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Brief Report

Protocol for a systematic review of the health impact of urban farming interventions

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Abstract: Urban farms are areas specifically dedicated to growing plants for purposes related to food security, medicinal use, and therapeutic benefits. Their prevalence has increased notably since the beginning of the 21st century, and they are associated with numerous health advantages. However, there remains a lack of consensus regarding the health impacts of urban farming. In this manuscript, we present a protocol for a systematic review which aims to provide comprehensive insight into required methods used to assess health outcomes from urban farming interventions and is registered in PROSPERO under the reference number CRD42023448001. The protocol will adhere to the PRISMA guidelines, including studies addressing urban farming interventions for any population, with no restrictions on the year of publication, in databases such as PubMed, DOAJ, CAB Abstracts, and NIH. The ROBINS-I tool will assess bias, and the certainty of evidence will be evaluated using the GRADE framework. The data will be synthesized narratively in accordance with SWiM guidelines, aligning with WHO health concepts.

Keywords: urban farming; health; repercussions; benefits; impact

1. Introduction

Urban farming refers to cultivating plants specifically within city environments for food, medicinal, or therapeutic purposes [1]. Historical accounts trace the origins of urban agriculture back to 3,500 BCE in Mesopotamia, with expansion into ancient civilizations such as Egypt and the Aztecs, eventually reaching modern countries like England, Canada, United States of America, Germany and Japan. In recent years, Japan has witnessed a 36% rise in urban farming initiatives [2,3].

Although precise user data for urban farming is scarce, the United Nations Food and Agriculture Organization (FAO) reports that 55% of the world's population resides in urban regions, with around 800 million people engaging in urban farming globally [4]. Urban areas account for 79% of worldwide food consumption, and in developing nations, 266 million households contribute to crop production. Urban farming can potentially provide a meaningful source of livelihood, offering crops that may be grown with fewer pesticides and synthetic fertilizers, which could contribute to health benefits [5].

Research has explored outcomes of urban farming interventions in various populations, highlighting potential economic savings, environmental gains, and promotion of healthier lifestyles [4]. However, limited scientific evidence directly links urban farming with health outcomes, making it difficult for health professionals to make informed recommendations [2,3,6].

This systematic review protocol aims to clarify the methodology used to assess the health impacts of urban farming interventions, providing a more transparent understanding of their potential health benefits.

2. Materials and methods

2.1. Protocol and guidelines compliance

In line with PRISMA-P guidelines, this study's protocol has been uploaded in PROSPERO portal under the number CRD42023448001, available at https://www.crd.york.ac.uk/prospero/display_record.php?ID=CRD42023448001.
The systematic review will follow the guidelines of the Cochrane Handbook for Systematic Reviews of Interventions, PRISMA statement [7], and SWiM procedures [8] for synthesis methods when meta-analysis is not suitable. The study methodology will undergo peer review.

2.2. Research question

The main research question is: what are the health outcomes of urban farming interventions?

2.3. Eligibility criteria, information sources and search strategy

The PIOS tool will guide the selection of studies, specifying years of publication, languages, and justifications (**Table 1**). Control groups will not be included, as they do not align with the study's primary focus. Searches will be conducted in multiple databases, including DOAJ, CAB Abstracts, PubMed, and NCBI, along with a snowball search of references from pertinent articles. Additional databases will be included as necessary if the snowball search warrants it. Each database will employ specific Boolean operators and MeSH terms. Detailed search strategies is presented in **Table 2**.

Table 1. Inclusion and exclusion criteria.

PIOS element	Inclusion criteria	Exclusion criteria
(P) Population	Intervention studies were included without restrictions regarding publication years or methodological approaches. Studies could be from any country and population group (age ≥18 years), provided they were published, indexed in journals in any language, and contained definitive data.	To minimize bias, literature from non-scientific sources—including gray literature, YouTube videos, general websites, and online forums—was excluded. Additionally, research protocols and preliminary results were not included.
(I) Intervention	The review focused on studies related to the practice of urban farming across various population groups.	Studies specifically concerning hydroponics or aquaponics were excluded.

Table 1. (*Continued*).

