PRISMA 2020 Checklist

Section and Topic	Item #	Checklist item	Location where item is reported
TITLE			
Title	1	Evaluating the Effects of Vertical and Roof Greenery on Pedestrian Outdoor Thermal Comfort: systematic review	Title page.
ABSTRACT			
Abstract	2	PRISMA 2020 for Abstracts checklist submitted separately.	Abstract is in the manuscript (page 1, lines 1-22).
INTRODUCTION			
Rationale	3	Explains urban heat stress, UHI effect, fragmented studies on green roofs and green walls, lack of human-centered outcomes, and the overlooked mediating role of urban morphology.	Section 1 (Introduction), paragraphs 1-3.
Objectives	4	This systematic review synthesizes recent evidence (2020-2025) on the effects of green roofs and vertical greenery on pedestrian thermal comfort. The research questions are: 1) What are the individual and combined effects of GRs and VGS on pedestrian thermal comfort? 2) Which microclimatic mechanisms influence physiological and perceptual responses? 3) How does urban morphology modulate the effectiveness of these interventions? This review aims to provide a multi-scale understanding for sustainable and climate-resilient urban design.	Section 1, last paragraph.
METHODS			
Eligibility criteria	5	Criteria: peer-reviewed, English, 2020-2025, Scopus/WoS, relevance to PTC. Grouped by intervention type (GR, GW, combined) and by climate zone.	Sections 2.1 and 2.2. and 3.2
Information sources	6	Scopus and Web of Science, 2020-2025	Section 2.1.
Search strategy	7	Keywords from four thematic groups (Intervention, Pedestrian Comfort & Microclimate, Urban Context & Design, Objectives). Filters: 2020-2025, English, peer-reviewed.	Section 2.1 + Table 1.
Selection process	8	Single reviewer; randomly selected 20% re-assessed after two weeks; no inconsistencies. No automation tools.	Section 2.3.
Data collection process	9	Data extraction followed a structured coding scheme (intervention type, microclimatic mechanisms, thermal comfort indices, physiological/psychological outcomes, urban morphology, climate zone). Single reviewer.	Section 2.7.
Data items	10a	Outcomes: PET, UTCI, MRT, skin temperature, heart rate, stress reduction, mood, behavioural adaptations, urban morphology parameters (street canyon geometry, building density, orientation, sky view factor). All compatible results were sought; no restrictions on measures or time points.	Section 2.7.
	10b	Other variables: intervention type (GR only, GW only, combined), microclimatic mechanisms, climate zone. Funding sources were not consistently reported; no assumptions made. Missing or unclear information was not imputed.	Section 2.7.
Study risk of bias assessment	11	Four transparency indicators: (1) relevance to PTC, (2) explicit description of intervention, (3) adequate methodological detail (field/simulation), (4) clear documentation of urban morphology.	Section 2.6 (Eligibility).
Effect measures	12	Not applicable (narrative synthesis; no meta-analysis). Effect measures are descriptive (e.g., reductions in PET/UTCI/MRT).	-
Synthesis methods	13a	Studies were grouped based on intervention type (green roof only, green wall only, or combined). Eligibility for synthesis was determined by four transparency indicators (relevance, intervention description, methodological detail, urban morphology documentation). Only studies meeting all four criteria (46 studies) entered the qualitative synthesis.	Section 2.6 (Eligibility) and Section 2.7 (Included).
	13b	Data extraction followed a structured coding scheme. No missing summary statistics were encountered; all required data were available in the full-text articles. No data conversions were necessary.	Section 2.7 (Included).
	13c	Visual displays created with specific software (see figure captions) • Figures 1, (PRISMA flow diagram)	Section 2 (Method) Section 3 (Results) – Figures 1-6; Section 4

