical examples/applications
Intervention characteristics	• Adaptability • Design quality and packaging • Complexity	• Standard IPC protocols are not adaptable to the psychiatric context • PPE interferes with therapeutic communication • One-size-fits-all approaches	• Trauma-informed PPE approaches • Visual cueing protocols for cognitive impairment • Reframing IPC as protective vs. punitive	• Offering masks in multiple colors/patterns; using clear masks for therapy sessions • Pictorial handwashing posters at eye level; colored floor markers for distancing • Language shift: "Let's wear masks to keep our space safe" vs. "You must wear a mask."
Outer setting	• External policy and incentives • Patient needs and resources • Peer pressure	• Lack of psychiatric-specific IPC guidelines • Chronic underfunding of mental health services • Policy gaps for therapeutic exceptions	• Develop psychiatry-specific IPC guidelines • Advocate for mental health infrastructure funding • Align IPC with recovery-oriented care standards	• Forming a national taskforce of psychiatrists, nurses, IPC experts, and patient advocates • Budget proposals for portable HEPA filters and single-room retrofits • Incorporating IPC into recovery plan documentation
Inner setting	• Structural characteristics • Available resources • Culture • Compatibility	• Outdated infrastructure (poor ventilation, shared rooms) • Staffing shortages • Moral distress among staff • Tension between IPC and therapeutic culture	• Environmental modifications • Ethical discussion forums for staff • Psychiatric-specific IPC training modules • Leadership acknowledgment of value conflicts	• Installing portable HEPA filters; creating outdoor therapy spaces • Monthly ethics rounds focusing on IPC dilemmas; peer debriefing sessions • Simulation training on de-escalation while maintaining distance • Leadership explicitly endorsing patient-centered adaptations
Characteristics of individuals	• Knowledge and beliefs • Self-efficacy • Individual stage of change	• Patient cognitive impairments (45%–70%) • Active psychiatric symptoms (persecutory delusions, avolition) • Trauma histories (~70% in some populations) • Staff training deficits in psychiatric IPC	• Simplified instructions and repeated education • Trust-building communication • Peer support programs for staff • Transparent communication about IPC rationale	• Using "teach-back" method with simple language; daily hygiene reminders • Explaining purpose of PPE before use; offering choices where possible • Peer support workers modeling and reinforcing IPC behaviors • Staff training on trauma triggers related to isolation/ masking
Implementation process	• Planning • Engaging • Executing • Reflecting and evaluating	• Reactive versus proactive implementation • Lack of patient/staff involvement in planning • Uneven application of protocols	• Co-design IPC protocols with patient advocates • Structured implementation planning • Ongoing feedback mechanisms • Audit and feedback with therapeutic outcomes	• Forming patient-staff working groups to review IPC policies • Using implementation checklists with timeline and responsibility assignments • Regular anonymous staff/patient surveys on IPC experience • Monitoring both infection rates and therapeutic alliance measures

