




BMJ Open Effect and outcome of equity, diversity and inclusion programs in healthcare institutions: a systematic review protocol

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ABSTRACT

Background Equity, diversity and inclusion (EDI) in the healthcare field are crucial in meeting the healthcare needs of a progressively diverse society. In fact, a diverse healthcare workforce enables culturally sensitive care, promotes health equity and enhances the understanding of various needs and patients' viewpoints, potentially resulting in more effective patient treatment and improved patient outcomes. Despite this, information on the effectiveness of policies or programmes promoting EDI in health institutions is scarce. The objective of this systematic review is to assess the effects and outcomes of EDI programmes in healthcare institutions.

Methods We will conduct Preferred Reporting Items for Systematic Reviews and Meta-Analyses-compliant systematic review of studies on EDI programmes and describe their effects and outcomes in healthcare institutions. We will search PubMed, Scopus, Web of Science, CINAHL and PsycINFO databases. Selected studies will include randomised control trials (RCTs), non-RCTs and cross-sectional studies published either in English or French. Quality appraisal of studies and a narrative synthesis of extracted data will be conducted as well as a meta-analysis if possible. The quality of evidence in this review will be assessed by the Grades of Recommendation, Assessment, Development and Evaluation.

Anticipated results We anticipate that this systematic review will reveal information on the effect of EDI programmes and their outcomes in healthcare institutions. We expect this information will provide insights that will lead to improvements in designing EDI policies and programmes in healthcare institutions.

Ethics and dissemination No ethical clearance is required for this study as no primary data will be collected. The final manuscript will be submitted to a journal for publication. In addition to this, the results of the study will also be disseminated through conference presentations to inform the research and clinical practice.

Review registration This protocol has been registered with the International Prospective Register of Systematic Reviews; registration number CRD42024502781.

STRENGTHS AND LIMITATIONS OF THIS STUDY

- ⇒ Inclusion criteria are broad, involving both randomised controlled trials and observational studies.
- ⇒ Narrative synthesis and meta-analysis (if nature of literature permits) of the data will be conducted.
- ⇒ Study quality and risk of bias will be assessed using standard critical appraisal tools from the Joanna Briggs Institute Meta-Analysis of Statistical Assessment and Review Instrument.
- ⇒ Search algorithm was developed by an experienced librarian and customised to five large databases.
- ⇒ The scarcity of published studies on the effect of equity, diversity and inclusion programmes in healthcare institutions as well as issues related to publication bias and variations in methodological quality among the published studies may limit the certainty of the evidence of this systematic review.

BACKGROUND

Globally, the diversity of the world's population is increasing and this is accompanied by an increase in health inequities especially among the under-represented minority populations.^{1 2} To effectively manage healthcare disparities in the midst of this growing diversity, the promotion of equity, diversity and inclusion (EDI) in healthcare institutions has been highly recommended.^{3 4} In fact, EDI programmes are initiatives that measure and track progress within the organisations and are best suited to inform the organisation and address health disparities at the population level.⁵ Nonetheless, the healthcare workforce responsible for caring for a highly diverse array of patients is relatively homogeneous.⁶

For example, the US healthcare workforce in 2020 was comprised of more than 50% White, 20% Asian, 7% Black, less than 1% Hispanic and less than 1% Native American workers.^{1 6} Additionally, only 3.6% of medical

faculty in the USA are Black, 3.3% are Hispanic or Latino and 0.1% are Native Americans.⁷ Still in the USA, it has also been documented that two-thirds of physicians and surgeons are Christians, 14% are Jewish and less than 15% represent other religions.^{6,8} Furthermore, although more than half of the most graduating medical classes are females, only 5.5% of full professors and 26% of departmental chairs are female physicians.⁷ This lack of diversity in the healthcare workforce poses challenges for caring for diverse populations of patients, potentially leading to variable and often detrimental effects on patient outcomes, access to care and patient trust, as well as workplace experiences and employee retention.^{6,7}

