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URINARY INCONTINENCE IN OLDER MEN: PROTOCOL FOR A SCOPING REVIEW OF RISK FACTORS

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TITLE PAGE

Protocol title: Urinary incontinence in older men: protocol for a scoping review of risk factors

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URINARY INCONTINENCE IN OLDER MEN: PROTOCOL FOR A SCOPING REVIEW OF RISK FACTORS

ABSTRACT

Introduction: Urinary Incontinence (UI) is common among older men. Epidemiological studies have established the risk factors for UI but are not always specific to men aged 65 and above. The literature is yet to be systematically and comprehensively reviewed to identify UI risk factors specific to these men. Such evidence is required for the development of evidence-based interventions. This scoping review will synthesize evidence regarding UI risk factors in older men.

Methods and analysis: The Joanna Briggs Institute (JBI) method for scoping reviews will guide the conduct of this scoping review and its reporting alongside the Preferred Reporting Items for Systematic Reviews and Meta-analyses extension for scoping reviews (PRISMA-ScR) checklist. JBI's Population, Concept, and Context (PCC) framework is used to frame inclusion criteria, and JBI's scoping review protocol template is used to format this protocol. Our comprehensive search will include Ovid MEDLINE, Ovid Embase, CINAHL, Scopus, Web of Science Core Collection, Cochrane Library (via Wiley), and ProQuest Dissertations & Theses Global. There will be no language restriction since approximately 10% of preliminary search results were in languages other than English (LOTE). Study type or publication date will not be restricted. Besides databases, we will review Google Scholar results and bibliographies. Two independent reviewers will screen, select, and extract eligible studies. A preliminary search strategy and data extraction template are in the appendix. A qualitative and quantitative analysis of data will be performed as a means of describing the risk factors for UI identified among older men by using frequencies and descriptive methods.

Ethics and dissemination: The review does not require ethics approval. Findings will be disseminated at conferences, in a peer-reviewed journal and used to inform the development of an evidence-based tool for self-management of UI in older men.

Registration: The protocol is registered in the Open Science Framework [<https://osf.io/xsrge/>].

Strengths and limitations of the proposed study

- In this review, evidence on UI risk factors will be mapped and synthesized in a systematic and comprehensive way, focusing specifically on older men.
- Cost-effective prevention and treatment programs aimed at older men will be informed by an understanding of UI risk factors.
- It will identify knowledge gaps associated with UI risk factors among older men, thereby highlighting future research directions.
- In order to map out the evidence base, the review will not include a quality appraisal of individual sources of evidence, regardless of their level on the hierarchy of evidence. This is in accordance with the JBI's scoping review method.

INTRODUCTION

The International Continence Society defines urinary incontinence (UI) as the complaint of any involuntary leakage of urine.[1] UI comes with huge costs to individuals, employers, and the health care system in Canada, estimated at \$8.5 billion annually in 2014,[2] and \$65.9 billion in the United States in 2007.[3] For the majority of sufferers, UI is a chronic stigmatizing condition that is under-reported and under-treated.[2] UI is under-prioritized and under-researched, particularly in older men (defined here as men 65+), and there have been calls for more targeted research focusing on this specific group.[4,5]

The prevalence of male UI is higher among older than younger men, reaching 30% compared to 10% and 16% in younger and middle-aged men from a Canadian Bladder survey.[6] In the United States, UI prevalence increases with age from 11% among men 60 to 64 years old to 31% among men 85 years and above.[7] According to evidence gathered from studies conducted in over 20 countries across the continents, the prevalence of UI was 4.81% to 32.17% among community-dwelling men and 21% to 32% among older men.[8] The Sixth International Consultation on Incontinence notes that the epidemiology of male UI has received less attention compared to female UI, and that UI prevalence seems to rise more steadily with advancing age in males than in females.[5] The prevalence of Urgency Urinary Incontinence is similar in both men and women and increases in association with increasing age.[9]

Although the overall prevalence of UI in older men is about half that of older women,[5] the consequences of UI in older men are equally far-reaching, affecting their quality of life, levels of physical activity, and economic productivity, posing significant physical, psychological, social, sexual, and financial burdens.[10] Similar to the experiences of older women, UI in older men increases the risks of institutionalization,[8] self-isolation, and depression.[2]

Much of the limited research on male UI has focused on its prevalence [6,8,11] and associated risk factors in general [8,11,12].

Most UI epidemiological studies have not systematically identified risk factors for UI in older men and have not sought to categorize them. Although age groups were not specified, the Sixth International Consultation on Incontinence documents some established risk factors predisposing men in general to UI including "increasing age, presence of LUTS, urinary tract infections, functional and cognitive impairment, diabetes, alcohol intake, neurological disorders, and prostatectomy." [5]

Given the financial burden of UI, an understanding of risk factors can inform cost-effective prevention and treatment programs such as self-management; a promising and proven intervention for managing chronic conditions like UI.[13] Evidence about factors amenable to modification will allow the development of evidence-based interventions for self-management of UI in older men, a strategy found to be effective in older women.[14,15]

1
2
3 So far, self-management intervention packages for men have targeted uncomplicated lower urinary tract
4 symptoms (LUTS) generally and mostly in men with prostate disease (Benign Prostatic Hyperplasia
5 [BPH]/Benign Prostatic Enlargement [BPE]). These packages vary in their components, recommendations,
6 and outcomes.[16–18] The inconsistencies and heterogeneity of these recommendations, the lack of clarity
7 as to what should constitute the optimal package of components for self-management,[27] and the need to
8 focus specifically on the population of older men with UI [4] necessitate a comprehensive mapping of the
9 full breadth of evidence through a scoping review of risk factors for UI in older men.
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14 As part of a larger study, this scoping review aims to synthesize evidence on risk factors as the starting
15 point in the creation of a self-management intervention targeting older men. The findings from this scoping
16 review will inform a formal process to define and prioritize risk factors amenable to self-management that
17 older male patients find practicable and are potentially willing to modify.
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21 The objective of this scoping review therefore is to identify risk factors for UI in older men.
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24 We found no current or ongoing review on our topic after a preliminary search of MEDLINE, PubMed, the
25 Cochrane Database of Systematic Reviews, and *JB* Evidence Synthesis. In addition, inquiries to subject
26 matter experts at the 2022 International Continence Society's scientific conference revealed that our topic
27 was not currently under review.
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31 **Review question**

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33 What are the risk factors for urinary incontinence in older men?
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35

36 **Eligibility criteria**

37

38 *Participants*

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41 Our review will include sources of evidence identifying the risk factors among older men (65+) with UI. We
42 will exclude data solely from men aged < 65 years of age.
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44

