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Review Article

Effectiveness of digital-based psychospiritual interventions on psychosocial outcomes in hypertensive patients: A Systematic Review

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Abstract

Background: Hypertension affects not only physical health but also quality of life, depression, and anxiety. Digital-based psychospiritual interventions may serve as a supportive strategy in hypertension management to address these psychosocial impacts.

Objective: This systematic review evaluated the effectiveness of digital-based psychospiritual interventions on quality of life, depression, and anxiety among individuals with hypertension.

Methods: The review followed PRISMA 2020 guidelines. Literature searches were conducted in PubMed, EBSCO, Scopus, Oxford Journal, and ProQuest for studies published between 2021 and 2026. Eligible studies were selected based on predefined inclusion and exclusion criteria and critically appraised using the *Joanna Briggs Institute* (JBI) Critical Appraisal Tool. Eight studies were included, and findings are presented according to intervention characteristics and reported outcomes.

Result: Digital-based psychospiritual interventions demonstrated potential benefits for psychosocial outcomes, including improvements in quality of life, depression, and anxiety. However, the magnitude and consistency of these effects varied depending on intervention characteristics, study design, and population. These benefits were associated with enhanced emotion regulation, stress management, self-awareness, and patient engagement in care.

Conclusion: Digital-based psychospiritual interventions may be considered a supportive nonpharmacological approach in hypertension management. Further research employing more rigorous designs and standardized outcome measures is warranted.

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Keywords
Hypertension; Digital Health; Psychospiritual.

Background

Hypertension is one of the chronic diseases that has a high health burden because it is directly related to the risk of cardiovascular disease, stroke, kidney failure, impaired cognitive function, decreased quality of life, and increased health service costs. Hypertension is a condition characterized by elevated blood pressure. Still, it can also be understood as a chronic disease that requires long-term management through pharmacological therapy, lifestyle modifications, blood pressure control, medication adherence, and psychosocial support. Study results: Hypertension-focused *Digital Application in a Community Sample: Randomized Controlled Trial* (HALCYON), conducted by Meyer and Kawan, reported that 40% of adults worldwide have hypertension and that about 10 million deaths per year are linked to arterial hypertension. This condition makes hypertension the main physical factor in the incidence of premature death, also known as *Disability Adjusted Life Years* (DALYs). The study also explains that many patients have not achieved comprehensive blood pressure control, and other causes include limited time for doctor consultations, noncompliance, and patients' difficulties balancing healthy lifestyle behaviors in their daily lives (1). Another study in Eastern European countries also stated that hypertension interventions that focus on medication and education in general are not considered sufficient because psychosocial factors are still part of the causes of disease and individual self-care behaviors (2).

The development of information technology in the health sector, also known as *Digital Health,* has expanded services and opportunities for treating hypertension. Digital interventions can be implemented through education, medication reminders, remote blood pressure monitoring, communication with health workers, and more adaptive behavioral support (3). Countries such as Singapore have implemented hypertensive telehealth programs that include home blood pressure monitoring, teleconsultations with support from health teams, and digital chatbot applications to increase the likelihood of blood pressure control. Analysis of the PTEC-HT group over a 6-12 month period showed better blood pressure control compared with the standard care group. This leads to cost savings per patient, as observed over the past 12 months since the program's equipment and maintenance were implemented (4). However, the effectiveness of the digital intervention depends on the suitability of the technology needed by the patient. Therefore, health literacy is the initial requirement for patients to use digital services to their full potential. This can be confirmed by research conducted on 507 hypertensive patients, in which only 11.8% of participants had engaged in remote

blood pressure monitoring, and digital health literacy scores across seven domains were higher (5).

A psychospiritual approach oriented to *mindfulness,* Meditation, relaxation, self-awareness, and stress management has relevance to hypertension and other causes such as stress, anxiety, and self-management behaviors. Adults who have a history of pulmonary hypertension have experienced symptoms, psychological distress, and poor quality of life. So. Programs such as *Mindfulness Meditation for Pulmonary Hypertension* (MMPH) were developed as part of an 8-week intervention delivered via Zoom, video, and other applications. The results of the feasibility test indicated that attendance was 93% on Zoom, 80% of participants accessed more than half of the videos, and the *System Usability Scale score was*81.47, placing it in the medium acceptance category (6, 7). In addition, quality of life, depression, and anxiety were positioned as impacts of hypertension, obtained from the study *Digital Cognitive Training* (8). Research has shown that modern hypertension has shifted from the basic factors of blood pressure to a more comprehensive approach that includes cognitive, psychological, and quality-of-life aspects (9).