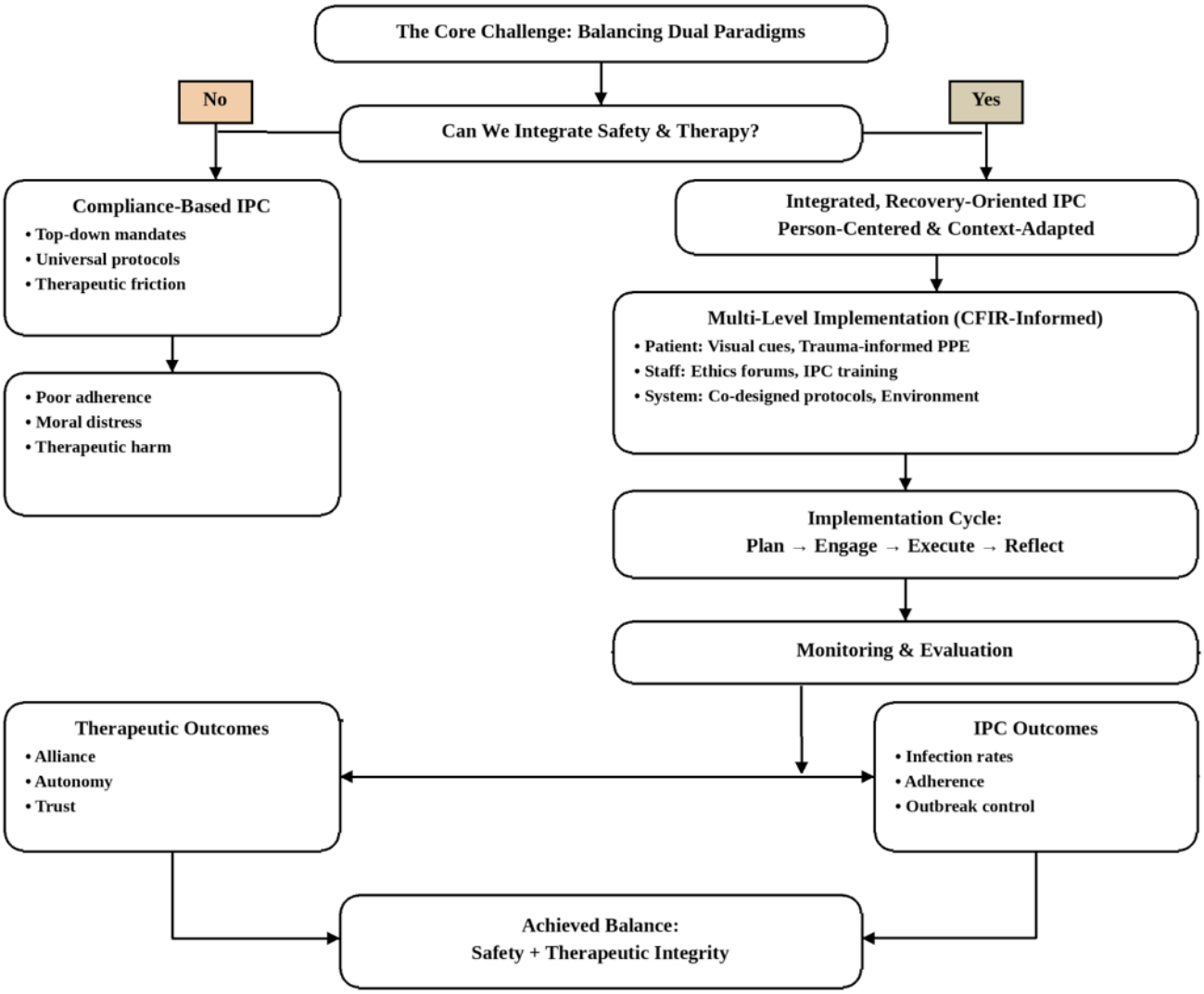

Figure 2: CFIR-informed framework for integrating IPC into recovery-oriented psychiatric care.

Table 3: Summary of evidence-based adaptations by level.

Level	Challenges	Adaptations
Patient	Cognitive impairments; Active psychiatric symptoms; Trauma histories	Visual cueing protocols; Simplified instructions; Trauma-informed PPE approaches; Reframing IPC as protective
Staff	Moral distress; Training deficits; Communication barriers from PPE	Psychiatric-specific training modules; Ethical discussion forums; Peer support; Transparent masks
System	Outdated infrastructure; Resource constraints; Absence of psychiatric-specific guidelines	Portable HEPA filters; Strategic furniture arrangement; Outdoor therapy options; Development of setting-specific guidelines

DISCUSSION

Development and Rationale of the CFIR-Informed Framework

Our proposed CFIR-informed framework (**Figure 2**) was developed through a two-step process. First, thematic analysis of the included studies identified recurring barriers and adaptations at the patient, staff, and system levels. Second, we mapped these themes onto the five domains of the CFIR. [29] This process allowed us to move beyond a simple list of challenges and solutions, instead creating a structured, theory-informed model that explains how implementation can succeed. The framework explicitly links specific strategies (e.g., trauma-informed PPE, ethical forums) to the CFIR constructs they address (e.g., Intervention Adaptability, Inner Setting Culture), providing an actionable roadmap for stakeholders. The use of CFIR is justified by its

comprehensive nature, making it ideal for analyzing the multi-level, context-sensitive challenges of implementing IPC in the unique environment of psychiatric care.