Nevertheless, the evidence reveals that a diverse healthcare workforce enables culturally sensitive care, promotes health equity and enhances the understanding of various needs and patient viewpoints, resulting in more effective patient treatment and improved patient outcomes.⁹ Despite the increased attention on workforce diversity-related issues, organisational actions and inaction, structural racism and unequal opportunity throughout the education continuum continue to fuel unequal representation in healthcare institutions.⁷ Although EDI has been endorsed in healthcare and academic institutions, there is evidence that stepwise implementation of this endorsement has neither been extensively evaluated nor documented.¹⁰⁻¹⁴ Added to this, information on the effectiveness of policies or programmes promoting EDI in healthcare institutions is scarce. Therefore, the objective of this review is to assess the effects and outcomes of EDI programmes in healthcare institutions.

Research question

What are the effects and outcomes of EDI programmes in healthcare institutions?

METHODS

Study design

We will systematically review the studies that have assessed EDI programmes or policies in healthcare institutions. This review has been registered with the International Prospective Register of Systematic Reviews; registration number CRD42024502781. The review will be conducted and reported in accordance with the Preferred Reporting Items for Systematic Reviews and Meta-Analyses criteria (online supplemental appendix 1).¹⁵

Inclusion criteria

Population

This review will include studies that assessed the effect of EDI programmes in healthcare institutions.

Intervention

This review will consider studies that evaluated any EDI programmes or policies, liaisons/committees in healthcare institutions.

Comparison

The effect of the interventions will be evaluated in comparison with before and after the implementation of EDI programmes interventions, or no interventions.

Outcomes

This review will consider studies that assessed the following outcome measures:

- ▶ Increased diversity in the workforce.
- ▶ Employee satisfaction.
- ▶ Employee retention.
- ▶ Patient satisfaction.
- ▶ Patient clinical outcomes.
- ▶ Institution performance.

Specifically, the outcomes will directly report the proportion of diversity among the workforce, the level of satisfaction of employees and patients, and the percentage of employees recruited and retained following the implementation of EDI programmes in healthcare institutions. Outcomes rating health institutions' effectiveness and efficiency and patient clinical outcomes (cure rate, patient recovery rate, readmission, mortality rate, etc.) following the implementation of EDI programmes will also be taken into consideration as measures of the effectiveness of EDI programmes.

Types of studies to be included

This review will include experimental study designs including randomised control trials, cohort and cross-sectional studies, qualitative studies, as well as before-and-after studies. Studies published either in English or French that have assessed the effect of EDI programmes in healthcare institutions will be included in this review.

Search strategy

This review will follow a three-step strategy to find studies conducted on the effect of EDI programmes. First, we will conduct an initial search in the PubMed database using an analysis of text words found in the title and abstract, and the index terms used to describe the article. Second, the identified keywords and index terms from the first step will be used to search for articles in other databases. Third, the reference list of selected studies from the first and second steps will be used to look for studies not found in the databases.

The databases that will be searched for this review will include PubMed, Scopus, Web of Science, CINAHL and PsycINFO.

The initial keywords used for the searches in the PubMed database included 'Equity', 'diversity', 'inclusion', 'healthcare facility', 'healthcare institution', 'hospital', 'health clinic', 'nursing home', 'university', 'faculty' (online supplemental appendix 2).

Screening and selection process

All the articles found in the search databases will be imported into the Covidence software for screening. Two reviewers will independently screen the titles and abstracts to identify the potentially relevant studies. Any

disagreements will be resolved through discussion. The same procedure will be repeated in screening the full text of studies retained after the title and abstract screening.

Assessment of methodological quality

Two independent reviewers will assess the methodological validity of the studies selected for retrieval prior to inclusion in this review. The assessment will be conducted using a standard critical appraisal tool from the Joanna Briggs Institute Meta-Analysis of Statistical Assessment and Review Instrument (JBI-MAStARI) (online supplemental appendix 3). Any disagreements between the two reviewers will be settled through discussion.

