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REVIEW

Summary of the Best Evidence for Safety Management in Patients with Parkinson's Disease Accompanied by Behavioral and Psychiatric Symptoms: A Systematic Review

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Purpose: To retrieve, screen, and summarize the best evidence for the safety management of patients with Parkinson's disease (PD) accompanied by behavioral and psychiatric symptoms (BPS). Safety management in this context refers to the systematic process of identifying, assessing, and mitigating risks of harm (eg, falls, self-harm, medication adverse effects) to ensure the physical and psychological well-being of patients. This review aims to provide an evidence-based foundation for clinical healthcare professionals to implement standardized safety management.

Patients and Methods: A systematic search was conducted in domestic and international databases and websites for guidelines, expert consensuses, clinical decisions, evidence summaries, and systematic reviews related to the safety management of PD patients with BPS. The search period spanned from database inception to March 31, 2025, with no additional limits applied to the publication dates of the documents. Two researchers independently evaluated the quality of the literature, extracted and summarized the evidence, and rated the evidence level of the included documents.

Results: Twenty-one documents were ultimately included: 6 guidelines, 5 expert consensuses, 5 clinical decisions, 4 systematic reviews, and 1 evidence summary. Thirty-two pieces of best evidence were summarized across five aspects: safety assessment and identification, safety management strategies, safe medication practices, safety intervention methods, and safe care environment. Key recommendations include the necessity of comprehensive risk assessment using standardized tools, the critical role of multidisciplinary care, the principle of starting low and going slow with antipsychotics, the integration of non-pharmacological interventions like cognitive-behavioral therapy and repetitive transcranial magnetic stimulation, and the importance of optimizing both the physical and psychosocial environment.

Conclusion: This study summarizes the best evidence for the safety management of PD patients with BPS, providing a reference for clinical healthcare professionals to make scientific decisions and implement standardized safety management protocols. The main recommendations for managing these patients emphasize a proactive, multifaceted approach that integrates continuous assessment, multidisciplinary collaboration, judicious medication use, evidence-based non-pharmacological strategies, and environmental modifications, all while considering patient preferences.

Keywords: Parkinson's disease, behavioral and psychiatric symptoms, safety management, evidence summary

Introduction

Parkinson's disease (PD) is a common neurodegenerative disorder in the elderly, characterized pathologically by the progressive loss of dopaminergic neurons in the substantia nigra.[1] Beyond the characteristic motor symptoms of bradykinesia, resting tremor, and rigidity, PD patients frequently experience non-motor symptoms (NMS), including sleep disturbances, autonomic dysfunction, cognitive decline, and neuropsychiatric symptoms.[2] Neuropsychiatric symptoms are among the most prevalent NMS, with prospective studies reporting a long-term cumulative prevalence of approximately 60%.[3] Clinically, these manifest as a spectrum of behavioral and psychiatric symptoms (BPS) –

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including affective disorders (eg, depression, anxiety), psychosis (eg, visual hallucinations, delusions), and impulse control disorders – which arise from the complex interplay between the disease's neuropathology and its pharmacological treatment.[3,4] These symptoms significantly increase therapeutic complexity and safety risks.[4,5] BPS can emerge in the early stages of PD, with frequency escalating as the disease progresses. These symptoms pose significant safety management challenges and adversely impact patients' physical and mental health, as well as their quality of life.[6] However, clinical focus often remains on managing motor symptoms like bradykinesia, resting tremor, and rigidity, potentially overlooking BPS.[3] While existing guidelines and expert consensuses address NMS management in PD,[4,6–9] safety management specific to BPS is often only briefly mentioned, lacking concrete evidence-based recommendations. Therefore, this study systematically retrieved and summarized the best evidence for safety management in PD patients with BPS to provide a reference for evidence-based clinical decision-making and standardized safety protocols. The term "safety management" in this context encompasses a systematic process of identifying, assessing, and mitigating risks to prevent adverse events and harm in this vulnerable population. Key risks include falls, injuries from agitation or impulsivity, medication side effects, self-harm, and wandering. Effective safety management is crucial as it directly impacts patient morbidity, mortality, quality of life, caregiver burden, and healthcare costs. Previous studies have highlighted the high prevalence of adverse events like falls in PD patients, with BPS being significant contributing factors, underscoring the urgent need for structured safety protocols.[5–7]

Materials and Methods

Defining the Question

The PIPOST Model[10] Was Used to Frame the Evidence-Based Question:

- Population (P): PD patients with BPS.
- Intervention (I): Safety management measures for PD patients with BPS.
- Professionals (P): Healthcare professionals (doctors, nurses).
- Outcome (O): Incidence of safety-related adverse events.
- Setting (S): Hospitals, community care facilities.