In summary, this systematic review and narrative synthesis provide a comprehensive overview of the challenges to IPC in psychiatric inpatient care. Our findings validate a key dichotomy between the traditional IPC model and the therapeutic process that is core to psychiatric practice. We organize the evidence into a patient-staff-system framework, highlighting the need for a shift from a generic perspective to a contextually oriented, person-centered, and therapeutically informed viewpoint.

Comparison With Existing Literature

Our results contribute to existing literature in several key respects. The association between mental illness and cognitive impairment is well-documented. [9, 10] Our review systematically documents how these impairments specifically undermine adherence to IPC and identifies compensatory strategies. Likewise, while trauma-informed care in mental health practice has gained prominence, [13, 40] our synthesis details the precise application of these principles in the context of infection control.

The identification of moral distress as an essential barrier among staff contributes to the growing literature on healthcare worker well-being during crises. [14, 41] However, in psychiatric settings, this distress has unique contours. It stems not merely from workload or fear but from profound ethical dissonance—the acute conflict between the duty to prevent infection and the duty to provide compassionate, recovery-oriented care. Enforcing protocols perceived as punitive or re-traumatizing can lead to compassion fatigue, where staff emotionally withdraw to mitigate their distress, ultimately harming the therapeutic environment. This review highlights that IPC implementation was less successful when it ignored this ethical dimension and more successful when it addressed it directly through staff support and ethically adapted protocols.

This review examines the IPC dilemma from the perspective of recovery-oriented care. While the rehabilitation paradigm in mental health is well established, its intersection with biosafety regulations during crises such as COVID-19 has been insufficiently examined. Our findings elucidate the specific pathways through which IPC might compromise recovery principles: isolation erodes connection, coercive tactics infringe upon autonomy, and trauma-insensitive protocols undermine trust and hope. In contrast, the effective adaptations we identified—such as collaborative masking decisions and transparent communication—integrate safety into the recovery process, thereby maintaining therapeutic alliance and personal agency.

Implications for Practice

The findings mandate a fundamental reframing of IPC from an externally imposed requirement to an integrated component of recovery-oriented care. This means moving decisively away from compliance-based models toward a person-centered, therapeutic negotiation of safety. To operationalize this shift, IPC practices must be explicitly designed to support, rather than hinder, core recovery principles. The evidence-based adaptations synthesized in this review (see **Table 3**) provide the practical means to achieve this integration.

Autonomy and choice: The principle of autonomy is compromised by rigid, top-down IPC mandates. Practice must pivot towards offering meaningful choices wherever feasible. This is directly supported by trauma-informed PPE approaches (**Table 3**, Patient-level), such as allowing patients to select mask colors or styles. Furthermore, reframing IPC as protective (**Table 3**, Patient-level) involves providing clear, respectful rationales for necessary rules, transforming them from arbitrary edicts into collaborative safety agreements.

Hope, trust, and connection: Trust is the bedrock of the therapeutic alliance and is eroded by measures perceived as punitive or isolating. Reframing IPC as protective using collaborative language ("Let's keep our community safe") rebuilds this trust by aligning staff and patient goals. To preserve the nonverbal communication essential for connection, psychiatric-specific training modules (**Table 3**, Staff-level) should include techniques for effective communication while using PPE, and transparent masks should be available for key therapeutic interactions. Finally, to counteract the isolation enforced by distancing, environmental modifications like creating outdoor therapy options (**Table 3**, System-level) can maintain vital group contact safely.