Data extraction

Data will be extracted from the selected studies independently by two reviewers, using a standardised data extraction tool from the JBI-MAStAR (online supplemental appendix 4). The extracted data will include specific details about the effect of EDI programmes, study institutions, study methods and outcomes significant to the review question. In the event of any missing data in a study, the corresponding author of that study will be contacted to provide the missing data.

Data synthesis

We plan to conduct both a narrative synthesis and random-effects meta-analysis if two or more studies with information permitting these analyses are included in the review. The meta-analysis will be conducted to identify EDI programmes with a significant impact on improving equity and diversity in healthcare institutions. For this analysis, we will first assess the statistical heterogeneity with I^2 , which indicates the percentage of the total variation across studies; where 0%–40% indicates low heterogeneity, 30%–60% indicates moderate heterogeneity, 50%–90% indicates substantial heterogeneity and 75%–100% indicates considerable heterogeneity. If there is substantial heterogeneity (75%), we will examine sources of heterogeneity through subgroup and sensitivity analyses. We will use χ^2 test to test the heterogeneity and consider $p < 0.05$ as statistically significant. We will select a fixed-effects model for significant homogeneous studies; otherwise, we will apply a random-effects model. We will summarise our outcomes using OR and 95% CI. We will consider an $OR < 1$ to indicate a lower rate of outcome (impact of EDI programme) among the group of healthcare institutions implementing a particular EDI programme. Publication bias will be assessed by visual inspections of funnel plots and Egger's test.

The narrative synthesis will involve a description of the EDI programmes and their impact on healthcare institutions. This synthesis will be structured by describing studies according to the type of EDI programme implemented, and the outcome. The findings will be presented in tables and figures where possible.

Confidence in cumulative evidence

The quality of evidence in this review will be assessed by the Grades of Recommendation, Assessment, Development and Evaluation.¹⁶

Ethics and dissemination

No ethical clearance is required for this study as no primary data will be collected. The study will strictly adhere to the procedures outlined in this protocol in reviewing published and unpublished material on the review topic. However, in case of any amendments to this protocol, the amendments will be notified and registered. The final manuscript will be submitted to a journal for publication. In addition to this, the results of the study will also be disseminated through conference presentations to inform research and clinical practice.

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Competing interests None declared.

Patient and public involvement Patients and/or the public were not involved in the design, conduct, reporting or dissemination plans of this research.

Patient consent for publication Not applicable.

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REFERENCES

- 1 Ni Luasa S, Ryan N, Lynch R. A systematic review protocol on workplace equality and inclusion practices in the healthcare sector. *BMJ Open* 2023;13:e064939.
- 2 Ganek E, Sazon RAP, Gray L, et al. An introduction to faculty diversity, equity, and inclusion for excellence in nurse education. *Asian Pac Isl Nurs J* 2023;7:e49231.
- 3 Morrison V, Hauch RR, Perez E, et al. Equity, and inclusion in nursing: the pathway to excellence framework alignment. *Nurs Adm Q* 2021;45:311–23.
- 4 Ashley WW, Eden S, Benson RT, et al. Diversity, equity, and inclusion and the goal of reducing healthcare disparities in neurosurgery. *Neurosurg Focus* 2023;55:E1.
- 5 Kelly C, Dansereau L, Sebring J, et al. Intersectionality, health equity, and EDI: what's the difference for health researchers? *Int J Equity Health* 2022;21:182.
- 6 Khuntia J, Ning X, Cascio W, et al. Valuing diversity and inclusion in health care to equip the workforce: survey study and pathway analysis. *JMIR Form Res* 2022;6:e34808.
- 7 Rotenstein LS, Reede JY, Jena AB. Addressing workforce diversity — A quality-improvement framework. *N Engl J Med* 2021;384:1083–6.
- 8 Curlin FA, Lantos JD, Roach CJ, et al. Religious characteristics of U.S. physicians. *J Gen Intern Med* 2005;20:629–34.
- 9 Taylor J, Sharma S, Supersad A, et al. Recommendations for improvement of equity, diversity, and inclusion in the CaRMS selection process. *Can Assoc Radiol J* 2023;74:624–8.
- 10 Bennett J. Equity, and inclusion: what it all means and when it matters. *J Vasc Nurs* 2021;39:26.
- 11 Holley K. *The Principles for Equitable and Inclusive Civic Engagement*. Kirwan Institute for the Study of Race and Ethnicity. The Ohio State University, 2016:67.
- 12 Steinkamp L, Deuel D, Lucre M, et al. The interplay of diversity, equity, and inclusion in addressing health inequities. *WMJ Off Publ State Med Soc Wis* 2021;120:S54–8.
- 13 Peek CJ, Allen M, Pacala JT, et al. Coming together in action for equity, diversity, and inclusion. *Fam Med* 2021;53:786–95.
- 14 Nanda JP, Clark RS, Harrison JA, et al. Community-academic partnerships to embrace and ensure diversity, equity, and inclusion in translational science: evidence of successful community engagement. *J Clin Transl Sci* 2023;7:e188.
- 15 Shamseer L, Moher D, Clarke M, et al. Preferred reporting items for systematic review and meta-analysis protocols (PRISMA-P) 2015: elaboration and explanation. *BMJ* 2015;350:g7647.
- 16 Guyatt GH, Oxman AD, Vist GE, et al. GRADE: an emerging consensus on rating quality of evidence and strength of recommendations. *BMJ* 2008;336:924–6.