45 *Concepts*

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48 Urinary incontinence is a storage symptom of the lower urinary tract defined as the complaint of any
49 involuntary loss/leakage of urine.[1] UI can be classified as reversible or established. Reversible UI has a
50 treatable cause and is more common among hospitalized older patients, and residents in long-term care
51 [19] while established UI is chronic, and it may not be possible to identify a reversible cause. The five major
52 types of established UI are urgency, stress (exertional), overflow, functional (disability associated), and
53 mixed urinary incontinence.[20]
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3 Risk factors are characteristics, conditions, behaviours or exposures that increase the likelihood of getting
4 a disease or injury.[21] There are general risk factors that may apply to chronic diseases in general (tobacco
5 use, alcohol consumption, physical inactivity, excess weight, and poor nutrition)[22] as well as specific risk
6 factors for UI. They also include those characteristics or conditions that increase the possibility of getting a
7 disease or injury.[21] Generally, risk factors can be grouped into categories: *Behavioural risk factors* relate
8 to the actions that individuals have chosen to take, and can be eliminated or modified through lifestyle or
9 behavioural changes. Examples include tobacco smoking, excessive alcohol use, poor nutrition, and
10 physical inactivity.[21] *Physiological risk factors* are those relating to an individual's body. They may be
11 influenced by an interaction of genetics, lifestyle, and other broad factors. Examples include overweight or
12 obesity, high blood pressure, high blood cholesterol, and high blood sugar. *Demographic risk factors* relate
13 to the overall population. Examples are age, occupation, religion, or income. *Environmental risk factors*
14 cover a wide range of topics such as social, economic, cultural, political, physical, chemical, and biological
15 factors. Examples include air pollution, workplace risks, access to clean water and sanitation, and social
16 interactions. *Genetic risk factors* are based on an individual's genetic make-up. While some diseases are
17 mainly genetic, others reflect an interaction between genetic and environmental factors.[21]
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26 *Context*

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28 All settings for older men with UI.
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31 *Types of sources*

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33 All study designs will be included in this scoping review without restriction. It will consider published and
34 unpublished sources. Text, opinion papers, and other grey literature will also be considered for
35 inclusion.[23]
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39 **METHODS AND ANALYSIS**

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41 We will conduct our scoping review following the Joanna Briggs Institute (JBI) method for scoping
42 review,[23] and in line with the Preferred Reporting Items for Systematic Reviews and Meta-analyses
43 extension for scoping reviews (PRISMA-ScR) checklist.[24]
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47 **Search strategy**

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49 The search strategy will aim to locate both published and unpublished studies. A librarian scientist (JK)
50 performed an initial search of MEDLINE to identify articles on the topic. The text words contained in the
51 titles and abstracts of relevant articles, and the index terms used to describe the articles were used to
52 develop a full search strategy for Ovid MEDLINE (Appendix I). The search strategy, including all identified
53 keywords and index terms, will be adapted for each included database or information source. This strategy
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3 will be reviewed by other members of the research team and if necessary, by a second librarian scientist
4 using the Peer Review of Electronic Search Strategies (PRESS) guideline.[25]
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7 Studies published in any language will be included. We will compare translations from two validated online
8 language translators; DeepL translator and Google translator (<https://www.deepl.com/en/translator> and
9 <https://translate.google.com/>) for LOTE and double-check with colleagues who are known native speakers
10 of the LOTE when necessary. Relevant studies published since the inception of the databases to date will
11 be included. In addition to subscription databases, the research team will review the first 200 results from
12 Google Scholar for inclusion. This is a reasonable number of results to screen since there is a high overlap
13 between Web of Science and Google Scholar.[26] The reference list of all included sources of evidence will
14 be screened for additional studies.
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20 The databases to be searched are Ovid MEDLINE, Ovid Embase, CINAHL, Scopus, Web of Science Core
21 Collection, Cochrane Library (via Wiley), and ProQuest Dissertations & Theses Global. Sources of
22 unpublished studies/ grey literature include (conference proceedings, information from government health
23 agencies, academic institutions, and professional societies). Grey literature consists of unpublished
24 literature, including publicly available information produced by all levels of government, academic
25 institutions, business, and industry, in print and electronic formats, which is not controlled by commercial
26 publishers.[27] We will use general and targeted internet searches for the electronic formats of these
27 documents. General searches will involve the use of Google, while targeted searches will examine the
28 websites of national and international organizations addressing the subject matter.
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34 **Study/Source of Evidence selection**

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36 All identified citations from the search will be collated and uploaded into Covidence (Veritas Health
37 Innovation Ltd, Melbourne); a web-based collaboration software platform that streamlines the production of
38 systematic and other literature reviews.[28] After automatic removal of duplicates, two reviewers will
39 independently screen titles and abstracts of a random sample of 5% of studies identified with our literature
40 search. They will discuss the results and review the eligibility criteria as needed. We will check the inter-
41 reviewer agreement for inclusion or exclusion between these reviewers using the kappa statistics.[29] A
42 Cohen kappa coefficient (κ value) of 0.41-0.60 indicates moderate agreement, 0.61-0.80 indicates
43 substantial agreement, and 0.81-1.00 is almost perfect agreement.[29] κ value >0.61 will be considered
44 sufficient to proceed.
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50 Potential reasons for exclusion will be defined a priori, categorized, recorded, and reported in the scoping
51 review. The full text of included citations will then be assessed in detail against the inclusion criteria by two
52 independent reviewers. Any disagreements that arise during the selection process will be resolved through
53 discussion and consensus between reviewers, and if needed, with a third party.[23] The results of the
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3 search and the study inclusion process will be reported in full and presented in a Preferred Reporting Items
4 for Systematic Reviews and Meta-analyses extension for scoping review (PRISMA-ScR) flow diagram.[24]
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7 **Data Extraction**

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9 Data will be extracted from papers using a data extraction tool developed by the reviewers. The data
10 extracted will include specific details about the country, authors, participants, concept, context, study
11 methods, and key findings relevant to the review question.
12
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15 A draft extraction form is provided (Appendix II).[30] Two reviewers will pilot test the draft extraction form
16 through a calibration exercise to guide the selection of evidence sources to ensure the form captures all
17 relevant data. They will then extract data independently from included studies into the draft. The draft data
18 extraction tool will be modified and revised as necessary. Any modifications will be detailed in the scoping
19 review. Any disagreements that arise between the reviewers will be resolved through discussion, or with
20 an additional reviewer. If appropriate, authors of papers will be contacted to request missing or additional
21 data where required.
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26 **Risk of bias**

27
28 In accordance with JBI method for scoping reviews, no quality appraisal will be conducted.[23] Rather than
29 engaging in formal quality assessments, we will assign a level of evidence rating to each study based on
30 JBI's well-established categorization of studies.
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34 **Data Analysis and Presentation**

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36 We will summarize data quantitatively (using frequencies) and qualitatively (using the descriptive-analytical
37 method). If possible, we will stratify results by the economic status of the country (e.g., low-, middle-, or
38 high-income country), ethnicity/race, and health context (e.g., primary care, secondary, and tertiary care).
39 Data will be presented in diagrammatic or tabular form. A narrative summary will accompany the tables and
40 charts and will describe how the results relate to the review objective and question.
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45 **Patient and public involvement**

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47 It might not be appropriate or possible to involve patients or the public in the design, conduct, reporting
48 and dissemination plans of our review. However, a patient advisory group will be involved in translating
49 evidence from the review into co-creating a patient-centered tool for self-management of UI in the context
50 of a larger study.
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Ethics and dissemination

The review does not require ethics approval. Findings will be disseminated through presentations at conferences/workshops, peer-reviewed publication, health blogs, and other social media platforms such as LinkedIn, Twitter, and Instagram.