Type of evidence (T): Guidelines, clinical decisions, systematic reviews, evidence summaries, expert consensuses.

Search Strategy

Following the "6S" evidence pyramid model[11] and a top-down search principle, a comprehensive search strategy using subject headings and free-text terms was employed. Databases and websites searched included: BMJ Best Practice, UpToDate, JBI Evidence-Based Healthcare Database, Medlive, CMA Knowledge Base, GIN, NICE, SIGN, NGC (archived content considered), RNAO, NZGG, CMA CPGs, APDA, DGN, Cochrane Library. Supplementary searches were performed in general databases: PubMed, Web of Science, Ovid, Embase, EBSCO, Springer, Medsci, CINAHL, CBM, CNKI, WanFang Data. The search period was from database inception to March 31, 2025. No additional restrictions on the publication date of the documents were applied. Search strategies for CNKI and PubMed are detailed in Table 1.

Literature Inclusion and Exclusion Criteria

Inclusion Criteria: (1) Study population: PD patients with BPS; (2) Content involving methods and strategies for BPS safety management; (3) Publication type: Guidelines, clinical decisions, systematic reviews, evidence summaries, expert consensuses; (4) Language: Chinese or English.

Exclusion Criteria: (1) Full text unavailable; (2) Irrelevant content; (3) Only describes research process/methods without results; (4) Literature rated as quality "C" during appraisal.

Table 1 Literature Search Format of CNKI and PubMed

Database		Search Strategy
CNKI	#1	Subject = "Parkinson" + "Parkinson's disease" + "Parkinson's patients" + "Parkinsonism"
	#2	Subject = "Neuropsychiatric symptoms" + "Psychotic disorders" + "Mood disorders" + "Depression" + "Impulse control disorders" + "Hallucinations"
	#3	Subject = "Guidelines" + "Expert consensus" + "Evidence summary" + "Systematic review" + "Clinical decision" + "Standards"
	#4	Subject = "Management"
	#5	#1 AND #2 AND #3 AND #4
PubMed	#1	"parkinson disease"[MeSH Terms] OR "parkinson"[Ti/Ab]
	#2	"psychotic disorders"[MeSH] OR "anxiety" [MeSH] OR "depression"[MeSH] OR "Impulse control disorder "[Ti/Ab] OR "hallucinations"[MeSH] OR "Psychobehavioral symptom"[Ti/Ab]
	#3	"guideline"[Ti/Ab] OR "systematic review"[Ti/Ab] OR "consensus"[MeSH] OR "evidence"[Ti/Ab] OR "standards"[Ti/Ab] OR "statement"[Ti/Ab] OR "Practice Recommendation"[Ti/Ab]
	#4	Management"[Ti/Ab]
	#5	#1 AND #2 AND #3 AND #4

Literature Quality Appraisal and Evidence Grading

Guidelines: Appraised using the AGREE II instrument.[12] Clinical Decisions: Appraised using tools corresponding to the original evidence type they were based on.Evidence Summaries: Appraised using a specific evidence summary quality appraisal tool.[12] Systematic Reviews and Expert Consensuses: Appraised using corresponding JBI critical appraisal tools.[12] The AGREE II tool consists of two global assessment items and six domains (comprising 23 items). Global Assessment 1 evaluates the overall quality of the guideline. Global Assessment 2 assesses the reviewer's recommendation for use (ie, whether the guideline should be endorsed). Each item is scored on a 7-point Likert scale (1 = strongly disagree, 7 = strongly agree), with higher scores indicating better compliance with the criteria.