Therefore, this systematic review aims to identify, evaluate, and synthesize the available scientific evidence on the effectiveness of digitally delivered psychospiritual interventions for psychosocial outcomes, particularly quality of life, depression, and anxiety, in hypertensive patients.

Methods

Research Design

This systematic review follows PRISMA 2020 guidelines (10). We conducted a comprehensive literature search to identify studies on digital technology-based nonpharmacological interventions for hypertensive patients. Interventions included digital psychospiritual methods such as mindfulness, meditation, relaxation, app-based education, telehealth, remote blood pressure monitoring, and digital behavioral support. The review primarily evaluates the effectiveness of these interventions on psychosocial outcomes, including quality of life, depression, anxiety, stress management, medication adherence, self-efficacy, and blood pressure control.

Search Strategy

The literature search strategy was compiled using the PICO framework. The population (P) in this study is patients with hypertension; the intervention (I) is in the form of digital-based psychospiritual interventions; the comparison (C) is in the form of standard treatments, while the outcome (O) includes quality of life, depression, and anxiety. The search was conducted in PubMed, EBSCO, Scopus, Oxford Journals, and ProQuest for articles published between 2021 and 2026. The keywords used included "hypertension", "digital health", "meditation", "mHealth", "telehealth", "mobile app", "mindfulness", "standard care", "quality of life", "depression", and "anxiety". All keywords were combined using the Boolean AND and OR operators to obtain articles that matched the research criteria.

Table 1. Literature Search Strategies Based on the PICO Framework

Components	Description	Keywords / Search Terms
Search resources	PubMed, EBSCO, Scopus, Oxford Journal, and ProQuest	-
Publication period	Articles published in 2021–2026	-
Population (P)	Patients with hypertension	*"Hypertension"*
Intervention (I)	Digital-based psychospiritual intervention	*"digital health", "meditation", "mHealth", "telehealth", "mobile app", "mindfulness"*
Comparison (C)	Standard care	*"Standard Care"*
Outcome (O)	Quality of life, depression, and anxiety	*"quality of life", "depression", "anxiety"*
Search combinations	Keywords are combined based on PICO components	Boolean Operator (AND/OR)

Inclusion and Exclusion Criteria

The review focused on studies involving people with hypertension, exploring digital nonpharmacological interventions such as meditation, mindfulness, relaxation, and psychospiritual methods. Outcomes of interest were quality of life, depression, and anxiety. Only *randomized controlled trials*, *quasi-experimental studies*, and pilot RCTs published in English from 2021 to 2026 were considered and Studies are excluded if they meet one of the following criteria: 1) Non-interventional observational studies (e.g., cross-sectional studies without intervention), 2) Studies with pharmacological intervention as the main component, 3) Studies involving pregnant women without intervention during labor, and 4) Research protocols, editorials, narrative reviews, or articles without empirical data.

Study selection process

The study selection process was carried out in stages according to the PRISMA guidelines and identified 37,431 records obtained from various electronic databases, namely PubMed (n=1,522), EBSCO (n=2,605), Scopus (n=17,119), Oxford Journal (n=10,259), and ProQuest (n=5,926). Before the screening stage, 23,738 records were removed: 12,567 irrelevant articles, 7,589 duplicates, and 3,582 for other reasons. After this process, 13,693 records were filtered by title and abstract. At this stage, 9,159 records were excluded for failing to meet the objectives. Furthermore, 4,534 reports were assessed for full-text retrieval, but 136 were not successfully retrieved. A total of 197 full-text articles were then assessed as eligible. Of these, 4,337 articles were excluded on the grounds that they were not in English (n=410), did not include digital interventions (n=1,797), and were not available in open access (n=2,130). And 8 articles were then continued for review. In the end, eight studies met all inclusion criteria and were included in the systematic review. The study selection process is presented in the PRISMA flowchart. Furthermore, the methodological quality of the selected studies was assessed

using the Joanna Briggs Institute (JBI) Critical Appraisal Tools for experimental, randomized controlled, and quasi-experimental studies.