PIOS element	Inclusion criteria	Exclusion criteria
(O) Outcome	The primary outcome assessed was the impact of urban farming interventions on the health of participants.	Interventions were excluded if they did not establish a clear link to the health status of participants in any relevant areas (physical, mental, social) or if they did not indicate any improvement or detriment to health within their findings.
(S) Study Design	Only studies presenting urban farming interventions with either quantitative or qualitative methodologies were included.	Exclusions were made for literature reviews, letters to the editor, and information from blogs, forums, and newspaper columns. Studies that did not present a concrete intervention or lacked a clear methodology were also excluded.

Table 2. Search strategy.

Source	Search strategies
PubMed	((“urban”[All Fields] OR “urbanicity”[All Fields] OR “urbanism”[All Fields] OR “urbanity”[All Fields] OR “urbanization”[MeSH Terms] OR “urbanization”[All Fields] OR “urbanizations”[All Fields] OR “urbanize”[All Fields] OR “urbanized”[All Fields] OR “urbanizes”[All Fields] OR “urbanizing”[All Fields] OR “urbans”[All Fields]) AND (“agriculture”[MeSH Terms] OR “agriculture”[All Fields] OR “farming”[All Fields] OR “farm s”[All Fields] OR “farmed”[All Fields] OR “farms”[MeSH Terms] OR “farms”[All Fields]) AND ((“urban”[All Fields] OR “urbanicity”[All Fields] OR “urbanism”[All Fields] OR “urbanity”[All Fields] OR “urbanization”[MeSH Terms] OR “urbanization”[All Fields] OR “urbanizations”[All Fields] OR “urbanize”[All Fields] OR “urbanized”[All Fields] OR “urbanizes”[All Fields] OR “urbanizing”[All Fields] OR “urbans”[All Fields]) AND (“agricultural”[All Fields] OR “agriculturally”[All Fields] OR “agriculture”[MeSH Terms] OR “agriculture”[All Fields] OR “agriculture s”[All Fields] OR “agricultures”[All Fields])) AND (“health”[MeSH Terms] OR “health”[All Fields] OR “health s”[All Fields] OR “healthful”[All Fields] OR “healthfulness”[All Fields] OR “healths”[All Fields])) AND (ffrft[Filter])
DOAJ	“urban farming” “urban farming” AND “health”
CAB Abstracts	“urban farming” AND “health”
NCBI	Urban farming

2.4. Article selection, data collection, and data items

The process of article screening will involve multiple reviewers: G.C.V. and B.D.F.G. will search PubMed, while G.M.N.R. and M.N.A.O. will search DOAJ website. Articles will be reviewed by title, followed by abstract, and then complete text, with consensus at each stage of manuscript selection. Disagreements will be moderated by K.J.H.R. Data collection will be conducted by G.C.V. and B.D.F.G., with oversight from G.M.N.R. and M.A.A.N.C. Data selection process will be organized, using PRISMA’s selection flowchart (**Figure 1**).

The authors outline their data assumptions, which form the foundation for their analysis. We assumed that all participants engaged in urban farming interventions would provide honest and accurate self-reports regarding their health outcomes and farming practices (Population). Additionally, we believe that the selected studies would encompass a representative sample of the broader population involved in urban farming, capturing diverse demographic factors such as age, ethnicity, and socioeconomic status (Intervention). We also presume that the interventions would be implemented consistently across different settings, allowing for comparability of results. Furthermore, we consider that the impact of urban farming on health would be measurable through the specified outcomes, including physical, mental, and social health indicators (Outcome). Lastly, we assume that interventions involving external

factors, such as environmental conditions and access to resources, would not significantly confound the results of the interventions (Study design).

