http://dx.doi.org/10.2106/JBJS.RVW.20.00122

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Electronic Supplementary Material 1: PRISMA-P Checklist for Systematic Review of Studies for Readmissions Post-Joint Replacements

PRISMA-P (Preferred Reporting Items for Systematic review and Meta-Analysis Protocols) 2015 checklist: recommended items to address in a systematic review protocol [8]

Section and topic	Item No	Checklist item	(Page No.#)
ADMINISTRATIVE INFORMATION			
Title:			
Identification	1a	Identify the report as a protocol of a systematic review	1
Update	1b	If the protocol is for an update of a previous systematic review, identify as such	N/A
Registration	2	If registered, provide the name of the registry (such as PROSPERO) and registration number	5
Authors:			
Contact	3a	Provide name, institutional affiliation, e-mail address of all protocol authors; provide physical mailing address of corresponding author	Title Page
Contributions	3b	Describe contributions of protocol authors and identify the guarantor of the review	Title Page
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	N/A
Support:			
Sources	5a	Indicate sources of financial or other support for the review	Title Page
Sponsor	5b	Provide name for the review funder and/or sponsor	
Role of sponsor or funder	5c	Describe roles of funder(s), sponsor(s), and/or institution(s), if any, in developing the protocol	
INTRODUCTION			
Rationale	6	Describe the rationale for the review in the context of what is already known	4
Objectives	7	Provide an explicit statement of the question(s) the review will address with reference to participants, interventions, comparators, and outcomes (PICO)	4
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	5, ESM2
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	5, ESM2
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	5, ESM2
Study records:			
Data management	11a	Describe the mechanism(s) that will be used to manage records and data throughout the review	5-6

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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)	5-6
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	Tables 1, 2
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	
Outcomes and prioritization	13	List and define all outcomes for which data will be sought, including prioritization of main and additional outcomes, with rationale	Tables 1, 2
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	ESM 3
Data synthesis	15a	Describe criteria under which study data will be quantitatively synthesised	ESM 4
	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)	
	15c	Describe any proposed additional analyses (such as sensitivity or subgroup analyses, meta-regression)	
	15d	If quantitative synthesis is not appropriate, describe the type of summary planned	
Meta-bias(es)	16	Specify any planned assessment of meta-bias(es) (such as publication bias across studies, selective reporting within studies)	10-16
Confidence in cumulative evidence	17	Describe how the strength of the body of evidence will be assessed (such as GRADE)	ESM 3

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Electronic Supplemental Material 2: Electronic Database Search Strategy

A medical librarian and one author (BA & SM) designed and implemented all the searches based on initial review in the following databases: (1) PubMed; (2) Embase; (3) Ovid MEDLINE; (4) Cochrane Database of Systematic Reviews; (5) Web of Science. If any database did not take the exact date for search, it was approximated to the nearest month and/or year. We searched for papers between the date of inception of each database and April 2019.

The search was first started with *hospital readmission* as the exploded Medical Subject Headings (MeSH) term and the key words *readmi**, *rehosp**, where * was used as the truncation character. Second, we searched for *risk* as the exploded MeSH term and the key words *model**, *predict**, *use**, *util**, and *risk**. Third, we performed a search that used the exploded MeSH term *arthroplasty*, *replacement, total*, *partial*, *prosthesis,* and *knee*. Fourth, we performed a search that used the exploded MeSH term *arthroplasty*, *replacement, total, partial, hemiarthroplasty*, *prosthesis,* and *hip*. Lastly, we combined all the search criteria that identified our final reference set in each database.

Inclusion

Study eligibility was determined using three stages of title review, abstract review, and full-article review. Studies were considered eligible if they (a) used readmission as an independent or composite outcome; (b) measured readmission after index hospitalization for the procedure; (c) examined the association between readmission and a specific risk factor while controlling for confounding variables; (d) were published in the English language. If a study proposed multiple models, only those using a readmission outcome were included.

Exclusion

Exclusion criteria applied at each stage of study eligibility are noted in detail in the PRISMA diagram in Figure 1.

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Supplemental Material 3: **NEWCASTLE - OTTAWA QUALITY ASSESSMENT SCALE CASE CONTROL STUDIES**

Note: A study can be awarded a maximum of one star for each numbered item within the Selection and Exposure categories. A maximum of two stars can be given for Comparability.

Selection

1) Is the case definition adequate?
   a) yes, with independent validation ✸
   b) yes, eg record linkage or based on self reports
   c) no description

2) Representativeness of the cases
   a) consecutive or obviously representative series of cases ✸
   b) potential for selection biases or not stated

3) Selection of Controls
   a) community controls ✸
   b) hospital controls
   c) no description

4) Definition of Controls
   a) no history of disease (endpoint) ✸
   b) no description of source

Comparability

1) Comparability of cases and controls on the basis of the design or analysis
   a) study controls for _____ (Select the most important factor.) ✸
   b) study controls for any additional factor ✸ (This criteria could be modified to indicate specific control for a second important factor.)