Evidence Level & Recommendation Strength: Evidence was pre-graded (Levels 1–5, 1=highest) using the JBI 2014 Evidence Pre-grading and Recommendation Level System.[12,13] The levels are defined as follows: Level 1 (1a: systematic review of RCTs; 1b: systematic review of RCTs and other interventional studies; 1c: single RCT; 1d: controlled clinical trial); Level 2 (2a: systematic review of quasi-experimental studies; 2b: systematic review of quasi-experimental studies and other lower-quality interventional studies; 2c: single prospective controlled quasi-experimental study; 2d: before-after/retrospective controlled quasi-experimental study); Level 3 (3a: systematic review of cohort studies; 3b: systematic review of cohort studies and other lower-quality observational studies; 3c: single cohort study with a control group; 3d: single case-control study; 3e: single observational study without a control group); Level 4 (4a: systematic review of descriptive studies; 4b: single cross-sectional study; 4c: case series; 4d: case study); Level 5 (5a: systematic review of expert opinions; 5b: expert consensus; 5c: basic research/single expert opinion). The strength of each recommendation (Grade A: Strong Recommendation; Grade B: Weak Recommendation) was subsequently determined through a structured expert consensus process involving all authors, which considered the pre-graded evidence level alongside practical factors of feasibility, appropriateness, clinical significance, and effectiveness.

Evidence Extraction and Synthesis

Two researchers independently extracted and synthesized the evidence. A third researcher verified the process. Conflicts were resolved prioritizing evidence-based sources, higher-quality evidence, and the most recent authoritative publications.

Results

Characteristics of Included Studies

Twenty-one studies were included: 6 guidelines,[2,7,14–17] 5 expert consensuses[4,8,9,18,19,] 5 clinical decisions,[20–24] 4 systematic reviews[25–28,] and 1 evidence summary.[29] The literature screening flow chart is shown in Figure 1. General characteristics of the included studies are summarized in Table 2.