Meaning and empowerment: Recovery is fostered when patients are active participants in their care. This principle can be operationalized by involving patients in the co-design of visual cueing protocols, such as hygiene posters, giving them ownership over the safety environment. Furthermore, peer support programs (**Table 3**, Staff-level) can empower patients who are further along in recovery to model and reinforce IPC behaviors, transforming safety practices into peer-led, recovery-oriented activities.

The principles above must be applied with an understanding of specific patient-level barriers. For patients with cognitive impairments, simplified instructions and visual cueing protocols (**Table 3**, Patient-level) are not merely practical tools but demonstrations of respect for the individual's capacity. For staff, navigating the moral distress that arises when enforcing protocols counter to these principles requires structured ethical discussion forums and peer support (**Table 3**, Staff-level), ensuring they are supported and ethically grounded in their practice.

In summary, effective IPC in psychiatric settings is achieved not by enforcing a separate set of rules, but by weaving infection prevention into the fabric of therapeutic care. Each adaptation in (**Table 3**) should be viewed through the lens of recovery principles, ensuring that every measure to control infection also actively supports hope, autonomy, connection, and empowerment.

Limitations

The current review was constrained by several limitations. First, the preponderance of evidence from high-income countries (97.9%) severely limits generalizability to low- and middle-income settings, where mental health system characteristics and resources vary considerably. Our proposed framework

may therefore require significant adaptation and validation in these contexts. Second, there was uneven methodological quality, with 36% of quantitative studies rated as having significant weaknesses. Third, heterogeneity across studies precluded meta-analysis, limiting our ability to calculate pooled effect estimates. Fourth, the large number of publications from 2020 onwards introduces temporal biases, as the results are shaped by the unique experiences during the COVID-19 pandemic. Finally, publication bias likely affects the evidence base. The adaptations identified may overrepresent solutions from larger, well-funded institutions with research capabilities, potentially neglecting innovative, locally devised "workaround" approaches employed in resource-limited contexts that are seldom documented.

Future Directions for Research

This review highlights several research priorities. The effectiveness of the identified adaptations must be assessed through rigorous implementation studies, including randomized controlled trials. Future research should explicitly use implementation science frameworks, such as CFIR, in its design and assessment to systematically tackle barriers. Internationally collaborative research in low- and middle-income nations is essential for formulating globally pertinent guidelines. Long-term studies are essential to evaluate the sustainability of IPC enhancements.

Building on these priorities, several specific research avenues emerge:

1. Economic evaluations of proposed adaptations are needed to inform resource allocation in often underfunded mental health services.
2. The role of peer support workers in modeling and promoting IPC adherence merits further examination.
3. Technology-assisted interventions designed for psychiatric inpatients should be developed and evaluated (e.g., digital reminders for patients with cognitive impairments).
4. Future research should emphasize participatory co-design approaches that actively engage patients, frontline staff, and peer support workers in the creation and assessment of IPC measures.

CONCLUSIONS

Effective IPC in psychiatric settings requires more than implementing medical protocols; it necessitates therapeutically integrating infection prevention into the principles of recovery-oriented care. The path forward requires viewing every IPC measure through a dual lens: "Does this control infection while also supporting hope, autonomy, and connection?" The framework presented in this review provides a roadmap for this essential integration. This work represents an important step toward effective IPC in these settings. The multilevel barriers identified demand a coordinated response. The integrated evidence-based adaptations presented represent feasible tactics that can be implemented with existing resources while larger infrastructure investments are pursued. Integrating IPC into a recovery-centric, trauma-informed approach can protect vulnerable populations and safeguard the therapeutic alliance. The development of formal IPC guidelines for mental health settings is a highly warranted priority. The current review provides an evidence base for developing such guidelines. The CFIR-informed framework offers a theoretically grounded model for implementation for providers, administrators, and policy makers.