Exposure

1) Ascertainment of exposure
   a) secure record (eg surgical records) ✸
   b) structured interview where blind to case/control status ✸
   c) interview not blinded to case/control status
   d) written self report or medical record only
   e) no description

2) Same method of ascertainment for cases and controls
   a) yes ✸
   b) no

3) Non-Response rate
   a) same rate for both groups ✸
   b) non respondents described
   c) rate different and no designation

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NEWCASTLE - OTTAWA QUALITY ASSESSMENT SCALE
COHORT STUDIES

Note: A study can be awarded a maximum of one star for each numbered item within the Selection and Outcome categories. A maximum of two stars can be given for Comparability

Selection

1) Representativeness of the exposed cohort
   a) truly representative of the average _____ (describe) in the community ✵
   b) somewhat representative of the average _____ in the community ✵
   c) selected group of users eg nurses, volunteers
   d) no description of the derivation of the cohort

2) Selection of the non exposed cohort
   a) drawn from the same community as the exposed cohort ✵
   b) drawn from a different source
   c) no description of the derivation of the non exposed cohort

3) Ascertainment of exposure
   a) secure record (eg surgical records) ✵
   b) structured interview ✵
   c) written self report
   d) no description

4) Demonstration that outcome of interest was not present at start of study
   a) yes ✵
   b) no

Comparability

1) Comparability of cohorts on the basis of the design or analysis
   a) study controls for _____ (select the most important factor) ✵
   b) study controls for any additional factor ✵ (This criteria could be modified to indicate specific control for a second important factor.)

Outcome

1) Assessment of outcome
   a) independent blind assessment ✵
   b) record linkage ✵
   c) self report
   d) no description

2) Was follow-up long enough for outcomes to occur
   a) yes (select an adequate follow up period for outcome of interest) ✵
   b) no

3) Adequacy of follow up of cohorts
   a) complete follow up - all subjects accounted for ✵
   b) subjects lost to follow up unlikely to introduce bias - small number lost - > ____ % (select an adequate %) follow up, or description provided of those lost) ✵
   c) follow up rate < ____% (select an adequate %) and no description of those lost

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d) no statement

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Supplementary Material 4

NOS Tool Assessment of Studies for Systematic Reviews and Meta-analysis									
Study	**Is the case definition adequate?**	**Representativeness of the cases**	**Selection of controls**	**Definition of controls**	**study controls for most important factor**	**study controls for any additional factor**	**ascertainment of exposure**	**same method of ascertainment for cases and controls**	**non-response rate**
Systematic Review Studies									
Boniello, Simon et al. 2018	1	1	1	1	1	1	1	1	N/A
Malkani, Dilworth et al. 2017	1	1	1	1	1	1	1	1	N/A
Miric, Inacio et al. 2014	1	1	1	1	1	1	1	1	N/A
Miric, Inacio et al. 2015	1	1	1	1	1	1	1	1	N/A
Stone, Dunn et al. 2018	1	1	1	0	NR	NR	1	1	N/A
Vorhies, Wang et al. 2012	1	1	1	0	NR	NR	1	1	N/A
Williams, Kester et al. 2017	1	1			1	1	1	1	N/A
Borza, Oerline et al. 2018	1	0	1	1	1	1	1	1	N/A

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Ibramim, Nathan et al. 2017	1	1	1	1	1	1	1	1	N/A
Arsoy, Huddleston et al. 2017	1	0	0	1	NR	NR	1	1	N/A
Lovald, Ong et al. 2015	1	1	1	0	1	1	1	1	N/A
McIsaac et al. 2017									
Briwb et al. 2o12									
Liddle et al. 2014									
Liddle et al. 2015									
Meta-analysis Studies									
Bini et al. 2012	1	1	1	1	1	1	1	1	N/A
Fu et al. 2017	1	1	1	1	1	1	1	1	N/A
Keswani et al. 2016a	1	1	1	1	1	1	1	1	N/A
Keswani et al. 2016b	1	1	1	1	1	1	1	1	N/A
McLawhorn et al. 2017	1	1	1	1	1	1	1	1	N/A
Owens et al. 2018	1	1	1	1	1	1	1	1	N/A

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George et al. 2018	1	1	1	1	1	1	1	1	N/A
Girardi et al.2018	1	1	1	1	1	1	1	1	N/A
Hanly et al. 2017	1	1	1	1	1	1	1	1	N/A
Huddleston et al. 2012	1	1	1	1	1	1	1	1	N/A
Jameson et al. 2014	1	1	1	1	1	1	1	1	N/A
Schawarzkopf et al. 2012	1	1	1	1	1	1	1	1	N/A
Shaparin et al. 2016	1	1	1	1	1	1	1	1	N/A
Zusmanovich et al. 2018	1	1	1	1	1	1	1	1	N/A
SooHoo et al. 2006	1	1	1	1	1	1	1	1	N/A
De Vries et al. 2011	1	1	1	1	1	1	1	1	N/A
Pamilo et al. 2013	1	1	1	1	1	1	1	1	N/A
NR: Not Reported									
N/A: Not Applicable									

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