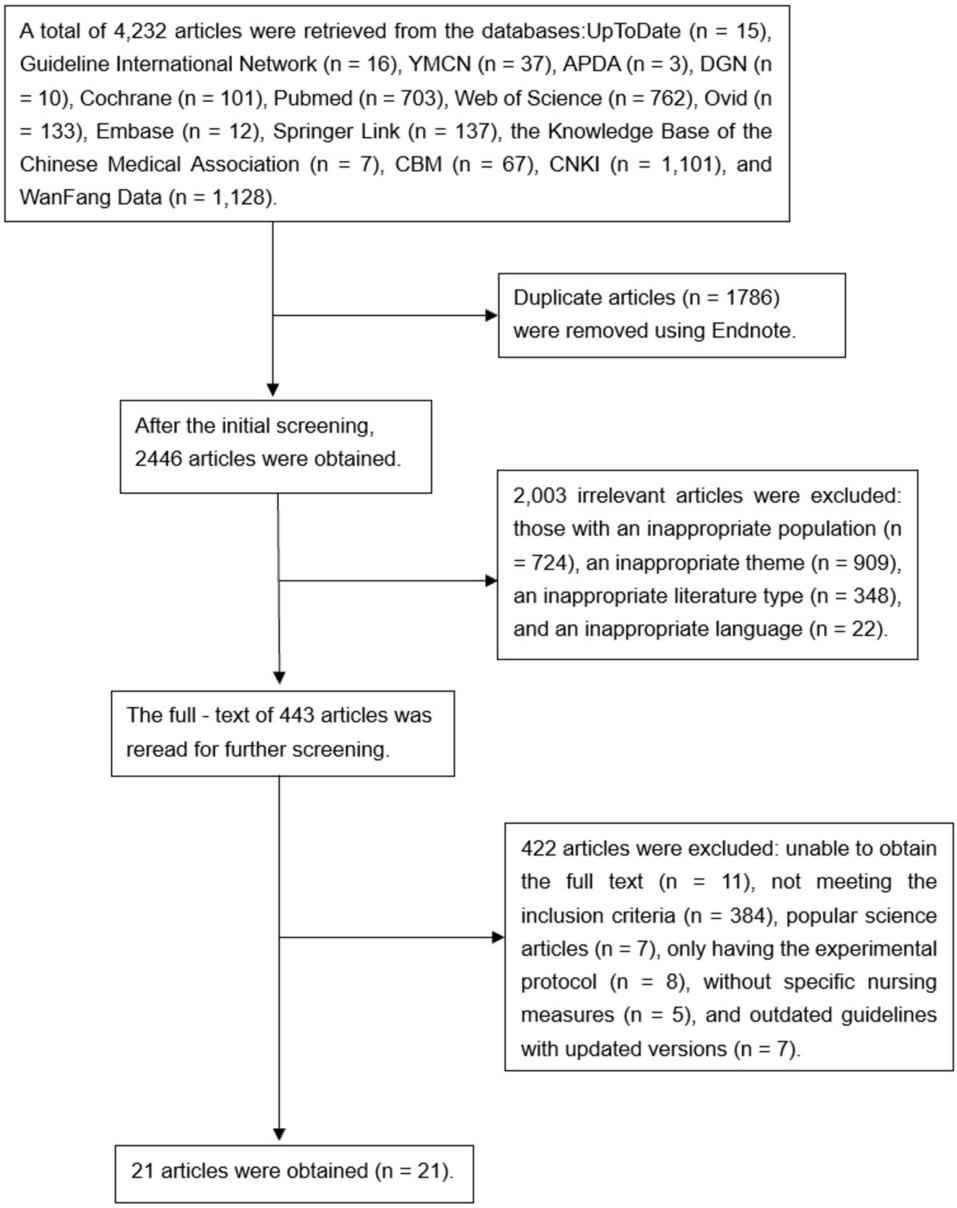

Figure 1 Flow chart of literature screening.

Results of Literature Quality Appraisal

Guidelines (n=6)

A total of six guidelines were included,[2,7,14–17] and their quality was evaluated using the Appraisal of Guidelines for Research and Evaluation II (AGREE II) instrument. Detailed scoring criteria for the guidelines are shown in Table 3.

Expert Consensuses (n=7)

Four consensuses[4,8,18,19] scored "Yes" on all appraisal items, indicating high quality. One consensus[9] scored "Unclear" on item 3 ("Is the evidence base sufficient?") but "Yes" on others, deemed sufficiently high quality for inclusion.

Table 2 Characteristics of Included Studies (n=21)

Included Literature	Publication Year	Literature Source	Literature Type	Literature Theme
Parkinson's Disease and Movement Disorder Group, Chinese Society of Neurology, Chinese Medical Association[2]	2020	Knowledge Base of Chinese Medical Association	Guideline	Chinese Guidelines for the Treatment of Parkinson's Disease (Fourth Edition)
Neurology Physicians Branch of Chinese Medical Doctor Association[14]	2021	Knowledge Base of Chinese Medical Association	Guideline	Chinese Guidelines for the Treatment of Parkinson's Disease with Repetitive Transcranial Magnetic Stimulation
Treatment Guidelines Sub - committee of the Taiwan Movement Disorder Society[16]	2023	PubMed	Guideline	Treatment Recommendations for Parkinson's Disease by the Taiwan Movement Disorder Society
Lars Tönges et al[17]	2024	DGN	Guideline	German Guidelines for the Nursing Concept of Parkinson's Disease
Karsten Witt et al[7]	2024	DGN	Guideline	Guidelines for the Diagnosis and Treatment of Impulse Control Disorders, Psychosis, and Delirium
German Parkinson Steering Committee[15]	2024	DGN	Guideline	Diagnosis and treatment of parkinson´s disease
Lana Chahine et al[22]	2024	UpToDate	Clinical Decision	Management of Non - motor Symptoms of Parkinson's Disease
Simone Veronese et al[23]	2024	UpToDate	Clinical Decision	Palliative Care for Parkinson's Disease and Parkinsonism Syndromes
Kelvin L Chou et al[21]	2024	UpToDate	Clinical Decision	Patient Education: Symptoms and Diagnosis of Parkinson's Disease
Daniel Press et al[20]	2025	UpToDate	Clinical Decision	Management of Neuropsychiatric Symptoms in Dementia Patients
Victoria S Pelak, MD et al[24]	2024	UpToDate	Clinical Decision	Management of Patients with Visual Hallucinations
Liu Xiaoyu et al[29]	2024	CNKI	Evidence Summary	Summary of the Best Evidence for Non - pharmacological Management of Depression in Parkinson's Disease Patient
Tang Rui et al[18]	2022	CNKI	Expert Consensus	Expert Consensus on the Clinical Application of Transcranial Direct - current Stimulation in the Treatment of Common Neuropsychiatric Diseases
Yang Ning et al[9]	2021	CNKI	Expert Consensus	Expert Consensus on the Integrated Traditional Chinese and Western Medicine Diagnosis and Treatment of Parkinson's Disease - associated Depression
Stocchi, F et al[19]	2023	PubMed	Expert Consensus	Exploring Depression - related Phenomena in Parkinson's Disease: Phenomenological Analysis, Diagnostic Strategies, and Management Plans in the Italian Delphi Consensus
Wu Chenghan et al[8]	2020	CNKI	Expert Consensus	Traditional Chinese Medicine Preventive Treatment of Disease • Expert Consensus on Parkinson's Disease - associated Depression and/or Anxiety|
Parkinson's Disease and Movement Disorder Group, Chinese Society of Neurology, Chinese Medical Association[4]	2020	Knowledge Base of Chinese Medical Association	Expert Consensus	Expert Consensus on the Management of Non - motor Symptoms of Parkinson's Disease
Rose, Olaf et al[27]	2024	PubMed	Systematic Review	Reatment of Parkinson's Disease - related Psychosis
Zhang, Y et al[28]	2024	PubMed	Systematic Review	Non - pharmacological Therapies for Treating Non - motor Symptoms in Parkinson's Disease Patients
Manuel Joaquín Machado Sotomayor et al[26]	2021	PubMed	Systematic Review	Music Therapy for Parkinson's Disease
Ella Burchill et al[25]	2024	PubMed	Systematic Review	Impact of Psychiatric Comorbidities on the Outcomes of Parkinson's Disease