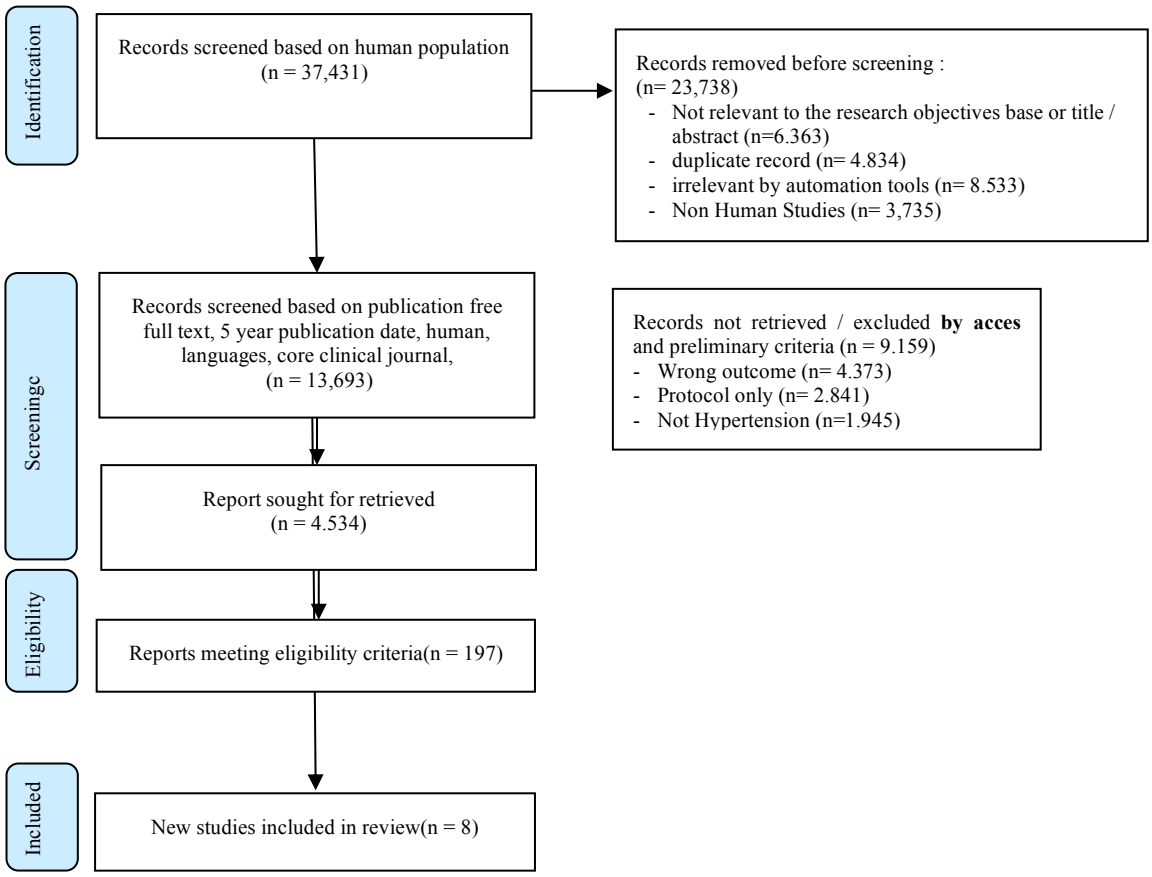


Figure 1. PRISMA Flow Chart

Result and Discussiun

Table 2. Joanna Briggs Institute (JBI) Critical Appraisal for RCT/Pilot RCT

Author	Study Design	1	2	3	4	5	6	7	8	9	10	11	12	13	Total score	(%)
Kong et al. [9]	RCT	Y	Y	Y	Y	N	Y	Y	Y	Y	Y	Y	Y	Y	12/13	92,3
Wiles et al. [11]	Pilot RCT	Y	Y	Y	U	N	U	Y	Y	Y	Y	Y	Y	Y	10/13	76,9
Von Visger et al. [8]	Pilot RCT	Y	Y	Y	Y	Y	U	Y	Y	Y	Y	Y	Y	Y	10/13	76,9
Wright et al. [12]	Pilot RCT	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	13/13	100

Note. Y = Yes; N = No; U = Unclear; N/A = Not applicable. Items 1–13 correspond to the JBI RCT checklist. If total score and percentage are reported, state the scoring rule explicitly in the Methods section.