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Authors' contributions: OO and AW contributed to the conceptualization, design, literature search, manuscript writing and manuscript editing. JK developed the search strategy, conducted the searches, and contributed to manuscript writing. WG contributed to the literature search, manuscript review and editing. All authors approved the final manuscript.

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Patient consent for publication: Not required.

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APPENDIXES

Appendix I: Search strategy

Ovid MEDLINE(R) ALL <1946 to May 24, 2022>

1	exp Male/ and exp Aged/	2,684,034
2	exp Aging/ and exp Male/	135,117
3	exp Male/ and exp "Aged, 80 and over"/	850,025
4	exp Geriatrics/ and exp Male/	4,724
5	((older or ag?ing or aged or senior* or elder* or gerontolog* or geriatric* or "old age") adj3 (male* or man or men)).mp.	105,120
6	(men over adj ("60" or "65" or "70" or "75" or "80" or "85" or "90")).mp.	414
7	(male* over adj ("60" or "65" or "70" or "75" or "80" or "85" or "90")).mp.	148
8	or/1-7	2,807,887
9	exp Urinary Incontinence/	35,150
10	((urin* or bladder) adj2 (incontinen* or continen*)).mp.	48,546
11	exp Urinary Bladder, Overactive/	5,510
12	((overactiv* or hyper* or detrusor or vesic*) adj2 bladder).mp.	11,440
13	(bladder* adj2 (neuropath* or neurogen* or neurolog*)).mp.	10,343
14	((bladder or detrusor or vesic*) adj5 (instability or stab* or unstable or irritab* or hyperreflexia or dys?ynerg* or dyskinesi* or irritat*)).mp.	6,390
15	(nervous adj1 (pollakisur* or pollakiur*)).mp.	5
16	or/9-15	67,490
17	exp Risk Factors/	926,730
18	risk*.ti. or risk factor*.ab. /freq=3	613,850
19	(predict* or cause*).ti. or ((modifiable or behavio?r* or contribut* or transient* or adjust* or temporar* or chang* or adapt* or alter*) adj3 (factor* or predict* or cause*)).mp.	1,005,389
20	relative risk*.mp.	86,221
21	or/17-20	2,172,971
22	8 and 16 and 21	1,662
23	limit 22 to english language	1,493

Appendix II: Data extraction form

Study Details	
Author/year	
objectives	
Participants (characteristics/total number)	
Setting/context	
Description of Interventions/phenomena of interest	
Search Details	
Sources searched	
Range (yrs) of included studies	
Number of studies included	
Types of studies included	
Country of origin of incl. studies	
Analysis	
Method of analysis	
Outcome assessed	
Results/Findings	
Significance/direction	
Heterogeneity	
Comments	

BMJ Open

URINARY INCONTINENCE IN OLDER MEN: PROTOCOL FOR A SCOPING REVIEW OF RISK FACTORS

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Manuscripts

TITLE PAGE

Protocol title: Urinary incontinence in older men: protocol for a scoping review of risk factors

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URINARY INCONTINENCE IN OLDER MEN: PROTOCOL FOR A SCOPING REVIEW OF RISK FACTORS

ABSTRACT

Introduction: Urinary Incontinence (UI) is common among older men. Epidemiological studies have established many risk factors for UI but these studies are not always specific to men aged 65 and above. The literature is yet to be systematically and comprehensively reviewed to identify UI risk factors specific to these men. Such evidence is required for the development of evidence-based interventions. This scoping review will synthesize evidence regarding UI risk factors in older men.

Methods and analysis: The Joanna Briggs Institute (JBI) method for scoping reviews will guide the conduct of this scoping review and its reporting alongside the Preferred Reporting Items for Systematic Reviews and Meta-analyses extension for scoping reviews (PRISMA-ScR) checklist. JBI's Population, Concept, and Context (PCC) framework is used to frame inclusion criteria, and JBI's scoping review protocol template is used to format this protocol. Our comprehensive search will include Ovid MEDLINE, Ovid Embase, CINAHL, Scopus, Web of Science Core Collection, Cochrane Library (via Wiley), and ProQuest Dissertations & Theses Global. There will be no language restriction since approximately 10% of preliminary search results were in languages other than English (LOTE). Study type or publication date will not be restricted. Besides databases, we will review Google Scholar results and bibliographies. Two independent reviewers will screen, select, and extract eligible studies. A preliminary search was performed on 24th May, 2022. The search strategy and data extraction template are in the appendix. A qualitative and quantitative analysis of data will be performed as a means of describing the risk factors for UI identified among older men by using frequencies and descriptive methods.

Ethics and dissemination: The review does not require ethics approval. Findings will be disseminated at conferences, in a peer-reviewed journal and used to inform the development of an evidence-based tool for self-management of UI in older men.

Registration: The protocol is registered in the Open Science Framework [<https://osf.io/xsrge/>].

Strengths and limitations of the proposed study

- In this review, evidence on UI risk factors will be mapped and synthesized in a systematic and comprehensive way, focusing specifically on older men.
- Cost-effective prevention and treatment programs aimed at older men will be informed by an understanding of UI risk factors.
- It will identify knowledge gaps associated with UI risk factors among older men, thereby highlighting future research directions.
- In order to map out the evidence base, the review will not include a quality appraisal of individual sources of evidence, regardless of their level on the hierarchy of evidence. This is in accordance with the JBI's scoping review method.

INTRODUCTION

The International Continence Society defines urinary incontinence (UI) as the complaint of any involuntary leakage of urine.[1] UI comes with huge costs to individuals, employers, and the health care system in Canada, estimated at \$8.5 billion annually in 2014,[2] and \$65.9 billion in the United States in 2007.[3] For the majority of sufferers, UI is a chronic stigmatizing condition that is under-reported and under-treated.[2] UI is under-prioritized and under-researched, particularly in older men (defined here as men 65+), and there have been calls for more targeted research focusing on this specific group.[4,5]

The prevalence of male UI is higher among older than younger men, reaching 30% compared to 10% and 16% in younger and middle-aged men from a Canadian Bladder survey.[6] In the United States, UI prevalence increases with age from 11% among men 60 to 64 years old to 31% among men 85 years and above.[7] International epidemiological data suggest that the prevalence of UI is 4.81% to 32.17% among community-dwelling men and 21% to 32% among older men.[8] The Sixth International Consultation on Incontinence notes that the epidemiology of male UI has received less attention compared to female UI, and that UI prevalence seems to rise more steadily with advancing age in males than in females.[5] The prevalence of Urgency Urinary Incontinence is similar in both men and women and increases in association with increasing age.[9]

Although the overall prevalence of UI in older men is about half that of older women,[5] the consequences of UI in older men are equally far-reaching, affecting their quality of life, levels of physical activity, and economic productivity, posing significant physical, psychological, social, sexual, and financial burdens.[10] Similar to the experiences of older women, UI in older men increases the risks of institutionalization,[8] self-isolation, and depression.[2]

Much of the limited research on male UI has focused on its prevalence [6,8,11] and associated risk factors in general [8,11,12].