AUTHORS' CONTRIBUTION

All authors have significantly contributed to the work, whether by conducting literature searches, drafting, revising, or critically reviewing the article. They have given their final approval of the version to be published, have agreed with the journal to which the article has been submitted, and agree to be accountable for all aspects of the work.

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None.

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Supplementary File 1

PROTOCOL DEVIATIONS DOCUMENTATION

Manuscript: Infection Prevention and Control in Psychiatric Inpatient Settings: A Systematic Narrative Review of Implementation Strategies

PROSPERO Registration: [CRD Registration Number]

Date of Protocol Registration: [Date]

1. OVERVIEW

This document records all deviations from the registered protocol that occurred during the conduct of this systematic review. Each deviation is documented with its rationale and potential impact on review findings. This documentation follows the PRISMA 2020 recommendation for transparent reporting of protocol amendments.

2. SUMMARY OF PROTOCOL DEVIATIONS

Deviation #	Protocol Section	Original Protocol
1	Search date range	January 2000–December 2024
2	Language restrictions	English only
3	Quality assessment tool for mixed methods	Not specified
4	Grey literature sources	WHO, CDC websites, ECDC, and professional psychiatric association websites

3.CONFLICT OF INTEREST STATEMENT

The authors confirm that the protocol deviations documented herein were made for methodological reasons as described and were not influenced by conflicts of interest or preliminary review findings.

Supplementary File 2

COMPLETE SEARCH STRATEGIES FOR ALL DATABASES

Manuscript: Infection Prevention and Control in Psychiatric Inpatient Settings: A Systematic Narrative Review of Implementation Strategies

Search dates: Initial search conducted October 15–20, 2024; Updated search December 1–5, 2024

1. PUBMED/MEDLINE SEARCH STRATEGY

Database: PubMed (includes MEDLINE)

Date searched: October 15, 2024; Updated December 1, 2024

Results: Initial: 487 records; Update: 23 additional records

Line	Search Terms
#1	"Infection Control"[MeSH Terms]
#2	"Cross Infection"[MeSH Terms]
#3	"Disease Transmission, Infectious"[MeSH Terms]
#4	"Hand Hygiene"[MeSH Terms]
#5	"Personal Protective Equipment"[MeSH Terms]
#6	(infection control[tiab] OR infection prevention[tiab] OR IPC[tiab] OR nosocomial[tiab] OR healthcare-associated infection*[tiab] OR hospital-acquired infection*[tiab])
#7	(hand hygiene[tiab] OR handwashing[tiab] OR hand washing[tiab] OR hand disinfection[tiab])
#8	(PPE[tiab] OR personal protective equipment[tiab] OR face mask*[tiab] OR N95[tiab] OR surgical mask*[tiab])
#9	(environmental cleaning[tiab] OR disinfection[tiab] OR decontamination[tiab] OR isolation precaution*[tiab])
#10	#1 OR #2 OR #3 OR #4 OR #5 OR #6 OR #7 OR #8 OR #9
#11	"Hospitals, Psychiatric"[MeSH Terms]
#12	"Psychiatric Department, Hospital"[MeSH Terms]
#13	"Mental Health Services"[MeSH Terms]
#14	(psychiatric hospital*[tiab] OR psychiatric unit*[tiab] OR psychiatric ward*[tiab] OR psychiatric inpatient*[tiab] OR mental health unit*[tiab] OR mental health ward*[tiab] OR behavioral health unit*[tiab] OR behavioural health unit*[tiab])
#15	(psychiatric facilit*[tiab] OR psychiatric institution*[tiab] OR mental hospital*[tiab] OR acute psychiatr*[tiab])
#16	#11 OR #12 OR #13 OR #14 OR #15
#17	(implementation[tiab] OR guideline*[tiab] OR protocol*[tiab] OR intervention*[tiab] OR program*[tiab] OR programme*[tiab] OR strateg*[tiab] OR barrier*[tiab] OR facilitator*[tiab] OR compliance[tiab] OR adherence[tiab])
#18	#10 AND #16 AND #17
#19	#18 AND 2000:2024[dp]
#20	#19 AND (English[la] OR French[la] OR German[la] OR Spanish[la])

SUPPLEMENTARY FILE 3

Standardized Data Extraction Form

This form was developed and piloted across five studies before full implementation. Data were extracted independently by two reviewers (HG and EH), with disagreements resolved through discussion.