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Table 3 Quality Evaluation of Guidelines (n=6)

Included Literature	Standardized Percentage in Each Domain (%)						Comprehensive Evaluation 1 (Score)	Comprehensive Evaluation 12 (Score)	Recommendation Level
	Scope and Objectives	Participants	Rigor	Clarity	Applicability	Independence			
Parkinson's Disease and Movement Disorder Group, Chinese Society of Neurology, Chinese Medical Association[2]	77.78	77.78	72.92	80.56	58.33	75	5	5	A
Neurology Physicians Branch of Chinese Medical Doctor Association[14]	86.11	75	63.54	83.33	62.50	62.50	6	6	A
Treatment Guidelines Sub - committee of the Taiwan Movement Disorder Society[16]	88.89	63.89	68.75	88.89	64.58	66.67	6	6	A
Lars Tönges et al[17]	91.67	77.78	79.17	86.11	77.08	100	6	6	A
Karsten Witt et al[7]	97.22	80.56	82.29	91.67	70.83	100	6	6	A
German Parkinson Steering Committee[15]	97.22	88.89	93.75	91.67	77.68	100	6	6	A

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Systematic Reviews (n=4)

Two reviews[27,28] scored "Yes" on all items, indicating high quality. Two reviews[25,26] scored "Unclear" on specific items (eg, independent quality assessment, publication bias assessment) but were deemed sufficiently high quality for inclusion based on overall design.

Evidence Summaries (n=1) and Clinical Decisions (n=5)

Appraised using appropriate JBI tools. Evidence was traceable to original sources. Study designs were deemed sufficiently complete and of high quality for inclusion.

Summary of Evidence

Thirty-two best evidence statements were synthesized across five categories: Safety Assessment & Identification, Safety Management Strategies, Safe Medication Practices, Safety Intervention Methods, and Safe Care Environment. These are presented in Table 4.

Discussion

Comprehensive Assessment and Early Identification are Foundational

BPS are common NMS in PD, often preceding motor diagnosis,[3] including depression, impulse control disorders (ICD), visual hallucinations (VH), and delusions (VH prevalence ~40%, delusions ~5-15%)[30.] Their non-specific presentation

Table 4 Summary of the Best Evidence for the Safety Management of Patients with Parkinson's Disease Accompanied by Behavioral and Mental Symptoms

