INPLASY PROTOCOL

Corresponding author:
Shigong Wang

wangsg@cuit.edu.cn

Author Affiliation:
School of Public Health, Lanzhou University, Lanzhou 730000, China.

Review Stage at time of this submission: Data analysis.

Conflicts of interest:
None declared.

Classification and Comparison of Tourism Climate Indices: A Systematic Review

Song, X[1]; Wang, R[2]; Han, Y[3]; Luo, Q[4]; Hu, Y[5]; Ma, Y[6]; Fu, X[7]; Ma, P[8]; Yin, L[9]; Sun, Y[10]; Wang, S[11]; Yang, K[12].

Review question / Objective: The objectives of this systematic review were (1) to identify and systematically classify the existing tourism climate indices (TCIs), (2) to compare the climate factors and weights of TCIs, and (3) to summarize the methodology defects of developing TCIs. Specifically, the purpose of this study is to identify all the tourism climate indices developed and thereafter comparing them with the including climate factors (temperature, precipitation, sunshine, air quality, etc.) and human feelings (comfort index).
Condition being studied: This study systematically classified tourism climate indices (TCIs). TCI is an index that connects climate and human feelings, which can help people choose travel destinations and improve human body comfort.

INTRODUCTION

Review question / Objective: The objectives of this systematic review were (1) to identify and systematically classify the existing tourism climate indices (TCIs), (2) to compare the climate factors and weights of TCIs, and (3) to summarize the methodology defects of developing TCIs. Specifically, the purpose of this study is to identify all the tourism climate indices developed and thereafter comparing them with the including climate factors (temperature, precipitation, sunshine, air

quality, etc.) and human feelings (comfort index).

Rationale: The target of climate tourism is to enhance physical wellness, increase disease resistance, and improve health. The Intergovernmental Panel on Climate Change (IPCC) indicated the frequency and intensity of extreme weather events are likely to become more frequent and intense in the coming decades due to the climate change. On the other hand, with the adjustment of COVID-19 response policy and improvement in people's living standards, climate tourism will arouses a fresh surge. Tourism climate index (TCI), a type of tourism related human thermal climate comfort indices, refers to a parameter or indicator that purports to represent or signify the state or significance of the tourism destinations thermal environment and a composite measure of the climatic well-being of tourists. Developing and selecting an appropriate destination-oriented TCI with proper climate factors or combination of climate factors to quantify the suitability of a location to tourism is a priority challenge to climate tourism research and tourism meteorological services. Therefore, this study can fill the research gap. The objectives of this systematic review were (1) to identify and systematically classify the existing TCIs, (2) to compare the climate factors and weights of TCIs, and (3) to summarize the methodology defects of developing TCIs.

Condition being studied: This study systematically classified tourism climate indices (TCIs). TCI is an index that connects climate and human feelings, which can help people choose travel destinations and improve human body comfort.

METHODS

Search strategy: Electronic databases: PubMed, Web of Science, Embase, China Knowledge Resource Integrated Database (CNKI) and Chinese Biomedical Literature Database (CBM). Search strategy for PubMed: (("climate suitable"[Title/ Abstract:~2] OR "climate therapy"[Title/ Abstract:~2] OR "climate health"[Title/ Abstract:~2] OR "thermal climate"[Title/ Abstract:~2] OR "holiday climate"[Title/ Abstract:~2] OR "forest wellness"[Title/ Abstract:~2] OR "forest wellbeing"[Title/ Abstract:~2] OR "forest therapy"[Title/ Abstract:~2] OR "spring therapy"[Title/ Abstract:~2] OR "forest travel"[Title/ Abstract:~2] OR "spa travel"[Title/ Abstract:~2] OR tourism[Title/Abstract] OR tourist[Title/Abstract] OR "health travel"[Title/Abstract:~2] OR "healthy travel"[Title/Abstract:~2] OR "nature travel"[Title/Abstract:~2] OR "climate comfort"[Title/Abstract:~2] OR "climate comfortable"[Title/Abstract:~2] OR "tourism comfort"[Title/Abstract:~2] OR "tourism comfortable"[Title/Abstract:~2] OR "tourist comfort"[Title/Abstract:~2] OR "tourist comfortable"[Title/Abstract:~2] OR "travel comfort"[Title/Abstract:~2] OR "travel comfortable"[Title/Abstract:~2] OR "ocean wellness"[Title/Abstract:~2] OR "ocean wellbeing"[Title/Abstract:~2] OR "ocean therapy"[Title/Abstract:~2] OR "mountain wellness"[Title/Abstract:~2] OR "mountain wellbeing"[Title/Abstract:~2] OR " mountain therapy"[Title/Abstract:~2] OR discomfort[Title/Abstract]) OR ("Climatotherapy"[Mesh] OR "Tourism"[Mesh]) AND ((indicator* OR index* OR indice* [Title/Abstract]) OR ("Environmental Indicators"[Mesh]).