Appendix 1

PRISMA Checklist

Section/topic	#	Checklist item	Information reported		Line number(s)
			Yes	No	
ADMINISTRATIVE INFORMATION					
Title					
Identification	1a	Identify the report as a protocol of a systematic review	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Page 1, line 2
Update	1b	If the protocol is for an update of a previous systematic review, identify as such	<input type="checkbox"/>	<input type="checkbox"/>	
Registration	2	If registered, provide the name of the registry (e.g., PROSPERO) and registration number in the Abstract	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Page 2, lines 49-50
Authors					
Contact	3a	Provide name, institutional affiliation, and e-mail address of all protocol authors; provide physical mailing address of corresponding author	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Page 1, lines 3-20
Contributions	3b	Describe contributions of protocol authors and identify the guarantor of the review	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Page 9, lines 222-228
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	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Page 8, lines 198-199
Support					
Sources	5a	Indicate sources of financial or other support for the review	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Page 9, line 221
Sponsor	5b	Provide name for the review funder and/or sponsor	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Page 9, line 221
Role of sponsor/funder	5c	Describe roles of funder(s), sponsor(s), and/or institution(s), if any, in developing the protocol	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Page 9, line 221
INTRODUCTION					
Rationale	6	Describe the rationale for the review in the context of what is already known	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Pages 3-4
Objectives	7	Provide an explicit statement of the question(s) the review will address with reference to participants, interventions, comparators, and outcomes (PICO)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Page 4, lines 104-105
METHODS					

Section/topic	#	Checklist item	Information reported		Line number(s)
			Yes	No	
Eligibility criteria	8	Specify the study characteristics (e.g., PICO, study design, setting, time frame) and report characteristics (e.g., years considered, language, publication status) to be used as criteria for eligibility for the review	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Page 4-5, lines 113-136
Information sources	9	Describe all intended information sources (e.g., electronic databases, contact with study authors, trial registers, or other grey literature sources) with planned dates of coverage	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Page 6, lines 149-150
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	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Page 6, lines 142-153
STUDY RECORDS					
Data management	11a	Describe the mechanism(s) that will be used to manage records and data throughout the review	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Page 7, line 166-171
Selection process	11b	State the process that will be used for selecting studies (e.g., two independent reviewers) through each phase of the review (i.e., screening, eligibility, and inclusion in meta-analysis)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Page 6, lines 154-158
Data collection process	11c	Describe planned method of extracting data from reports (e.g., piloting forms, done independently, in duplicate), any processes for obtaining and confirming data from investigators	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Page 7, lines 165-171
Data items	12	List and define all variables for which data will be sought (e.g., PICO items, funding sources), any pre-planned data assumptions and simplifications	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Page 7, lines 173-191
Outcomes and prioritization	13	List and define all outcomes for which data will be sought, including prioritization of main and additional outcomes, with rationale	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Page 5, lines 122-136
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	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Page 6, lines 159-164
DATA					
Synthesis	15a	Describe criteria under which study data will be quantitatively synthesized	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Page 7, lines 172-187
	15b	If data are appropriate for quantitative synthesis, describe planned summary measures, methods of handling data, and methods of combining data from studies,	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Page 7, lines 174-187

