

Supplementary Information for Search Strategy and Quality Assessment

Search Strategy Details

Components	Description
Databases Searched	<ul style="list-style-type: none">• Scopus• PubMed• ScienceDirect
Publication Date	2019-2024
Language	English
Keywords	"Urinary tract infections (UTIs)", "Biofilm-forming bacteria", "Antibiotic resistance"
Boolean Operators	- AND (e.g., "urinary tract infections" AND "biofilm-forming bacteria" AND "antibiotic resistance") - OR (e.g., "biofilm-forming bacteria OR biofilm-producing bacteria")
Study Type	Original peer-reviewed research articles, Journal articles
Geographical Region	Worldwide

Database	Search Methodology
Scopus	<ul style="list-style-type: none">- Initial search with the search terms: "Urinary tract infections (UTI)" AND "biofilm-forming bacteria" AND "antibiotic resistance".- Applied filters within the interface.<ul style="list-style-type: none">○ Publication date: 2019-2024○ Search within: All fields○ Open access articles- Search results citation were directly exported to Mendeley to remove duplicated studies.- Search results underwent title and abstract screening and eligibility verification.- Checked for peer-reviewed status.- Full-text screening was performed and consulted with another reviewer.- Studies were assessed for risk of bias using appropriate Joanna Briggs Institute Critical Appraisal tools.
PubMed	<ul style="list-style-type: none">- Initial search with the search terms: "Urinary tract infections (UTI)" AND "biofilm-forming bacteria" AND "antibiotic resistance".- Used Advance search builder and filters within the interface.<ul style="list-style-type: none">○ Publication date: 2019-2024- Search results citation were both directly and manually exported to Mendeley to remove duplicated studies.- Search results underwent title and abstract screening and eligibility verification.

	<ul style="list-style-type: none"> - Checked for peer-reviewed status. - Full-text screening was performed and consulted with another reviewer. - Studies were assessed for risk of bias using appropriate Joanna Briggs Institute Critical Appraisal tools.
ScienceDirect	<ul style="list-style-type: none"> - Initial search with the search terms: "Urinary tract infections" AND "biofilm-forming bacteria" AND "antibiotic resistance." - Used advance search to detect term locations (in study title, abstract, and keywords). - Applied filters within the interface. <ul style="list-style-type: none"> o Publication date: 2019-2024 - Search results citation were directly exported to Mendeley to remove duplicated studies. - Search results underwent title and abstract screening and eligibility verification. - Checked for peer-reviewed status. - Full-text screening was performed and consulted with another reviewer. - Studies were assessed for risk of bias using appropriate Joanna Briggs Institute Critical Appraisal tools.

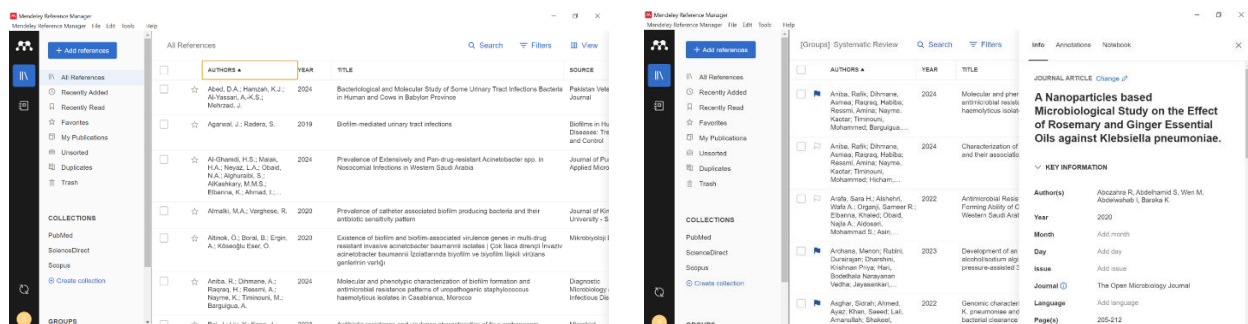
Mendeley (Version 2.128.0)

This reference management tool was used to streamline research articles. It allows users to store and organize references in collections, to check and remove duplicates, to help in creating citations and bibliography, to share references and annotate PDFs, and to import or export citations directly from web browsers and other data bases.