Participant or population: All population.

Intervention: Non-applicable.

Comparator: Non-applicable.

Study designs to be included: We included all the original researches. Because focusing on the development of tourism climate index (TCI), we included original studies of indicator development.

Eligibility criteria: All tourism climate indices developed to were eligible to be included in our study. Inclusion criteria were: (1) Studies on development of tourism climate indices (TCIs); (2) Studies that quantified TCIs by equations or steps; (3) Studies published in peer-reviewed

journals, patents or monographs. The exclusion criteria were as follows: (1) The TCIs considered the combined effects of economic, social and meteorological consequences; (2) Derivative indices of TCIs. For example, skiing weather indices.

Information sources: A comprehensive literature search was conducted in databases of PubMed, Web of Science, Embase, China Knowledge Resource Integrated Database (CNKI) and Chinese Biomedical Literature Database (CBM) up to November 30th, 2022. The reference lists of included studies were cross-checked to identify additional relevant studies and authors were contacted for any uncertainty.

Main outcome(s): Tourism Climate Index(TCI) is our main outcome. The study reveals that 41 indices were included, of which 33 were newly developed indices and eight were modified indices. Classification, development methods and defects of TCIs can be analyzed.

Additional outcome(s): Composition factors and weights included by each tourism climate indices (TCIs).

Data management: Study selection was completed via a two-step screening process using EndNote X9 reference manager. Two reviewers independently screened the title and abstract of all articles to identify eligible articles. In the second stage, two reviewers independently examined the full text of all potentially relevant studies according to the inclusion and exclusion criteria. A third reviewer arbitrated any differences. Two authors extracted data independently from the final selections using a pre-designed Microsoft Excel 2021 data extraction form. Descriptive information were retrieved and examined for each eligible research, including the first author, the publication year, name of index, the application scope, the development methodology, the composition factors and the defects of index.

Quality assessment / Risk of bias analysis: Our systematic review aims to identify all

the tourism climate indices (TCIs) and analyze the classification, composition factors and weights, development methods and defects of TCIs. A risk of bias analysis is non-applicable in this study.

Strategy of data synthesis: First, the basic information of tourism climate indices(TCIs) was extracted and perfected; second, TCIs were classified according to their characteristics and expert consensus; third, the single factors (such as temperature, humidity, etc.) and composite factors (such as temperature humidity index, human comfort index, etc.) in the equation were extracted, and the heat map on factors and weights was drawn and color hues were used to indicate the weight values; at last, thematic synthesis was performed to analyze the defects.

Subgroup analysis: Non-applicable.

Sensitivity analysis: Non-applicable.

Language restriction: Chinese or English.

Country(ies) involved: China.

Other relevant information: We provided list of the articles excluded in the full text screening.

Keywords: Tourism Climate Indices; Temperature; Air Pollution; Systematic Review.

Dissemination plans: We plan to deliver the journal after completing the research.

Contributions of each author:
Author 1 - Xuping Song - Dr. Song took on the task of conceptualization, methodology, writing—original draft and writing—review and editing.
Email: songxp@lzu.edu.cn
Author 2 - Rui Wang - MS. Wang took on the task of conceptualization, methodology, writing—original draft and writing—review and editing.
Email: 220220912880@lzu.edu.cn
Author 3 - Yunze Han - MS. Han took on the task of conceptualization, methodology,

writing—original draft and writing—review and editing.
Email: hanyz21@lzu.edu.cn

Author 4 - Qiyin Luo - MS. Luo took on the task of data curation, writing—original draft and writing—review and editing.
Email: 220220912660@lzu.edu.cn

Author 5 - Yue Hu - MS. Hu took on the task of data curation, writing—original draft and writing—review and editing.
Email: huy20@lzu.edu.cn

Author 6 - Yan Ma - MS. Ma took on the task of data curation, writing—original draft and writing—review and editing.
Email: may2020@lzu.edu.cn

Author 7 - Xinyu Fu - Mr. Ma took on the task of writing—original draft and writing—review and editing.
Email: fuxy19@lzu.edu.cn

Author 8 - Pan Ma - Dr. Ma took on the task of conceptualization and supervision.
Email: mapan@cuit.edu.cn

Author 9 - Li Yin - Dr. Yin took on the task of conceptualization and supervision.
Email: yinlipzh19@163.com

Author 10 - Yu Sun - Dr. Sun took on the task of conceptualization and supervision.
Email: 1461509823@qq.com

Author 11 - Shigong Wang - Dr. Wang took on the task of conceptualization, writing—original draft and supervision.
Email: wangsg@cuit.edu.cn

Author 12 - Kehu Yang - Dr. Yang took on the task of conceptualization, writing—original draft and supervision.
Email: kehuyangebm2006@126.com