Evidence Category		Evidence Content	Evidence Level (Grade)	Evidence Grade
Safety Assessment and Identification	Early Screening and Differentiation	1. A detailed medical history should be collected from PD patients, including past medical history, medication history, and risk factor assessment, such as old age, long disease course, obvious motor symptoms, sleep disorders, past history of mental illness, or being in a stressed state, etc.[21,25,29]	3a	B
		2. Based on the medical history, medication, clinical manifestations, and combined with imaging, early differential diagnosis should be made, such as mental illnesses like schizophrenia, bipolar disorder, depression; secondary factors such as infection, stress, electrolyte imbalance, etc.[15]	5b	A
	Early Observation and Assessment	3. Behavioral and mental symptoms can be observed long before motor symptoms and clinical diagnosis, including depression, impulse control disorders, hallucinations and delusions, etc., usually manifested as nightmares, false perceptions of people or objects, pseudohallucinations, photophobia, phonophobia, etc.[7,19]	5a	A
		4. It is recommended to use the non - motor symptoms questionnaire (NMSQ), scale for the assessment of positive symptoms (SAPS - PD), Parkinson Psychosis Rating Scale (PPRS), Parkinson psychosis questionnaire (PPQ), Mini - mental State Examination (MMSE), and The Questionnaire for Impulsive - Compulsive Disorders in Parkinson's Disease (QUIP)[4,7,9,25] for assessment	3a	B
Safety Management Strategies	Establishing a Safety Team	5. Form a multi - disciplinary cooperation team including neurology, psychiatry, rehabilitation, traditional Chinese medicine, and specialized nurses, etc.[2,15]	1a	A
		6. It is recommended to establish PD advanced practice nurses. PD advanced practice nurses should lead the establishment of an interdisciplinary safety management team and construct a safety early - warning mechanism and management strategies[17]	5b	A
	Multimodal Comprehensive Treatment	7. Based on the bio - psycho - social medical model, comprehensive management should be carried out through multiple approaches such as drug treatment, non - drug interventions, and psychosocial environmental interventions according to the patient's individualized etiology and pathophysiological mechanisms[15]	5b	A
	Implementing Hierarchical Management	8. Implement hierarchical management, strengthen inspections and supervision, conduct monitoring, evaluation, and reminders, and dynamically adjust the intervention plan to reduce the possibility of adverse events[17]	5b	A

(*Continued*)

Table 4 (Continued).

Evidence Category		Evidence Content	Evidence Level (Grade)	Evidence Grade
Safe and Standardized Medication	Medication Principles	9. If psychotic symptoms are considered to be related to PD medications, PD medications should be gradually discontinued in the following order: first, reduce the dose or stop anticholinergic drugs, then monoamine oxidase (MAO) B inhibitors, amantadine, dopamine receptor agonists, catechol - O - methyl transferase (COMT) inhibitors, and finally levodopa[4,7,22]	5b	A
		10. PD drug treatment and antipsychotic treatment are contradictory. It is necessary to balance the treatment goals of motor symptoms and mental symptoms. During treatment, follow the principles of using the minimum dose required to achieve clinical efficacy, slow titration, and short - term use; administer the drug at night to reduce daytime sleepiness[2]	5b	A
	Precise Medication	11. Clozapine, quetiapine, and pimavanserin are the preferred drugs, which generally do not exacerbate motor symptoms. Closely monitor for adverse reactions such as hypotension, QT interval prolongation, and excessive sedation[20,22]	4c	B
		12. The initial dose of clozapine is 12.5mg, which should be administered at night. Then, it can be gradually increased to 50mg or a larger dose according to the patient's response and tolerance. However, it is likely to cause agranulocytosis, and regular blood routine monitoring is required[20,22]	2b	A
		13. Quetiapine is administered at night with an initial dose of 12.5mg. Then, it can be gradually increased to a maximum of 100mg according to the patient's response and tolerance. It can cause abnormal blood sugar and lipids, and regular monitoring is required[22]	4b	A
		14. For patients with cognitive impairment, atypical antipsychotics will increase the risk of adverse events such as accidental falls, cognitive deterioration, pneumonia, cardiovascular diseases, cerebrovascular diseases, etc., and even increase the patient's mortality rate. Use with caution[22]	1b	B
Safety Intervention Methods	Non- Pharmacological Intervention Methods	15. For PD patients with behavioral and mental symptoms, effective psychological intervention and emotional support are as important as drug treatment[8]	5b	A
		16. Cognitive behavior therapy (CBT) is recommended as the preferred non - pharmacological intervention method. It is based on mindfulness and aims to change unreasonable thoughts and behaviors. It mainly includes cognitive reconstruction, emotional regulation, behavioral activation, and psychological support[4,16]	5b	A
		17. High - frequency repetitive transcranial magnetic stimulation (rTMS) of the left dorsolateral prefrontal cortex and bilateral motor M1 areas can improve patients' negative emotional disorders, with an overall benefit[8,14,18,22]	5b	A
		18. Electroconvulsive therapy (ECT) is effective and well - tolerated for patients with psychotic symptoms[7,9,16]	5b	A
		19. Relaxation therapies such as music therapy, aromatherapy, massage, yoga, hypnosis, and qigong are recommended; humanistic therapy, group dance therapy, etc. can stimulate patients' interest and maintain a good mental state[8,20,22,26]	1a	A
	Traditional Chinese Medicine Therapeutic Techniques	20. Implement traditional Chinese medicine emotional nursing, including the method of emotional restraint, the method of following desires, and the method of mood - overcoming - emotion, to relieve negative emotions and rebuild patients' self - confidence[8]	5b	A
		21. According to the patient's main causes, symptoms, and individual differences, adjust the balance of yin and yang and the balance of internal organs. Adopt a traditional Chinese medicine intervention plan using ingredients such as lotus seeds, spiny jujube seeds, silk tree flowers, bupleurum, rhubarb, angelica, and atractylodes macrocephala to nourish the heart and soothe the nerves, clear away liver fire, and soothe the liver and relieve depression, thereby alleviating negative emotional disorders[8]	5b	A
		22. Methods such as auricular point pressing, acupuncture, scraping, acupoint drug application, cupping, and tuina massage are recommended. Through the conduction of meridians, these methods can achieve the effects of regulating qi and blood, soothing the liver and regulating qi, and calming the heart and tranquilizing the mind[8]	5b	A