- Install and Set Up Mendeley Reference Management
 - The software can be downloaded from the official site of [Mendeley](https://www.mendeley.com/). Users can create an account or use their existing Elsevier account.
- Importing references to Mendeley
 - Citations of articles from databases such as PubMed, Scopus, and ScienceDirect can be directly exported to Mendeley as RIS, BibTeX, or EndNote files.
 - Users can also manually add references and fill in their details.
- Managing References
 - Users can create collections as folders to group references.
 - Under the “Duplicate” tab, users can detect duplicates and remove them.
 - Users can tag articles and highlight and annotate the PDF files (if PDF format is provided).
- Sharing of References
 - Users can create groups to collaborate on references and sync with one another.

Additional information and detailed procedure about Mendeley and how it is operated can be found at their website ([Mendeley.com](https://www.mendeley.com)).

Screenshots from Mendeley were taken by the reviewers.



Joanna Briggs Institute Appraisal Checklist

The Joanna Briggs Institute (JBI) provides appraisal tools to evaluate the quality and validity of methodology of studies included for systematic reviews. This tool aids in identifying any bias, confounding factors, and limitations within the studies' methodology hence it aids in determining high-quality.

JBI provides a checklist of questions to assess key parts of the studies. Key aspects such as but not limited to sample information, statistical analysis, confounding factors, and standard criteria. Questions are answered with four responses: "Yes", "No", "Unclear", and "Not applicable". Overall appraisal is determined whether to include, exclude, or to seek more information. The studies' quality is usually determined by the proportion of "Yes". Usually, if there are more "yes" it is considered high quality and if there are several "no" or "unclear" then it indicates methodological limitations or weaknesses. Hence careful interpretation must be observed in studies with methodological weaknesses.

JBI Critical Appraisal Checklist for Analytical Cross Sectional Studies

Reviewer _____ Date _____

Author _____ Year _____ Record Number _____

	Yes	No	Unclear	Not applicable
1. Were the criteria for inclusion in the sample clearly defined?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2. Were the study subjects and the setting described in detail?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3. Was the exposure measured in a valid and reliable way?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4. Were objective, standard criteria used for measurement of the condition?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5. Were confounding factors identified?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6. Were strategies to deal with confounding factors stated?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
7. Were the outcomes measured in a valid and reliable way?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
8. Was appropriate statistical analysis used?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Overall appraisal: Include ☐ Exclude ☐ Seek further info ☐

Comments (including reason for exclusion)