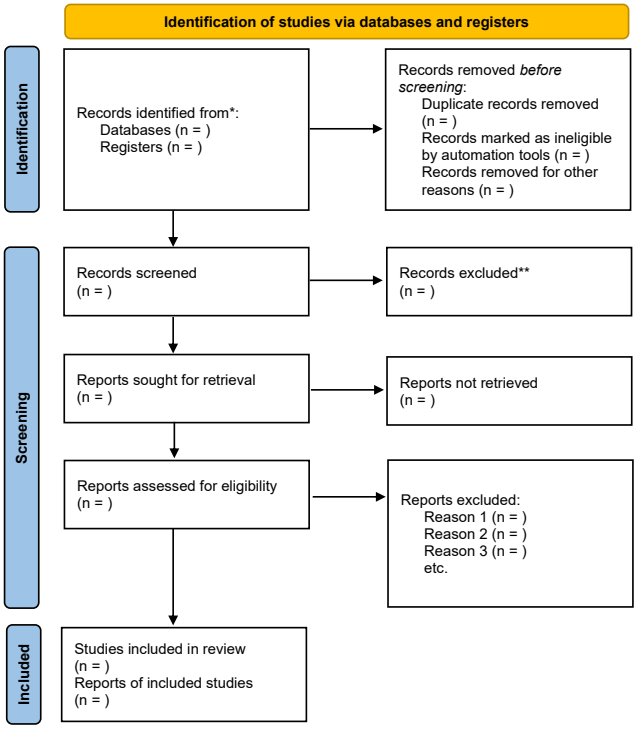

Figure 1. Selection flowchart provided by PRISMA.

2.5. Synthesis methods

The synthesis will be conducted following SWIM guidelines, categorizing interventions based on WHO's health concepts [10], such as physical, mental, and social health outcomes. If concrete evidence is lacking, results will be grouped by target population after protocol registration. Both qualitative and quantitative data will be analyzed narratively, with no statistical analysis performed due to the nature of the research question. The Table example for data extraction is presented in **Table 3,** following a format previously established by other authors [11],

Table 3. Table example for data extraction.

Manuscripts authors, year and country	**Demographic Characteristics (age, gender and any co morbidities)**	**Study Design and Methodological Approach**	**Description of the Intervention and its Objective**	**Outcome Measurement Units**	**Results (in the Intervention Group)**	**Results (in Control Group)**	**Conclusions**	**Key Findings**
1rst included manuscript								
2n included manuscript								
# included manuscript								

2.6. Risk of bias assessment

Risk of Bias and Heterogeneity G.C.V. and M.N.A.O. will evaluate risk of bias using ROBINS-I tool [9] and record data in Excel. B.D.F.G. and K.J.H.R. will review the findings and will introduce a general risk column before uploading the data to Robvis (https://mcguinlu.shinyapps.io/robvis/). Methodological heterogeneity will be assessed by comparing study designs and differences in participants, interventions, or outcomes. Domains Included in Assessment of risk of bias and author's assumption is presented in **Table 4**.

Table 4. Domains included in assessment of risk of bias.

Domain	Concept
D1: bias due to confounding	The intervention's outcomes were thoroughly evaluated
D2: bias due to selection of participants	Characteristics between the experimental and control groups were comparable
D3: bias due to classification of interventions	A detailed description of the urban farming intervention was provided
D4: bias due to deviations from intended interventions	Both the experimental and control groups followed similar procedures
D5: bias due to missing data	Results were reported clearly, aligned with the applied methodology
D6: bias due to measurement of outcomes	External factors did not influence participants during data collection
D7: bias due to selection of the reported result	Reported outcomes aligned with the intervention's objectives

2.7. Certainty of evidence

The Grading of Recommendations Assessment, Development and Evaluation (GRADE approach) [12], and summaries will be performed using the system pro guideline development tool. B.D.F.G. and K.J.H.R. will independently evaluate the manuscripts, with disagreements resolved through consensus. Detailed judgments will be included in the supplementary materials.

3. Conclusions

This protocol aims to investigate the health implications of urban farming interventions. By adhering to PRISMA-P, Cochrane Handbook, and SWiM guidelines, the study will ensure a thorough review of existing literature. The findings will provide insights into the health benefits of urban farming, potentially informing future public health policies and urban planning efforts.

Author contributions: Conceptualization, GCV, BDFG and GMNR; methodology, GCV and KJHR; software, BDFG and MNAO; validation, GMNR and MNAO; formal analysis, BDFG and KJHR; investigation, GCV and MNAO; resources, GMNR and KJHR; data curation, GCV and BDFG; writing—original draft preparation, GCV and GMNR; writing-review and editing, BDFG, KJHR and MNAO; visualization, GCV and GMNR; supervision, BDFG. and KJHR; project

administration, GCV and GMNR; funding acquisition, KJHR and MNAO. All authors have read and agreed to the published version of the manuscript.

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Conflict of interest: The authors declare no conflict of interest.

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