Most UI epidemiological studies have not systematically identified risk factors for UI in older men and have not sought to categorize them. Although age groups were not specified, the Sixth International Consultation on Incontinence documents some established risk factors predisposing men in general to UI including "increasing age, presence of LUTS, urinary tract infections, functional and cognitive impairment, diabetes, alcohol intake, neurological disorders, and prostatectomy." [5]

Given the financial burden of UI, an understanding of risk factors can inform cost-effective prevention and treatment programs such as self-management; a promising and proven intervention for managing chronic conditions like UI.[13] Evidence about factors amenable to modification will allow the development of evidence-based interventions for self-management of UI in older men, a strategy found to be effective in older women.[14,15]

1
2
3 So far, self-management intervention packages for men have targeted uncomplicated lower urinary tract
4 symptoms (LUTS) generally and mostly in men with prostate disease (Benign Prostatic Hyperplasia
5 [BPH]/Benign Prostatic Enlargement [BPE]). These packages vary in their components, recommendations,
6 and outcomes.[16–18] The inconsistencies and heterogeneity of these recommendations, the lack of clarity
7 as to what should constitute the optimal package of components for self-management, and the need to
8 focus specifically on the population of older men with UI [4] necessitate a comprehensive mapping of the
9 full breadth of evidence through a scoping review of risk factors for UI in older men.
10
11
12
13

14 As part of a larger study, this scoping review aims to synthesize evidence on risk factors as the starting
15 point in the creation of a self-management intervention targeting older men. The findings from this scoping
16 review will inform a formal process to define and prioritize risk factors amenable to self-management that
17 older male patients find practicable and are potentially willing to modify.
18
19
20

21 The objective of this scoping review therefore is to identify risk factors for UI in older men.
22
23

24 We found no current or ongoing review on our topic after a preliminary search of MEDLINE, PubMed, the
25 Cochrane Database of Systematic Reviews, and *JBI Evidence Synthesis*. In addition, inquiries to subject
26 matter experts at the 2022 International Continence Society's scientific conference revealed that our topic
27 was not currently under review.
28
29
30

31 **Review question**

32
33 What are the risk factors for urinary incontinence in older men?
34
35

36 **Eligibility criteria**

37 *Participants*

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39
40
41 **Inclusion criteria:** All sources of evidence on UI risk factors that include older men (65+).
42
43

44 **Exclusion criteria:** Data derived solely from men under 65 years of age or exclusively from women will
45 be excluded. We will exclude articles featuring combined datasets where it is impossible to extract the UI
46 risk factors for older men due to a lack of age stratification. Similarly, where studies retrieved include
47 information on both men and women, only data stratified by sex will be reported.
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49
50

51 *Concepts*

52
53 Urinary incontinence is a storage symptom of the lower urinary tract defined as the complaint of any
54 involuntary loss/leakage of urine.[1] UI can be classified as reversible or established. Reversible UI has a
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57

1
2
3 treatable cause and is more common among hospitalized older patients, and residents in long-term care
4 [19] while established UI is chronic, and it may not be possible to identify a reversible cause. The five major
5 types of established UI are urgency, stress (exertional), overflow, functional (disability associated), and
6 mixed urinary incontinence.[20]
7
8

9
10 Risk factors are characteristics, conditions, behaviours or exposures that increase the likelihood of getting
11 a disease or injury.[21] There are general risk factors that may apply to chronic diseases in general (tobacco
12 use, alcohol consumption, physical inactivity, excess weight, and poor nutrition)[22] as well as specific risk
13 factors for UI. They also include those characteristics or conditions that increase the possibility of getting a
14 disease or injury.[21] Generally, risk factors can be grouped into categories: *Behavioural risk factors* relate
15 to the actions that individuals have chosen to take, and can be eliminated or modified through lifestyle or
16 behavioural changes. Examples include tobacco smoking, excessive alcohol use, poor nutrition, and
17 physical inactivity.[21] *Physiological risk factors* are those relating to an individual's body. They may be
18 influenced by an interaction of genetics, lifestyle, and other broad factors. Examples include overweight or
19 obesity, high blood pressure, high blood cholesterol, and high blood sugar. *Demographic risk factors* relate
20 to the overall population. Examples are age, occupation, religion, or income. *Environmental risk factors*
21 cover a wide range of topics such as social, economic, cultural, political, physical, chemical, and biological
22 factors. Examples include air pollution, workplace risks, access to clean water and sanitation, and social
23 interactions. *Genetic risk factors* are based on an individual's genetic make-up. While some diseases are
24 mainly genetic, others reflect an interaction between genetic and environmental factors.[21]
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32 *Context*

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35 All settings for older men with UI.
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38 *Types of sources*

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40 All study designs will be included in this scoping review without restriction. It will consider published and
41 unpublished sources. Text, opinion papers, and other grey literature will also be considered for
42 inclusion.[23]
43
44
45

46 **METHODS AND ANALYSIS**

47
48 We will conduct our scoping review following the Joanna Briggs Institute (JBI) method for scoping
49 review,[23] and in line with the Preferred Reporting Items for Systematic Reviews and Meta-analyses
50 extension for scoping reviews (PRISMA-ScR) checklist.[24]
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Search strategy

The search strategy will aim to locate both published and unpublished studies. A medical librarian (JYK) performed an initial search of MEDLINE on 24th May, 2022, to identify articles on the topic. The text words contained in the titles and abstracts of relevant articles, and the index terms used to describe the articles were used to develop a full search strategy for Ovid MEDLINE (Appendix I). The search strategy, including all identified keywords and index terms, will be adapted for each included database or information source. It will be reviewed by other members of the research team and if necessary, by a second librarian using the Peer Review of Electronic Search Strategies (PRESS) guideline.[25] The search strategy will be updated six months after it was originally run, and prior to submission for publication, the search will be updated to reflect newly published studies since the original run.

Studies published in any language will be included. We will compare translations from two validated online language translators; DeepL translator and Google translator (<https://www.deepl.com/en/translator> and <https://translate.google.com/>) for LOTE and double-check with colleagues who are known native speakers of the LOTE when necessary. Relevant studies published since the inception of the databases to date will be included. In addition to subscription databases, the research team will review the first 200 results from Google Scholar for inclusion. This is a reasonable number of results to screen since there is a high overlap between Web of Science and Google Scholar.[26] The reference list of all included sources of evidence will be screened for additional studies.

The databases to be searched are Ovid MEDLINE, Ovid Embase, CINAHL, Scopus, Web of Science Core Collection, Cochrane Library (via Wiley), and ProQuest Dissertations & Theses Global. Sources of unpublished studies/ grey literature include (conference proceedings, information from government health agencies, academic institutions, and professional societies). Grey literature consists of unpublished literature, including publicly available information produced by all levels of government, academic institutions, business, and industry, in print and electronic formats, which is not controlled by commercial publishers.[27] We will use general and targeted internet searches for the electronic formats of these documents. General searches will involve the use of Google, while targeted searches will examine the websites of national and international organizations addressing the subject matter.