Joanna Briggs Institute Appraisal Checklist Results

Table 1. Results of critical appraisal using appropriate JBI appraisal tools

Author and Year of the Study	Score based on JBI appraisal checklist for analytical cross-sectional studies								Score	Overall Appraisal
	1	2	3	4	5	6	7	8		
1. Almalki & Varghese (2019) [9]	Y	Y	Y	Y	Y	Y	Y	Y	8	Included
2. Aniba et al. (2023) [10]	Y	Y	Y	Y	Y	Y	Y	Y	8	Included
3. Arafa et al. (2022) [11]	Y	Y	Y	Y	Y	Y	Y	Y	8	Included
4. Baldiris-Avila et al. (2020) [12]	Y	Y	Y	Y	Y	Y	Y	Y	8	Included
5. Ballen et al. (2021) [13]	Y	Y	Y	Y	Y	Y	Y	Y	8	Included
6. Dawadi et al. (2022) [14]	N	Y	Y	Y	Y	Y	Y	Y	7	Included
7. de Oliveira et al. (2020) [15]	Y	Y	Y	Y	Y	Y	Y	Y	8	Included
8. Gajdacs et al. (2021) [16]	Y	Y	Y	Y	Y	Y	Y	Y	8	Included
9. Hasan et al. (2020) [17]	N	Y	Y	Y	Y	Y	Y	Y	7	Included
10. Hashemzadeh et al. (2020) [18]	Y	Y	Y	Y	Y	Y	Y	Y	8	Included
11. Hassuna et al. (2024) [19]	Y	Y	Y	Y	Y	Y	Y	Y	8	Included
12. Kar & Devnath (2021) [20]	Y	Y	Y	Y	Y	Y	Y	Y	8	Included
13. Katongole et al. (2020) [21]	Y	Y	Y	Y	Y	Y	Y	Y	8	Included
14. Kumar et al. (2023) [22]	N	Y	Y	Y	Y	Y	Y	Y	7	Included
15. Mirzaei et al. (2021) [23]	Y	Y	Y	Y	Y	Y	Y	Y	8	Included
16. Mlugu et al. (2023) [24]	Y	Y	Y	Y	Y	Y	Y	Y	8	Included
17. Raya et al. (2019) [25]	Y	Y	Y	Y	Y	Y	Y	Y	8	Included
18. Sweden et al. (2024) [26]	N	Y	Y	Y	Y	Y	Y	Y	7	Included

Y = Yes; N = No; U = Unclear; NA = Not applicable.

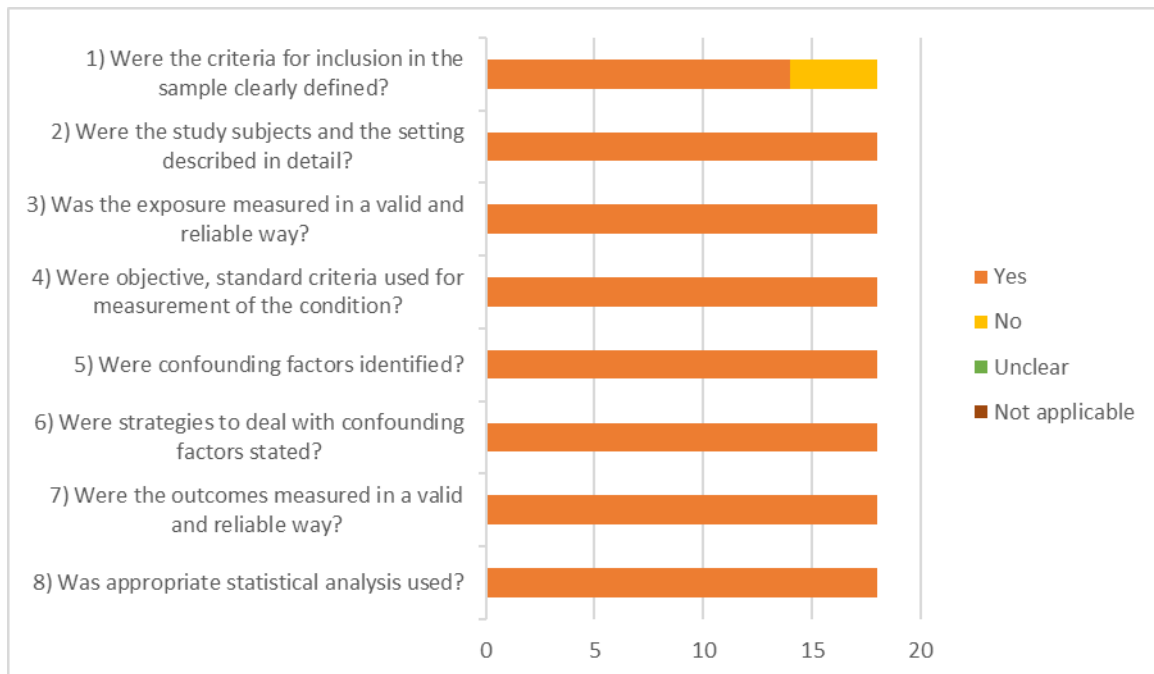


Figure 2. JBI Appraisal Checklist Results