Section/topic	#	Checklist item	Information reported		Line number(s)
			Yes	No	
		including any planned exploration of consistency (e.g., I^2 , Kendall's tau)			
	15c	Describe any proposed additional analyses (e.g., sensitivity or subgroup analyses, meta-regression)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Page 7, lines 179-187
	15d	If quantitative synthesis is not appropriate, describe the type of summary planned	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Page 7, lines 188-191
Meta-bias(es)	16	Specify any planned assessment of meta-bias(es) (e.g., publication bias across studies, selective reporting within studies)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Page 7, lines 186-187
Confidence in cumulative evidence	17	Describe how the strength of the body of evidence will be assessed (e.g., GRADE)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Page 7-8, lines 192-194

Appendix 2

PubMed search strategy

("Health Care Facilities, Manpower, and Services"[Mesh] OR "healthcare institution" OR hospital OR "health clinic" OR "nursing home" OR "university" OR "faculty"[Title/Abstract]) AND ("Diversity, Equity, Inclusion"[Mesh] OR "DEI program" OR "DEI initiative" OR "DEI efforts" OR "diversity, inclusion, equity" OR "minority groups" OR "anti-racism"[Title/Abstract]) AND ("Program Evaluation"[Mesh] OR "employee retention" OR "employee satisfaction" OR "workforce diversity" OR "program evaluation" [Title/Abstract])

Appendix 3

Joanna Briggs Institute for Meta-Analysis of Statistics Assessment and Review Instruments

1. JBI critical appraisal checklist for randomized control trials

Assessor:	Date of Appraisal:	Record Number:
Study Author:	Study Title:	Study Year:

Internal Validity		Choice - Comments/Justification	Yes	No	Unclear	N/A
Bias related to selection and allocation						
1	Was true randomization used for assignment of participants to treatment groups?		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2	Was allocation to treatment groups concealed?		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3	Were treatment groups similar at the baseline?		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Bias related to administration of intervention/exposure						
4	Were participants blind to treatment assignment?		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5	Were those delivering the treatment blind to treatment assignment?		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6	Were treatment groups treated identically other than the intervention of interest?		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Bias related to assessment, detection and measurement of the outcome

7	Were outcome assessors blind to treatment assignment?	Yes	No	Unclear	N/A
	Outcome 1	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	Outcome 2	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	Outcome 3	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	Outcome 4	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	Outcome 5	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	Outcome 6	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	Outcome 7	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

8	Were outcomes measured in the same way for treatment groups?	Yes	No	Unclear	N/A
	Outcome 1	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	Outcome 2	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	Outcome 3	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	Outcome 4	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	Outcome 5	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	Outcome 6	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	Outcome 7	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

9	Were outcomes measured in a reliable way		Yes	No	Unclear	N/A
	Outcome 1		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	Outcome 2		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	Outcome 3		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	Outcome 4		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	Outcome 5		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	Outcome 6		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	Outcome 7		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Bias related to participant retention

10	Was follow up complete and if not, were differences between groups in terms of their follow up adequately described and analysed?					
	Outcome 1		Yes	No	Unclear	N/A
	Result 1		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	Result 2		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	Result 3		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	Outcome 2		Yes	No	Unclear	N/A