Assessment scores in the RCT and RCT Pilot groups ranged from 76.9% to 100%. Wright (12) achieved the highest score, 13/13 (100%), followed by Kong (9) with 12/13 (92.3%). Wiles (11) and Von Visger (8) each scored 10/13 (76.9%). These results indicate variability in meeting methodological criteria, with some items still marked as No or Unclear.

Table 3. Joanna Briggs Institute (JBI) Critical Appraisal for Quasi Experimental

Author	Study Design	1	2	3	4	5	6	7	8	9	Total score	(%)
Meyer et al. [13]	Quasi-experimental	Y	Y	Y	Y	N	U	Y	N	Y	6/9	66,7
Wang et al. [4]	Quasi-experimental	Y	Y	Y	N	N	N	Y	Y	Y	6/9	66,7
Tauro et al. [6]	Quasi-experimental	Y	Y	Y	Y	N	Y	Y	Y	Y	8/9	88,9
Teshome et al. [14]	Quasi-experimental	Y	Y	Y	U	N	N	Y	Y	Y	6/9	66,7

Note. Y = Yes; N = No; U = Unclear; N/A = Not applicable. Items 1–9 correspond to the JBI quasi experimental checklist. If total score and percentage are reported, state the scoring rule explicitly in the Methods section.

In the quasi-experimental group, the appraisal score ranged from 66.7% to 88.9%. Tauro (6) obtained the highest score of 8/9 (88.9%), while Meyer (1), Wang (4), and Teshome (14) obtained a score of 6/9 (66.7%), respectively. Some items in quasi-experimental studies are still rated as *No* or *Unclear*, indicating that certain methodological aspects need to be considered when interpreting research results. Based on evidence from randomized controlled trials and clustered randomized controlled trials published between 2021 and 2026, digitally based interventions have shown significant effectiveness, particularly in improving quality of life, depression, and anxiety. However, the magnitude and consistency of the effects vary depending on the type of intervention, implementation method, and population characteristics. So that in this discussion, a discussion will be held related to 5 points, namely 1) the effectiveness of digital psychospiritual interventions on the psychosocial outcomes of hypertensive patients, 2) the working mechanism of intervention and the role of patient involvement, 3) Technological variations, intensity of interventions, and integration with standard care, 4) Heterogeneity of findings, quality of evidence, and limitations of review, 5) Implications of practice and further research directions.

The effectiveness of digital psychospiritual interventions on the psychosocial outcomes of hypertensive patients

Based on the results of the initial review, it is clear that digital-based psychospiritual interventions have the potential to support the management of hypertensive patients, especially on psychosocial impacts such as quality of life, depression, and anxiety. Hypertension is not only related to blood pressure but also related to psychological burden, behavioral changes in self-care, adherence to medication, and the patient's ability to see life in the long term. Although many intervention approaches focus on pharmacological approaches, they are not fully implemented, and psychosocial and behavioral support is needed to strengthen interventions (15).

Intervention working mechanisms and the role of patient involvement

The conceptual approach to digitally based psychospheric interventions can be described through several mechanisms. First, the intervention we call *mindfulness* or meditation can help patients improve self-awareness, stress management, and decrease reactive emotional responses to chronic illness (9). Second, digital presence support, delivered through applications, educational videos, medication reminders, and remote blood pressure monitoring, can increase patient participation in the treatment process. Third, digital communication with health workers can strengthen feelings of support,

increase patients' understanding, and encourage patients to adopt healthy living behaviors (16).

Variety of technologies, intensity of interventions, and integration with standard care

The role of technology in the findings must be revisited, including digital interventions with homogeneous properties. Interventions carried out include mobile applications, educational videos, teleconsultations, *chatbots, short messages*, Zoom meetings*, and mindfulness* (16). Online, *Remote Blood Pressure Monitoring,* or a combination of these components, has differentiated the type of technology chosen and affected the intensity of the intervention, the frequency of contact with the patient, the level of individuality, and the effectiveness of the psychosocial impact (3).