Study/Source of Evidence selection

All identified citations from the search will be collated and uploaded into Covidence (Veritas Health Innovation Ltd, Melbourne); a web-based collaboration software platform that streamlines the production of systematic and other literature reviews.[28] After automatic removal of duplicates, two reviewers will independently screen titles and abstracts of a random sample of 5% of studies identified with our literature search. They will discuss the results and review the eligibility criteria as needed. We will check the inter-

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2
3 reviewer agreement for inclusion or exclusion between these reviewers using the kappa statistics.[29] A
4 Cohen kappa coefficient (κ value) of 0.41-0.60 indicates moderate agreement, 0.61-0.80 indicates
5 substantial agreement, and 0.81-1.00 is almost perfect agreement.[29] κ value >0.61 will be considered
6 sufficient to proceed.
7
8
9

10 Potential reasons for exclusion will be defined a priori, categorized, recorded, and reported in the scoping
11 review. The full text of included citations will then be assessed in detail against the inclusion criteria by two
12 independent reviewers. Any disagreements that arise during the selection process will be resolved through
13 discussion and consensus between reviewers, and if needed, with a third party.[23] The results of the
14 search and the study inclusion process will be reported in full and presented in a Preferred Reporting Items
15 for Systematic Reviews and Meta-analyses extension for scoping review (PRISMA-ScR) flow diagram.[24]
16
17
18

19 **Data Extraction**

20 Data will be extracted from papers using a data extraction tool based on JBI's data extraction form template
21 (Appendix II).[30] The data extracted will include specific details about the country, authors, participants,
22 concept, context, study methods, and key findings relevant to the review question.
23
24
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27 Two reviewers will pilot test the draft extraction form through a calibration exercise to guide the selection of
28 evidence sources to ensure the form captures all relevant data. They will then extract data independently
29 from included studies into the draft. The draft data extraction tool will be modified and revised as necessary.
30 Any modifications will be detailed in the scoping review. Any disagreements that arise between the
31 reviewers will be resolved through discussion, or with an additional reviewer. If appropriate, authors of
32 papers will be contacted to request missing or additional data where required.
33
34
35
36

37 **Risk of bias**

38 In accordance with JBI method for scoping reviews, no quality appraisal will be conducted.[23] Rather than
39 engaging in formal quality assessments, we will assign a level of evidence rating to each study based on
40 JBI's well-established categorization of studies.
41
42
43
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45 **Data Analysis and Presentation**

46 We will summarize data quantitatively (using frequencies) and qualitatively (using the descriptive-analytical
47 method). If possible, we will stratify results by the economic status of the country (e.g., low-, middle-, or
48 high-income country), ethnicity/race, and health context (e.g., primary, secondary, and tertiary care). Data
49 will be presented in diagrammatic or tabular form. A narrative summary will accompany the tables and
50 charts and will describe how the results relate to the review objective and question.
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Patient and public involvement

It might not be appropriate or possible to involve patients or the public in the design, conduct, reporting and dissemination plans of our review. However, a patient advisory group will be involved in translating evidence from the review into co-creating a patient-centered tool for self-management of UI in the context of a larger study.

Ethics and dissemination

The review does not require ethics approval. Findings will be disseminated through presentations at conferences/workshops, peer-reviewed publication, health blogs, and other social media platforms such as LinkedIn, Twitter, and Instagram.

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Authors' contributions: OO and AW contributed to the conceptualization, design, literature search, manuscript writing and manuscript editing. JK developed the search strategy, conducted the searches, and contributed to manuscript writing. WG contributed to the literature search, manuscript review and editing. All authors approved the final manuscript.

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Competing interest statement: The authors have no competing interests to declare.

Patient consent for publication: Not required.

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46 [material-3.pdf?download=true](https://bmjopen.bmj.com/content/bmjopen/9/7/e029811/DC3/embed/inline-supplementary-material-3.pdf?download=true)
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APPENDIXES

Appendix I: Search strategy

Ovid MEDLINE(R) ALL <1946 to May 24, 2022>

1	exp Male/ and exp Aged/	2,684,034
2	exp Aging/ and exp Male/	135,117
3	exp Male/ and exp "Aged, 80 and over"/	850,025
4	exp Geriatrics/ and exp Male/	4,724
5	((older or ag?ing or aged or senior* or elder* or gerontolog* or geriatric* or "old age") adj3 (male* or man or men)).mp.	105,120
6	(men over adj ("60" or "65" or "70" or "75" or "80" or "85" or "90")).mp.	414
7	(male* over adj ("60" or "65" or "70" or "75" or "80" or "85" or "90")).mp.	148
8	or/1-7	2,807,887
9	exp Urinary Incontinence/	35,150
10	((urin* or bladder) adj2 (incontinen* or continen*)).mp.	48,546
11	exp Urinary Bladder, Overactive/	5,510
12	((overactiv* or hyper* or detrusor or vesic*) adj2 bladder).mp.	11,440
13	(bladder* adj2 (neuropath* or neurogen* or neurolog*)).mp.	10,343
14	((bladder or detrusor or vesic*) adj5 (instability or stab* or unstable or irritab* or hyperreflexia or dys?ynerg* or dyskinesi* or irritat*)).mp.	6,390
15	(nervous adj1 (pollakisur* or pollakiur*)).mp.	5
16	or/9-15	67,490
17	exp Risk Factors/	926,730
18	risk*.ti. or risk factor*.ab. /freq=3	613,850
19	(predict* or cause*).ti. or ((modifiable or behavio?r* or contribut* or transient* or adjust* or temporar* or chang* or adapt* or alter*) adj3 (factor* or predict* or cause*)).mp.	1,005,389
20	relative risk*.mp.	86,221
21	or/17-20	2,172,971
22	8 and 16 and 21	1,662

Appendix II: Data extraction form

Study Details	
Author/year	
objectives	
Participants (characteristics/total number)	
Setting/context	
Description of Interventions/phenomena of interest	
Search Details	
Sources searched	
Range (yrs) of included studies	
Number of studies included	
Types of studies included	
Country of origin of incl. studies	
Analysis	
Method of analysis	
Outcome assessed	
Results/Findings	
Significance/direction	
Heterogeneity	
Comments	

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URINARY INCONTINENCE IN OLDER MEN: PROTOCOL FOR A SCOPING REVIEW OF RISK FACTORS

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TITLE PAGE

Protocol title: Urinary incontinence in older men: protocol for a scoping review of risk factors

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URINARY INCONTINENCE IN OLDER MEN: PROTOCOL FOR A SCOPING REVIEW OF RISK FACTORS

ABSTRACT

Introduction: Urinary Incontinence (UI) is common among older men. Epidemiological studies have established many risk factors for UI but these studies are not always specific to men aged 65 and above. The literature is yet to be systematically and comprehensively reviewed to identify UI risk factors specific to these men. Such evidence is required for the development of evidence-based interventions. This scoping review will synthesize evidence regarding UI risk factors in older men.