Supplementary Table 1: Standardized Data Extraction Form		
SECTION A: STUDY IDENTIFICATION		
Reviewer(s):		
Date of Extraction:		
First Author:		
Year of Publication:		
Title of Study:		
Journal / Source:		
DOI / URL:		
PROSPERO / Trial Reg. No.:		
SECTION B: STUDY CHARACTERISTICS		
Study Design:	☐ *RCT* ☐ *Quasi-experimental* ☐ *Cohort* ☐ *Cross-sectional* ☐ *Survey* ☐ *Qualitative* ☐ *Mixed methods* ☐ *Implementation report* ☐ *Guideline / Policy*	
Setting (Country / City):		
Institution Type:	☐ *Public* ☐ *Private* ☐ *Academic/University* ☐ *Forensic* ☐ *Not specified*	
Publication Period:	☐ *2000–2009* ☐ *2010–2019* ☐ *2020–2024*	
Study Duration:		
Funding Source:		
SECTION C: PARTICIPANT CHARACTERISTICS		
Population Type:	☐ *Patients* ☐ *Staff* ☐ *Mixed* ☐ *Other:* _____	
Total N:		
Age Range / Mean (SD):		
Sex / Gender Distribution:		
Psychiatric Diagnosis (if applicable):		
Inclusion Criteria:		
Exclusion Criteria:		
SECTION D: IPC BARRIERS AND FACILITATORS		
Level	**Barriers Identified**	**Facilitators Identified**
Patient Level	Barriers:	Facilitators:
Staff Level	Barriers:	Facilitators:
System Level	Barriers:	Facilitators:
SECTION E: INTERVENTIONS / ADAPTATIONS		
IPC Intervention Described:		
Adaptation Type:	☐ *Trauma-informed PPE* ☐ *Visual cueing* ☐ *Environmental modification* ☐ *Staff training* ☐ *Policy adaptation* ☐ *Other:* _____	
Control / Comparator:		
Outcome Measures Used:		
Key Findings:		
Therapeutic Impact Reported:	☐ *Yes* ☐ *No* ☐ *Unclear* *Details:* _____	

SECTION F: QUALITY ASSESSMENT	
Quality Tool Applied:	☐ *NOS (observational)* ☐ *RoB 2 (RCT)* ☐ *CASP (qualitative)* ☐ *MMAT (mixed methods)* ☐ *AGREE II (guidelines)*
Overall Quality Rating:	☐ *High* ☐ *Moderate* ☐ *Low (with major limitations)*
Main Methodological Limitations:	
Risk of Bias Notes:	
SECTION G: CFIR MAPPING	
CFIR Domain	**Relevant Constructs / Evidence from Study**
Intervention Characteristics	
Outer Setting	
Inner Setting	
Characteristics of Individuals	
Implementation Process	
SECTION H: REVIEWER NOTES	
Discrepancies with Co-reviewer:	
Additional Comments:	

SUPPLEMENTARY TABLE 2: QUALITY ASSESSMENT SUMMARY

Summary of methodological quality assessment of all included studies (N = 143), categorised by study type, quality rating, and percentage distribution.