(*Continued*)

Table 4 (Continued).

Evidence Category		Evidence Content	Evidence Level (Grade)	Evidence Grade
Safe Care Environment	Physical Environment Safety	23. Keep the room layout clean and tidy, reduce the stacking of sundries, and ensure smooth passageways to avoid falls and injuries during states of impulse or hallucination[24]	4b	B
		24. Keep the environment quiet and reduce adverse stimuli from the surrounding environment such as noise and strong light[24]	1b	A
		25. Dim light may exacerbate hallucinations. Ensure sufficient indoor light during the day, and a night - light is recommended at night[20]	3b	A
		26. Store dangerous items such as sharp objects, fragile items, and ropes to prevent self - harm or harm to others when the patient is emotionally impulsive[20]	4b	A
	Physical Environment Safety	27. Develop a schedule and establish fixed sleep and wake - up times[15]	5b	A
		28. When a patient has hallucinations, do not immediately loudly deny or argue about the existence of the hallucinated object. Briefly empathize, distract, and divert the patient's attention[20]	4b	A
		29. Speak in a slow and clear tone. Do not whisper in front of the patient; avoid talking in a place where the patient can hear but not see[20]	2b	B
		30. Pay attention to sudden emotional changes in the patient, avoid physical conflicts, patiently comfort and stabilize their emotions, and make them feel safe[20]	1b	B
	Caregiver Support	31. The multi - disciplinary team provides caregivers with sufficient professional knowledge, care experience, psychological support, safety education, and care according to individual needs[15,23]	1b	A
		32. Caregivers should give patients full respect, proper guidance and encouragement, create a warm environmental atmosphere, relieve mental stress, and enhance their confidence in overcoming the disease[2]	5b	A

can lead to oversight,[4] increasing risks of falls, self-harm, or harm to others.[31] Early recognition and risk assessment (history, scales like SAPS-PD, PPRS) are crucial first steps. Clinicians must also differentiate BPS from primary psychiatric disorders or secondary causes (infections, metabolic). Patient self-report remains vital alongside objective tools.[31]

Standardized Management Strategies and Multidisciplinary Teams

Evidence statements 5–8 highlight key strategies. PD patients with BPS often have complex, overlapping NMS (sleep, cognition, autonomic).[2] A multidisciplinary team (Neurology, Psychiatry, Rehabilitation, TCM, PD Nurses) is essential for comprehensive, individualized care addressing biological, psychological, and social aspects. The role of PD Advanced Practice Nurses (APNs)[17,19] in coordinating care, providing support/education, and implementing protocols is emphasized. While PD specialist nursing roles are less defined in China,[32] adapting this model within local contexts is recommended. Practical steps for healthcare institutions in China to develop such roles could include: (1) establishing standardized training curricula and certification pathways for PD Advanced Practice Nurses, focusing on BPS recognition and non-pharmacological intervention; (2) implementing pilot programs in tertiary hospitals to demonstrate their value in patient outcomes and cost-effectiveness; and (3) advocating for policy support and funding to formally integrate these roles into the healthcare system. Tiered management with proactive monitoring and dynamic intervention adjustment is key.