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		• Figures 9, 10 (thematic review diagram, conceptual framework) – SankeyMATIC • Figure 6 (keyword co-occurrence network) – VOSviewer • Figures 2, 3, 4, 5 (map, bar chart, trends, pie chart) – Datawrapper • Figures 7, 8 (technical layer diagrams) – Adobe Photoshop • Table 1-3 (keyword groups) – Microsoft Word	(Thematic reviews) – Figures 7-10; Table 1,2,3.
	13d	Narrative synthesis + bibliometric analysis using VOSviewer (version 1.6.20). No meta-analysis due to heterogeneity in study designs, outcomes, and contexts.	Section 2 (Method) – first paragraph; Section 3.6; Section 4.
	13e	Qualitative exploration via subgroup analysis by climate zone (Csa, Cfa, Cfb, Dfb, Af/Am, BWh) and by urban morphology (street canyon geometry, density, orientation, SVF). No meta-regression.	Section 3.2 and 4.3.1.
	13f	No sensitivity analyses conducted. Narrative and bibliometric synthesis is descriptive; robustness supported by systematic PRISMA-guided process.	Not performed
Reporting bias assessment	14	No meta-analysis; reporting bias minimised by dual-database search (Scopus, WoS) and documentation of non-retrieved records (n=182).	Sections 2.5 and 4.4.3.
Certainty assessment	15	No formal GRADE; quality assessed via four indicators; limitations discussed (lack of long-term field data)	Section 2.6, Section 6.
RESULTS			
Study selection	16a	1,050 records identified → after duplicate removal and screening → 326 retrieved → 144 full-text assessed → 46 studies included.	Sections 2.2–2.7 and Figure 1.
	16b	Excluded publication types: book chapters (35), conference papers (28), non-peer-reviewed records (12). Additionally, 98 articles excluded during eligibility because they lacked one or more of the four transparency indicators.	Sections 2.2 and 2.6.
Study characteristics	17	(geographic distribution: 60+ cities, 26 countries; climate zones: Csa, Cfa, Cfb, Dfb, Af/Am, BWh). A full list of included studies with characteristics (intervention type, climate zone, urban morphology, outcomes) is available from the corresponding author upon request.	Sections 3.1–3.3
Risk of bias in studies	18	All 46 included studies satisfied all four transparency indicators; thus, no high-risk studies were excluded.	Section 2.6.
Results of individual studies	19	Not applicable (narrative synthesis, no meta-analysis). Instead, ranges and illustrative values are provided: e.g., PET reduction ~2.5 °C (from 53.5 °C to 51.0 °C), UTCI reduction up to 1.6 °C, MRT reduction up to 3.0 °C	Sections 4.3.1 and 4.3.2.
Results of syntheses	20a	(characteristics: 60+ cities, 26 countries, climate zones) and Section 2.6 (risk of bias: all 46 studies met four transparency indicators).	Sections 3.1–3.3.
	20b	No meta-analysis performed. (Not applicable)	(Not applicable)
	20c	Heterogeneity explored qualitatively via subgroup analysis by climate zone (Csa, Cfa, Cfb, Dfb, Af/Am, BWh) and urban morphology (street canyon geometry, density, orientation, SVF). Results show that cooling effectiveness varies with these factors (e.g., Mediterranean courtyards achieved UTCI reduction >6 °C, while east-west canyons showed minimal improvement).	Sections 3.2 and 4.3.1.
	20d	No sensitivity analyses conducted.	(Not applicable)
Reporting biases	21	182 full-text reports could not be retrieved; potential bias acknowledged. Dual-database search (Scopus, WoS) minimised risk. No further statistical assessment.	Sections 2.5 and 4.4.3.

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Certainty of evidence	22	limitations include lack of long-term field data, simplified models.	Section 6 (Conclusions).
DISCUSSION			
Discussion	23a	Introduces an integrated conceptual framework (Figure 10); compares findings with existing literature; emphasises the multidimensional nature of outdoor thermal comfort, the mediating role of urban morphology, and the central importance of human physiological, psychological, and behavioural responses.	Section 5 (Discussion), paragraphs 1-3.
	23b	Limitations: lack of long-term field data, oversimplified models, no meta-analysis.	Section 6 (Conclusions) and Section 4.4.3.
	23c	Single reviewer screening; randomly selected 20% re-assessed with no inconsistencies; limited geographic generalisability; no registration.	Section 2.3 and Section 6.
	23d	Implications: need for context-specific green strategies, hybrid methods (field measurements + simulations), ex-post evaluations, health and equity metrics, climate-sensitive design.	Section 6 (Conclusions and Future Directions).
OTHER INFORMATION			
Registration and protocol	24a	Provide registration information for the review, including register name and registration number, or state that the review was not registered.	
	24b	A protocol was not prepared.	
	24c	No registration or protocol; therefore no amendments.	
Support	25	This research received no external funding.	
Competing interests	26	The authors declare no competing interests.	
Availability of data, code and other materials	27	Data extraction forms and extracted data are available from the corresponding author upon reasonable request. No custom analytic code used. No other materials publicly archived.	

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