Methods and analysis: The Joanna Briggs Institute (JBI) method for scoping reviews will guide the conduct of this scoping review and its reporting alongside the Preferred Reporting Items for Systematic Reviews and Meta-analyses extension for scoping reviews (PRISMA-ScR) checklist. JBI's Population, Concept, and Context (PCC) framework is used to frame inclusion criteria, and JBI's scoping review protocol template is used to format this protocol. Our comprehensive search will include Ovid MEDLINE, Ovid Embase, CINAHL, Scopus, Web of Science Core Collection, Cochrane Library (via Wiley), and ProQuest Dissertations & Theses Global. There will be no language restriction since approximately 10% of preliminary search results were in languages other than English (LOTE). Study type or publication date will not be restricted. Besides databases, we will review Google Scholar results and bibliographies. Two independent reviewers will screen, select, and extract eligible studies. A preliminary search was performed on 24th May, 2022. The search strategy and data extraction template are in the appendix. A qualitative and quantitative analysis of data will be performed as a means of describing the risk factors for UI identified among older men by using frequencies and descriptive methods.

Ethics and dissemination: The review does not require ethics approval. Findings will be disseminated at conferences, in a peer-reviewed journal and used to inform the development of an evidence-based tool for self-management of UI in older men.

Registration: The protocol is registered in the Open Science Framework [<https://osf.io/xsrge/>].

Strengths and limitations of the proposed study

- It will be one of the few papers to specifically focus on older men's risk factors for UI by synthesizing and mapping the evidence in a systematic and comprehensive manner.
- Through the scoping review method, knowledge gaps in the literature will be identified regarding UI risk factors among older men.
- To ensure an exhaustive search and to yield robust evidence from all sources, an extensive review of grey literature will supplement the conventional scientific database search.
- The lack of age stratification in most data on men in general and the paucity of data specifically on older men with UI will pose limitations.
- In accordance with the JBI's scoping review method, the review will not include a quality appraisal of individual sources of evidence, regardless of their level on the hierarchy of evidence.

INTRODUCTION

The International Continence Society defines urinary incontinence (UI) as the complaint of any involuntary leakage of urine.[1] UI comes with huge costs to individuals, employers, and the health care system in Canada, estimated at \$8.5 billion annually in 2014,[2] and \$65.9 billion in the United States in 2007.[3] For the majority of sufferers, UI is a chronic stigmatizing condition that is under-reported and under-treated.[2] UI is under-prioritized and under-researched, particularly in older men (defined here as men 65+), and there have been calls for more targeted research focusing on this specific group.[4,5]

The prevalence of male UI is higher among older than younger men, reaching 30% compared to 10% and 16% in younger and middle-aged men from a Canadian Bladder survey.[6] In the United States, UI prevalence increases with age from 11% among men 60 to 64 years old to 31% among men 85 years and above.[7] International epidemiological data suggest that the prevalence of UI is 4.81% to 32.17% among community-dwelling men and 21% to 32% among older men.[8] The Sixth International Consultation on Incontinence notes that the epidemiology of male UI has received less attention compared to female UI, and that UI prevalence seems to rise more steadily with advancing age in males than in females.[5] The prevalence of Urgency Urinary Incontinence is similar in both men and women and increases in association with increasing age.[9]

Although the overall prevalence of UI in older men is about half that of older women,[5] the consequences of UI in older men are equally far-reaching, affecting their quality of life, levels of physical activity, and economic productivity, posing significant physical, psychological, social, sexual, and financial burdens.[10] Similar to the experiences of older women, UI in older men increases the risks of institutionalization,[8] self-isolation, and depression.[2]

Much of the limited research on male UI has focused on its prevalence [6,8,11] and associated risk factors in general [8,11,12].

Most UI epidemiological studies have not systematically identified risk factors for UI in older men and have not sought to categorize them. Although age groups were not specified, the Sixth International Consultation on Incontinence documents some established risk factors predisposing men in general to UI including "increasing age, presence of LUTS, urinary tract infections, functional and cognitive impairment, diabetes, alcohol intake, neurological disorders, and prostatectomy." [5]

Given the financial burden of UI, an understanding of risk factors can inform cost-effective prevention and treatment programs such as self-management; a promising and proven intervention for managing chronic conditions like UI.[13] Evidence about factors amenable to modification will allow the development of evidence-based interventions for self-management of UI in older men, a strategy found to be effective in older women.[14,15]

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3 So far, self-management intervention packages for men have targeted uncomplicated lower urinary tract
4 symptoms (LUTS) generally and mostly in men with prostate disease (Benign Prostatic Hyperplasia
5 [BPH]/Benign Prostatic Enlargement [BPE]). These packages vary in their components, recommendations,
6 and outcomes.[16–18] The inconsistencies and heterogeneity of these recommendations, the lack of clarity
7 as to what should constitute the optimal package of components for self-management, and the need to
8 focus specifically on the population of older men with UI [4] necessitate a comprehensive mapping of the
9 full breadth of evidence through a scoping review of risk factors for UI in older men.
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14 As part of a larger study, this scoping review aims to synthesize evidence on risk factors as the starting
15 point in the creation of a self-management intervention targeting older men. The findings from this scoping
16 review will inform a formal process to define and prioritize risk factors amenable to self-management that
17 older male patients find practicable and are potentially willing to modify.
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21 The objective of this scoping review therefore is to identify risk factors for UI in older men.
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24 We found no current or ongoing review on our topic after a preliminary search of MEDLINE, PubMed, the
25 Cochrane Database of Systematic Reviews, and *JBI Evidence Synthesis*. In addition, inquiries to subject
26 matter experts at the 2022 International Continence Society's scientific conference revealed that our topic
27 was not currently under review.
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31 **Review question**

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33 What are the risk factors for urinary incontinence in older men?
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36 **Eligibility criteria**

37 *Participants*

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41 **Inclusion criteria:** All sources of evidence on UI risk factors that include older men (65+).
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44 **Exclusion criteria:** Data derived solely from men under 65 years of age or exclusively from women will
45 be excluded. We will exclude articles featuring combined datasets where it is impossible to extract the UI
46 risk factors for older men due to a lack of age stratification. Similarly, where studies retrieved include
47 information on both men and women, only data stratified by sex will be reported.
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51 *Concepts*