Principled and Precise Medication Management

BPS prevalence increases with disease progression,[33] significantly impacting function. Clinicians must first determine if BPS is drug-induced or disease-related. If drug-induced, a sequential reduction/withdrawal protocol is recommended (Evidence 9),[4,7,22] acknowledging the inherent conflict with motor symptom control. Balancing these opposing needs is critical. If BPS persists or is primary, antipsychotics are indicated.[3] Clozapine, Quetiapine, and Pimavanserin (Evidence 11) are preferred due to minimal motor worsening,[20,22] but require careful dosing (start low, titrate slowly - Evidence 12, 13) and vigilant monitoring for adverse effects (agranulocytosis, metabolic changes, falls, cognitive decline, CVD/CVA, mortality - especially in cognitively impaired patients - Evidence 14). Precise dosing balancing efficacy and safety is

paramount. For patients with medication-refractory symptoms, particularly severe motor fluctuations or tremors that may exacerbate BPS-related safety risks, deep brain stimulation (DBS) can be a consideration. DBS has been shown to effectively control motor symptoms and may indirectly improve certain BPS by allowing for reduction in dopaminergic medication. However, careful patient selection is crucial, as DBS can also potentially worsen or induce new neuropsychiatric symptoms in some individuals.[34,35]

Integrating Non-Pharmacological and TCM Interventions

Non-pharmacological interventions offer advantages (lower side effects, broader applicability) and can be used alongside or even before medications.[36] Evidence 16–22 summarizes effective options: CBT[4,16,] rTMS[9,14,18,22,] ECT,[7,9,16] and various relaxation/expressive therapies.[8,20,22,26] TCM approaches (Evidence 20–22), including emotional care, tailored herbal formulas, and acupoint therapies, show promise in improving mood and BPS.[8,37–39] It is important to note that these TCM-related recommendations are currently graded as Level V, reflecting their foundation in expert consensus, clinical experience, and preliminary studies rather than large-scale RCTs. While valuable and deeply rooted in clinical practice, this underscores the need for more rigorous, high-quality clinical trials to further validate their efficacy and safety, and to mitigate potential publication or reporting biases inherent in this field of research. While unlikely to cure BPS rooted in PD pathology or medication effects, integrating these methods with pharmacotherapy can enhance overall efficacy, improve psychological well-being, and boost patient confidence.

Building Integrated Safe Care Environments

BPS significantly elevates safety risks (falls, suicide, aggression). Integrating physical and psychosocial environmental optimization can reduce adverse events by 30–50%.[40] Evidence 23–26 provides practical physical safety measures (tidiness, hazard removal, lighting). Evidence 27–30 addresses psychosocial safety (routine, non-confrontational communication during hallucinations, mood monitoring, reassurance). Caregiver support (Evidence 31–32) is vital for knowledge, skills, psychological resilience, and extending safety management beyond the hospital. Current literature lacks systematic integration of physical and psychosocial safety strategies; developing such integrated environmental safety protocols is a future direction. Furthermore, throughout the safety management process, respecting patient autonomy and incorporating their preferences is ethically crucial. This includes engaging in shared decision-making regarding the use of antipsychotics—discussing potential benefits, risks, and alternatives—and collaboratively planning environmental modifications that the patient finds acceptable and non-intrusive. Acknowledging the patient's voice ensures that safety measures are not only effective but also preference-sensitive and person-centered.

Limitations

This study has several limitations. First, while a comprehensive search strategy was employed, it is possible that some relevant, non-English or non-Chinese literature was missed. Second, the quality of the synthesized evidence is inherently dependent on the quality of the original included documents, such as guidelines and systematic reviews. Third, the evidence related to Traditional Chinese Medicine interventions is primarily based on expert opinion (Level V), indicating a need for more robust primary research in this area. Finally, this review summarizes existing evidence but does not directly evaluate its implementation in clinical practice; the feasibility and effectiveness of these recommendations across diverse healthcare settings require further investigation.

Conclusion

This study summarized 32 best evidence statements across five domains (Assessment, Management Strategies, Medication, Interventions, Environment) for safety management in PD patients with BPS, providing a scientific foundation for clinical practice. Key findings highlight the need for robust PD nurse-led support systems and the development of integrated physical-psychosocial environmental safety strategies. Future research should focus on establishing PD nurse-led multidisciplinary safety teams, optimizing environmental integration, and exploring AI-enhanced risk prediction systems[41] to further mitigate safety risks in this vulnerable population.

Author Contributions

All authors made a significant contribution to the work reported, whether that is in the conception, study design, execution, acquisition of data, analysis and interpretation, or in all these areas; took part in drafting, revising or critically reviewing the article; gave final approval of the version to be published; have agreed on the journal to which the article has been submitted; and agree to be accountable for all aspects of the work.

Disclosure

The authors declare that they have no competing interests.

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