Heterogeneity of findings, quality of evidence, and limitations of reviews

Another explanation for the findings of *this systematic review* can be seen in the differences in study design, sample size, patient characteristics, type of intervention, program duration, measurement instruments, and impact measures used. Heterogeneity often occurs in *systematic reviews* when examining study methods, including RCTs, pilot RCTs, *feasibility studies,* RCT protocols, *economic evaluations,* and cross-sectional *studies*. Therefore, the inserted narrative must align with the principle of effectiveness and not be excessive. The quality of the evidence can be emphasized in terms of the effectiveness of digital interventions, where differences will depend on the type of intervention, implementation method, and population characteristics. The discussion in this hypertension-themed manuscript suggests that success in digital psychospiritual interventions will be affected by technological adjustments to patient readiness, support for health workers, and the context of health services (17).

The limitations of the review in this manuscript begin with the search process, including language, publication year, and database used. So some searches may find ineffective or inaccurate findings (18).

Implications of practice and further direction of research

Opportunities for digital-based psychospiritual interventions in hypertension services are found in primary services, chronic disease management programs, and community-based patient monitoring systems. In Indonesia itself, this approach will depend on several factors. This is due to the high number of hypertensive patients and the need to monitor patients on a large scale, as well as the presence of inefficient access to face-to-face services. Therefore, implementing patient digital literacy, device availability, internet access, family support, health worker readiness, and integration with the service system that has been running is very important to consider (11).

The future orientation of digital psychospiritual interventions in hypertensive patients must be strengthened by the existence of *randomized controlled trials* with measurable validation and objectivity. Outputs such as quality of life, depression, and anxiety can be measured by indicators such as blood pressure, medication adherence, self-efficacy, stress, sleep quality, and long-term application use. Other considerations that must be

updated and further examined include clinical cost evaluation and realistic value in the implementation of health services (14).

Therefore, this *systematic review* will only affirm, from the beginning, digital-based psychospiritual interventions with approaches in the management of hypertension, especially from the psychosocial perspective of patients. It will also use literature evidence in specific searches and methodological quality assessments, as well as the synthesis of consistent results in accordance with the principles of PRISMA 2020.

Table 4. Characteristics of literature included in the systematic review (n=8)

Author (Year)	Title	Design	Method	Sample	Digital Intervention	Key Findings
Meyer et al.13]	Internet-based digital intervention to support hypertension self-management compared to usual care: HALCYON randomised controlled trial	Quasi-Experimental	Randomize to liebria plus regular care or just regular care. Results are assessed after 3 months; The main outcome is systolic blood pressure.	102 adults with hypertension (52 interventions; 50 controls)	Liebria: Internet-based digital therapy accessed via a smartphone or computer; including education, self-monitoring, behavior change techniques, motivational messages, audio exercises, and PDF materials.	Promises a decrease in systolic blood pressure and an improvement in social/occupational function; There were no obvious effects on diastolic blood pressure, quality of life, or medication adherence.
Wang et al. [4]	Primary Technology Enhanced Hypertension Scaling Program: effectiveness and cost-effectiveness using real-world data	Quasi-experimental	PTEC-HT is compared to usual treatment using patient-level real-world data. Regression analysis and exact matching were applied to the 6- and 12-month analyses.	6 months: 427 PTEC-HT and 64,679 usual treatments; 12 months: 338 PTEC-HT and 7,324 usual treatments	PTEC-HT: remote BP monitoring with Bluetooth-enabled BP devices, Health Discovery+ app, care team teleconsultation, and in-app chatbot support.	PTEC-HT improved blood pressure control at 6 and 12 months and was more cost-effective than usual treatment for 12 months.
Kong et al. [9]	Digital computerized cognitive training to prevent cognitive decline among hypertensive patients: DELIGHT trial protocol	RCT	Participants will be randomized to adaptive computerized cognitive training or active control training for 12 weeks, with follow-up for up to 24 weeks.	Planned sample: 200 older patients with hypertension and mild cognitive impairment	Digital adaptive computerized cognitive training for 30 minutes/day, 5 days/week for 12 weeks.	Final effectiveness results are not yet available. The trial aims to improve global cognitive function and evaluate self-efficacy, mental health, and quality of life.
Tauro et al. [6]	InTakeCare trial study design: a digital health solution to monitor and improve medication adherence	Quasi-experimental	Includes focus groups, persona development, usability testing, and clinical validation. Patients will be randomized to standard care or active digital intervention for 3 months, followed by 2 months of observation.	Planned sample: 206 patients with hypertension	InTakeCare: Android patient app and physician web dashboard for medication reminders, customized health messages, compliance monitoring, diary input, breast pressure recording, and asynchronous communication.	The final results are not yet available. These interventions are designed to improve medication adherence through personalized digital pushes based on patient personas.