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53 Urinary incontinence is a storage symptom of the lower urinary tract defined as the complaint of any
54 involuntary loss/leakage of urine.[1] UI can be classified as reversible or established. Reversible UI has a
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3 treatable cause and is more common among hospitalized older patients, and residents in long-term care
4 [19] while established UI is chronic, and it may not be possible to identify a reversible cause. The five major
5 types of established UI are urgency, stress (exertional), overflow, functional (disability associated), and
6 mixed urinary incontinence.[20]
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10 Risk factors are characteristics, conditions, behaviours or exposures that increase the likelihood of getting
11 a disease or injury.[21] There are general risk factors that may apply to chronic diseases in general (tobacco
12 use, alcohol consumption, physical inactivity, excess weight, and poor nutrition)[22] as well as specific risk
13 factors for UI. They also include those characteristics or conditions that increase the possibility of getting a
14 disease or injury.[21] Generally, risk factors can be grouped into categories: *Behavioural risk factors* relate
15 to the actions that individuals have chosen to take, and can be eliminated or modified through lifestyle or
16 behavioural changes. Examples include tobacco smoking, excessive alcohol use, poor nutrition, and
17 physical inactivity.[21] *Physiological risk factors* are those relating to an individual's body. They may be
18 influenced by an interaction of genetics, lifestyle, and other broad factors. Examples include overweight or
19 obesity, high blood pressure, high blood cholesterol, and high blood sugar. *Demographic risk factors* relate
20 to the overall population. Examples are age, occupation, religion, or income. *Environmental risk factors*
21 cover a wide range of topics such as social, economic, cultural, political, physical, chemical, and biological
22 factors. Examples include air pollution, workplace risks, access to clean water and sanitation, and social
23 interactions. *Genetic risk factors* are based on an individual's genetic make-up. While some diseases are
24 mainly genetic, others reflect an interaction between genetic and environmental factors.[21]
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32 *Context*

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35 All settings for older men with UI.
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38 *Types of sources*

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40 All study designs will be included in this scoping review without restriction. It will consider published and
41 unpublished sources. Text, opinion papers, and other grey literature will also be considered for
42 inclusion.[23]
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46 **METHODS AND ANALYSIS**

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48 We will conduct our scoping review following the Joanna Briggs Institute (JBI) method for scoping
49 review,[23] and in line with the Preferred Reporting Items for Systematic Reviews and Meta-analyses
50 extension for scoping reviews (PRISMA-ScR) checklist.[24]
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Search strategy

The search strategy will aim to locate both published and unpublished studies. A medical librarian (JYK) performed an initial search of MEDLINE on 24th May, 2022, to identify articles on the topic. The text words contained in the titles and abstracts of relevant articles, and the index terms used to describe the articles were used to develop a full search strategy for Ovid MEDLINE (Appendix I). The search strategy, including all identified keywords and index terms, will be adapted for each included database or information source. It will be reviewed by other members of the research team and if necessary, by a second librarian using the Peer Review of Electronic Search Strategies (PRESS) guideline.[25] The search strategy will be updated six months after it was originally run, and prior to submission for publication, the search will be updated to reflect newly published studies since the original run.

Studies published in any language will be included. We will compare translations from two validated online language translators; DeepL translator and Google translator (<https://www.deepl.com/en/translator> and <https://translate.google.com/>) for LOTE and double-check with colleagues who are known native speakers of the LOTE when necessary. Relevant studies published since the inception of the databases to date will be included. In addition to subscription databases, the research team will review the first 200 results from Google Scholar for inclusion. This is a reasonable number of results to screen since there is a high overlap between Web of Science and Google Scholar.[26] The reference list of all included sources of evidence will be screened for additional studies.

The databases to be searched are Ovid MEDLINE, Ovid Embase, CINAHL, Scopus, Web of Science Core Collection, Cochrane Library (via Wiley), and ProQuest Dissertations & Theses Global. Sources of unpublished studies/ grey literature include (conference proceedings, information from government health agencies, academic institutions, and professional societies). Grey literature consists of unpublished literature, including publicly available information produced by all levels of government, academic institutions, business, and industry, in print and electronic formats, which is not controlled by commercial publishers.[27] We will use general and targeted internet searches for the electronic formats of these documents. General searches will involve the use of Google, while targeted searches will examine the websites of national and international organizations addressing the subject matter.

Study/Source of Evidence selection

All identified citations from the search will be collated and uploaded into Covidence (Veritas Health Innovation Ltd, Melbourne); a web-based collaboration software platform that streamlines the production of systematic and other literature reviews.[28] After automatic removal of duplicates, two reviewers will independently screen titles and abstracts of a random sample of 5% of studies identified with our literature search. They will discuss the results and review the eligibility criteria as needed. We will check the inter-

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3 reviewer agreement for inclusion or exclusion between these reviewers using the kappa statistics.[29] A
4 Cohen kappa coefficient (κ value) of 0.41-0.60 indicates moderate agreement, 0.61-0.80 indicates
5 substantial agreement, and 0.81-1.00 is almost perfect agreement.[29] κ value >0.61 will be considered
6 sufficient to proceed.
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10 Potential reasons for exclusion will be defined a priori, categorized, recorded, and reported in the scoping
11 review. The full text of included citations will then be assessed in detail against the inclusion criteria by two
12 independent reviewers. Any disagreements that arise during the selection process will be resolved through
13 discussion and consensus between reviewers, and if needed, with a third party.[23] The results of the
14 search and the study inclusion process will be reported in full and presented in a Preferred Reporting Items
15 for Systematic Reviews and Meta-analyses extension for scoping review (PRISMA-ScR) flow diagram.[24]
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19 **Data Extraction**

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22 Data will be extracted from papers using a data extraction tool based on JBI's data extraction form template
23 (Appendix II).[30] The data extracted will include specific details about the country, authors, participants,
24 concept, context, study methods, and key findings relevant to the review question.
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28 Two reviewers will pilot test the draft extraction form through a calibration exercise to guide the selection of
29 evidence sources to ensure the form captures all relevant data. They will then extract data independently
30 from included studies into the draft. The draft data extraction tool will be modified and revised as necessary.
31 Any modifications will be detailed in the scoping review. Any disagreements that arise between the
32 reviewers will be resolved through discussion, or with an additional reviewer. If appropriate, authors of
33 papers will be contacted to request missing or additional data where required.
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38 **Risk of bias**

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40 In accordance with JBI method for scoping reviews, no quality appraisal will be conducted.[23] Rather than
41 engaging in formal quality assessments, we will assign a level of evidence rating to each study based on
42 JBI's well-established categorization of studies.
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46 **Data Analysis and Presentation**

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48 We will summarize data quantitatively (using frequencies) and qualitatively (using the descriptive-analytical
49 method). If possible, we will stratify results by the economic status of the country (e.g., low-, middle-, or
50 high-income country), ethnicity/race, and health context (e.g., primary, secondary, and tertiary care). Data
51 will be presented in diagrammatic or tabular form. A narrative summary will accompany the tables and
52 charts and will describe how the results relate to the review objective and question. Our results will be
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3 reported using the Preferred Reporting Items for Systematic reviews and Meta-Analyses extension for
4 Scoping Reviews (PRISMA-ScR) checklist.
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7 **Patient and public involvement**

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9 It might not be appropriate or possible to involve patients or the public in the design, conduct, reporting
10 and dissemination plans of our review. However, a patient advisory group will be involved in translating
11 evidence from the review into co-creating a patient-centered tool for self-management of UI in the context
12 of a larger study.
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16 **Ethics and dissemination**

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18 The review does not require ethics approval. Findings will be disseminated through presentations at
19 conferences/workshops, peer-reviewed publication, health blogs, and other social media platforms such as
20 LinkedIn, Twitter, and Instagram.
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24 **Copyright/license for publication**