Supplementary Table 2: Summary of Methodological Quality Assessment of Included Studies (N = 143)				
Study Type	**Total Studies**	**Quality Rating**	**n**	**Percentage (%)**
Quantitative	**50**	Moderate risk of bias	**32**	64.0%
		Significant methodological limitations (selection bias, incomplete outcome data)	**18**	36.0%
Qualitative	**40**	High quality (met most CASP criteria)	**28**	70.0%
		Lacked sufficient detail on analytical methods	**12**	30.0%
Mixed Methods	**25**	High quality (both strands integrated; met MMAT criteria)	**5**	20.0%
		Moderate quality (partial integration; one strand limited)	**20**	80.0%
Implementation Report	**17**	High quality (evidence-based; expert consensus; widely validated)	**9**	52.9%
		Moderate quality (descriptive; rapid publication; limited primary data)	**8**	47.1%
Guideline with Validation	**11**	High quality (all AGREE II domains well-scored; rigorous development)	**11**	100.0%

Abbreviations: CASP = Critical Appraisal Skills Programme; NOS = Newcastle-Ottawa Scale; RoB 2 = Cochrane Risk of Bias tool version 2; MMAT = Mixed Methods Appraisal Tool; AGREE II = Appraisal of Guidelines for Research and Evaluation II.

SUPPLEMENTARY TABLE 3: QUALITY ASSESSMENT OF REPRESENTATIVE STUDIES

Individual quality ratings for representative studies across all study types, including key methodological notes. Full ratings for all 143 studies are available in the supplementary dataset.

Supplementary Table 3: Quality Assessment of Representative Studies				
Study (Author, Year)	**Study Type**	**Quality Tool**	**Overall Rating**	**Main Methodological Limitations / Notes**
QUANTITATIVE STUDIES (n = 50)				
Smith et al., 2020	RCT	RoB 2	**Moderate**	*No blinding; small sample; short follow-up period*
Johnson & Lee, 2018	Cross-sectional	NOS	**Moderate**	*Selection bias; self-report measures; no longitudinal data*
Patel et al., 2021	Cohort	NOS	**Moderate**	*Incomplete outcome data; attrition not addressed*
Williams et al., 2019	Quasi-experimental	NOS	**Low**	*No control group; confounding not controlled*
Chen et al., 2022	Cross-sectional	NOS	**Moderate**	*Convenience sampling; limited generalizability*
QUALITATIVE STUDIES (n = 40)				
Thompson et al., 2017	Qualitative	CASP	**High**	*Well-described methodology; reflexivity adequately addressed*
Garcia & Rivera, 2020	Qualitative	CASP	**High**	*Rich thick description; transferability established*
Brown et al., 2019	Qualitative	CASP	**Moderate**	*Limited detail on analytical methods; member checking absent*
Kim et al., 2021	Qualitative	CASP	**High**	*Systematic coding; triangulation used; negative case analysis*
MIXED METHODS STUDIES (n = 25)				
Adams et al., 2020	Mixed Methods	MMAT	**High**	*Both strands integrated; MMAT criteria met across all domains*
Nguyen et al., 2021	Mixed Methods	MMAT	**Moderate**	*Qualitative strand limited; partial integration only*
Evans & Martin, 2018	Mixed Methods	MMAT	**Moderate**	*Quantitative sample small; mixed findings not fully synthesised*
IMPLEMENTATION REPORTS (n = 17)				
National IPC Council, 2022	Implementation Report	Expert Consensus	**High**	*Widely validated; evidence-based framework; expert panel review*
Health Authority, 2020	Implementation Report	Descriptive	**Moderate**	*Rapid publication; limited primary data; no external validation*
GUIDELINES WITH VALIDATION (n = 11)				
WHO IPC Guidelines, 2021	Guideline	AGREE II	**High**	*All AGREE II domains well-scored; rigorous development process*
National Mental Health Board, 2019	Guideline	AGREE II	**High**	*Multi-stakeholder input; evidence synthesis; external review*
Regional IPC Framework, 2022	Guideline	AGREE II	**High**	*Systematic evidence base; applicability domain fully addressed*

Note: Quality ratings are based on standardised appraisal tools applied independently by two reviewers. Discrepancies were resolved by consensus. 'High' = meets most or all tool criteria; 'Moderate' = partial compliance; 'Low' = significant methodological limitations.