Author (Year)	Title	Design	Method	Sample	Digital Intervention	Key Findings
Teshome et al. [14]	Health extension workers leading home-based multicomponent interventions improve links with hypertension care in northwestern Ethiopia	Quasi-Experimental	Rural communities are randomized for intervention or usual care. These interventions include home health education, behavioral counseling, medication adherence counseling, and referrals to health facilities.	456 participants (228 interventions; 228 controls) from 20 rural communities	There is no major digital intervention; delivered through a home visit by a health extension worker.	The intervention substantially improved the association with hypertension treatment compared to usual treatment; The initiation of antihypertensive drugs remains low.
Wiles et al. [11]	Feasibility of a randomized controlled trial of isometric exercise interventions for uncomplicated stage 1 hypertension	Pilot RCT	Participants were randomized to standard lifestyle advice or individual isometric wall squat recipes for 6 months. BP feasibility, compliance, friction, and variance were assessed.	41 participants with stage 1 hypertension	There is no major digital intervention; The main intervention was isometric wall squat exercises, supported by remotely monitored home blood pressure measurements.	These interventions were feasible and acceptable, with good adherence among completion participants and no intervention-related side effects. The findings inform the sample size for the full RCT.
Von Visger et al. [8]	Web-based multi-component mindfulness meditation for pulmonary hypertension: a pilot randomized controlled trial	Pilot RCT	Participants were randomized into two conditions that began to be delayed. Outcomes were measured at the beginning, mid-intervention, and post-intervention using online REDCap assessments.	16 patients with pulmonary hypertension were recruited; 15 Interventions completed	MMPH virtual program: eight weekly sessions using Zoom meetings, pre-recorded videos, and the MMPH app, including mindful breathing, gentle movements, restorative poses, and body awareness.	Early benefits were found for depressive symptoms, health-related quality of life, attention, and sleep difficulties. Larger RCTs are needed.
Wright et al. [12]	Stress and hypertension among African American female family caregivers: protocols for a pilot internet-based RCT	Pilot RCT	Participants are randomized to MIM DASH or caregiver training. The program is delivered through internet-based group sessions via video or phone, followed by coaching calls.	Planned sample: 28 African-American/Black female caregivers with hypertension	MIM DASH: an internet-based intervention that combines Mindfulness in Motion and DASH diet education, delivered through online sessions and follow-up training calls.	Preliminary feasibility data suggest the intervention is acceptable, with higher average attendance at MIM DASH than caregiver training.

Conclusion

The results of this study show that digital-based psychospiritual interventions play an important role in improving psychosocial outcomes among patients with hypertension. These interventions can help improve quality of life, reduce depressive symptoms, and reduce anxiety by providing spiritual support, emotional regulation, self-reflection, relaxation, and positive coping strategies. Digital psychospiritual interventions offer patients an accessible and flexible medium to strengthen inner peace, increase self-acceptance, increase motivation for disease management, and reduce the psychological burden associated with chronic hypertension. Through structured digital support, patients can receive guidance that integrates psychological and spiritual aspects, contributing to better emotional well-being and overall health management. Therefore, digital-based psychospiritual interventions can be considered as a supportive non-pharmacological approach in the treatment of hypertension, especially in addressing psychosocial problems such as decreased quality of life, depression, and anxiety.

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None.

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Author Contributions

E: Conceptualization, methodology, investigation, data collection, formal analysis, writing-original draft preparation. ISW,EM, FEJ: Conceptualization, methodology, formal analysis, writing-review and editing, supervision, Methodology, writing-review and editing, supervision. All authors have read and agreed to the published version of the manuscript.

Data Availability Statement

The dataset generated and analysed during the current study is available from the corresponding author upon reasonable request.

Declaration of the Use of AI in Scientific Writing

The authors declare that artificial intelligence (AI) tools were used solely to assist in language refinement and improving the clarity of the manuscript. The AI did not contribute to the study design, data analysis, or interpretation of results.

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