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27 "The Corresponding Author has the right to grant on behalf of all authors and does grant on behalf of all
28 authors, a worldwide licence to the Publishers and its licensees in perpetuity, in all forms, formats and
29 media (whether known now or created in the future), to i) publish, reproduce, distribute, display and store
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33 inclusion of electronic links from the Contribution to third party material where-ever it may be located; and,
34 vi) licence any third party to do any or all of the above."
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38

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40
41 **Authors' contributions:** OO and AW contributed to the conceptualization, design, literature search,
42 manuscript writing and manuscript editing. JK developed the search strategy, conducted the searches, and
43 contributed to manuscript writing. WG contributed to the literature search, manuscript review and editing.
44 All authors approved the final manuscript.
45
46

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48 commercial or not-for-profit sectors.
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51 **Competing interest statement:** The authors have no competing interests to declare.
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53 **Patient consent for publication:** Not required.
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PRISMA-P (Preferred Reporting Items for Systematic review and Meta-Analysis Protocols) 2015 checklist: recommended items to address in a systematic review protocol

Section and topic	Item No	Checklist item	Information reported		Page number(s)
			Yes	N/A	
ADMINISTRATIVE INFORMATION					
Title:					
Identification	1a	Identify the report as a protocol of a systematic review	X		2 Abstract
Update	1b	If the protocol is for an update of a previous systematic review, identify as such		X	
Registration	2	If registered, provide the name of the registry (such as PROSPERO) and registration number	X		2 Abstract
Authors:					
Contact	3a	Provide name, institutional affiliation, e-mail address of all protocol authors; provide physical mailing address of corresponding author	X		1
Contributions	3b	Describe contributions of protocol authors and identify the guarantor of the review	X		9
Amendments	4	If the protocol represents an amendment of a previously completed or published protocol, identify as such and list changes; otherwise, state plan for documenting important protocol amendments		X	
Support:					
Sources	5a	Indicate sources of financial or other support for the review		X	
Sponsor	5b	Provide name for the review funder and/or sponsor		X	
Role of sponsor or funder	5c	Describe roles of funder(s), sponsor(s), and/or institution(s), if any, in developing the protocol		X	
INTRODUCTION					
Rationale	6	Describe the rationale for the review in the context of what is already known	X		4-5

Objectives	7	Provide an explicit statement of the question(s) the review will address with reference to participants, interventions, comparators, and outcomes (PICO)	X	5-6
METHODS				
Eligibility criteria	8	Specify the study characteristics (such as PICO, study design, setting, time frame) and report characteristics (such as years considered, language, publication status) to be used as criteria for eligibility for the review	X	5-6
Information sources	9	Describe all intended information sources (such as electronic databases, contact with study authors, trial registers or other grey literature sources) with planned dates of coverage	X	7
Search strategy	10	Present draft of search strategy to be used for at least one electronic database, including planned limits, such that it could be repeated	X	Appendix
Study records:				
Data management	11a	Describe the mechanism(s) that will be used to manage records and data throughout the review	X	7
Selection process	11b	State the process that will be used for selecting studies (such as two independent reviewers) through each phase of the review (that is, screening, eligibility and inclusion in meta-analysis)	X	7
Data collection process	11c	Describe planned method of extracting data from reports (such as piloting forms, done independently, in duplicate), any processes for obtaining and confirming data from investigators	X	8
Data items	12	List and define all variables for which data will be sought (such as PICO items, funding sources), any pre-planned data assumptions and simplifications	X	5-6

Outcomes and prioritization	13	List and define all outcomes for which data will be sought, including prioritization of main and additional outcomes, with rationale	X	
Risk of bias in individual studies	14	Describe anticipated methods for assessing risk of bias of individual studies, including whether this will be done at the outcome or study level, or both; state how this information will be used in data synthesis	X	8
Data synthesis	15a	Describe criteria under which study data will be quantitatively synthesised	X	8
	15b	If data are appropriate for quantitative synthesis, describe planned summary measures, methods of handling data and methods of combining data from studies, including any planned exploration of consistency (such as I^2 , Kendall's τ)	X	8
	15c	Describe any proposed additional analyses (such as sensitivity or subgroup analyses, meta-regression)	X	
	15d	If quantitative synthesis is not appropriate, describe the type of summary planned	X	8
Meta-bias(es)	16	Specify any planned assessment of meta-bias(es) (such as publication bias across studies, selective reporting within studies)	X	
Confidence in cumulative evidence	17	Describe how the strength of the body of evidence will be assessed (such as GRADE)	X	8

From: Shamseer L, Moher D, Clarke M, Ghersi D, Liberati A, Petticrew M, Shekelle P, Stewart L, PRISMA-P Group. Preferred reporting items for systematic review and meta-analysis protocols (PRISMA-P) 2015: elaboration and explanation. *BMJ*. 2015. doi: <https://doi.org/10.1136/bmj.g7647>

APPENDICES

Appendix I: Search strategy

Ovid MEDLINE(R) ALL <1946 to May 24, 2022>

1	exp Male/ and exp Aged/	2,684,034
2	exp Aging/ and exp Male/	135,117
3	exp Male/ and exp "Aged, 80 and over"/	850,025
4	exp Geriatrics/ and exp Male/	4,724
5	((older or ag?ing or aged or senior* or elder* or gerontolog* or geriatric* or "old age") adj3 (male* or man or men)).mp.	105,120
6	(men over adj ("60" or "65" or "70" or "75" or "80" or "85" or "90")).mp.	414
7	(male* over adj ("60" or "65" or "70" or "75" or "80" or "85" or "90")).mp.	148
8	or/1-7	2,807,887
9	exp Urinary Incontinence/	35,150
10	((urin* or bladder) adj2 (incontinen* or continen*)).mp.	48,546
11	exp Urinary Bladder, Overactive/	5,510
12	((overactiv* or hyper* or detrusor or vesic*) adj2 bladder).mp.	11,440
13	(bladder* adj2 (neuropath* or neurogen* or neurolog*)).mp.	10,343
14	((bladder or detrusor or vesic*) adj5 (instability or stab* or unstable or irritab* or hyperreflexia or dys?ynerg* or dyskinesi* or irritat*)).mp.	6,390
15	(nervous adj1 (pollakisur* or pollakiur*)).mp.	5
16	or/9-15	67,490
17	exp Risk Factors/	926,730
18	risk*.ti. or risk factor*.ab. /freq=3	613,850
19	(predict* or cause*).ti. or ((modifiable or behavio?r* or contribut* or transient* or adjust* or temporar* or chang* or adapt* or alter*) adj3 (factor* or predict* or cause*)).mp.	1,005,389
20	relative risk*.mp.	86,221
21	or/17-20	2,172,971
22	8 and 16 and 21	1,662

Appendix II: Data extraction form

Study details	
Author/Year	
Objectives	
Participants (characteristics/total number	
Setting/context	
Phenomena of interest	
Search details	
Sources searched	
Range (yrs) of included studies	
Number of studies included	
Types of studies included	
Country of origin of included studies	
Analysis	
Method of analysis	
Results/Findings	
Significance/ Direction	
Heterogeneity	
Comments	