Result 1		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Result 2		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Result 3		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Outcome 3		Yes	No	Unclear	N/A
Result 1		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Result 2		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Result 3		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Outcome 4		Yes	No	Unclear	N/A
Result 1		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Result 2		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Result 3		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Outcome 5		Yes	No	Unclear	N/A
Result 1		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Result 2		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Result 3		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Outcome 6		Yes	No	Unclear	N/A
Result 1		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Result 2		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Result 3		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Outcome 7		Yes	No	Unclear	N/A
Result 1		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Result 2		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Result 3		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Statistical Conclusion Validity

11	Were participants analysed in the groups to which they were randomized?					
	Outcome 1		Yes	No	Unclear	N/A
	Result 1		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	Result 2		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	Result 3		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	Outcome 2		Yes	No	Unclear	N/A
	Result 1		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	Result 2		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	Result 3		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	Outcome 3		Yes	No	Unclear	N/A
	Result 1		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	Result 2		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Result 3		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Outcome 4		Yes	No	Unclear	N/A
Result 1		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Result 2		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Result 3		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Outcome 5		Yes	No	Unclear	N/A
Result 1		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Result 2		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Result 3		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Outcome 6		Yes	No	Unclear	N/A
Result 1		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Result 2		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Result 3		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Outcome 7		Yes	No	Unclear	N/A
Result 1		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Result 2		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Result 3		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

12	Was appropriate statistical analysis used?					
	Outcome 1		Yes	No	Unclear	N/A
	Result 1		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	Result 2		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	Result 3		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	Outcome 2		Yes	No	Unclear	N/A
	Result 1		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	Result 2		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	Result 3		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	Outcome 3		Yes	No	Unclear	N/A
	Result 1		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	Result 2		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	Result 3		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	Outcome 4		Yes	No	Unclear	N/A
	Result 1		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	Result 2		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Result 3		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Outcome 5		Yes	No	Unclear	N/A	

Result 1		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Result 2		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Result 3		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Outcome 6		Yes	No	Unclear	N/A
Result 1		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Result 2		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Result 3		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Outcome 7		Yes	No	Unclear	N/A
Result 1		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Result 2		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Result 3		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
		Yes	No	Unclear	N/A
13 Was the trial design appropriate and any deviations from the standard RCT design (individual randomization, parallel groups) accounted for in the conduct and analysis of the trial?		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Overall appraisal: Include: <input type="checkbox"/> Exclude: <input type="checkbox"/>		Seek Further Info: <input type="checkbox"/>			
Comments:					

Table 3 – The JBI Critical Appraisal Tool for RCTs

2. JBI critical appraisal checklist for quasi-experimental s (non-randomized experimental) studies

Reviewer _____ Date _____

Author _____ Year _____ Record Number _____

	Yes	No	Unclear	Not applicable
1. Is it clear in the study what is the 'cause' and what is the 'effect' (i.e. there is no confusion about which variable comes first)?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2. Were the participants included in any comparisons similar?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3. Were the participants included in any comparisons receiving similar treatment/care, other than the exposure or intervention of interest?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4. Was there a control group?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5. Were there multiple measurements of the outcome both pre and post the intervention/exposure?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6. Was follow up complete and if not, were differences between groups in terms of their follow up adequately described and analyzed?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
7. Were the outcomes of participants included in any comparisons measured in the same way?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
8. Were outcomes measured in a reliable way?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
9. 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)

Appendix 4**JBI Data Extraction Form for
Experimental / Observational Studies**

Reviewer Date

Author Year

Journal Record Number

Study MethodRCT Quasi-RCT Longitudinal Retrospective Observational Other **Participants**Setting
_____Population
_____**Sample size**

Group A _____ Group B _____

InterventionsIntervention A

_____Intervention B

_____Authors Conclusions:

_____Reviewers Conclusions:

Study results**Dichotomous data**

Outcome	Intervention () number / total number	Intervention () number / total number

Continuous data

Outcome	Intervention () number / total number	Intervention () number / total number

Source: JBI Database of Systematic Reviews and Implementation Reports15(7):1835-1849, July 2017.