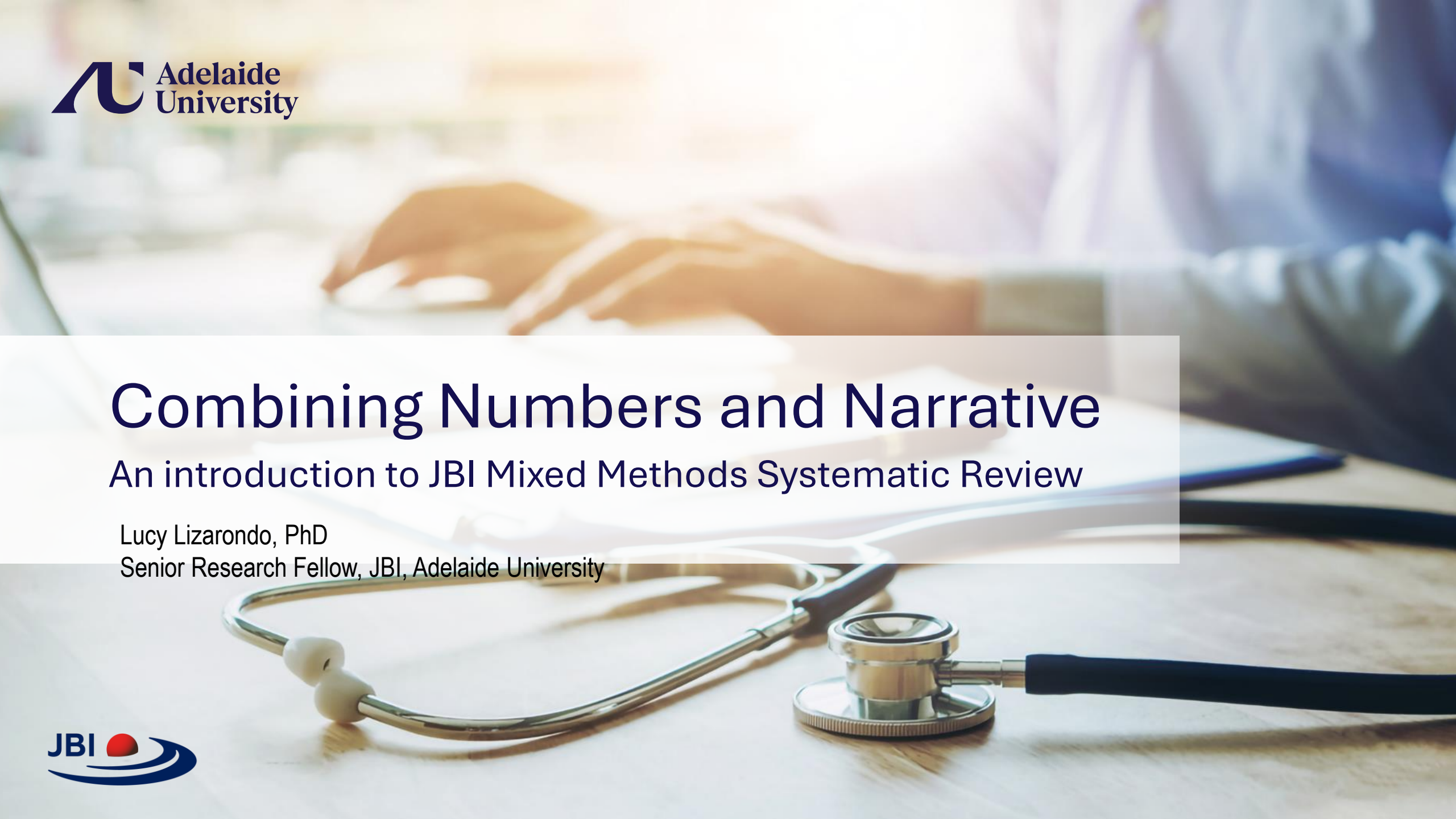
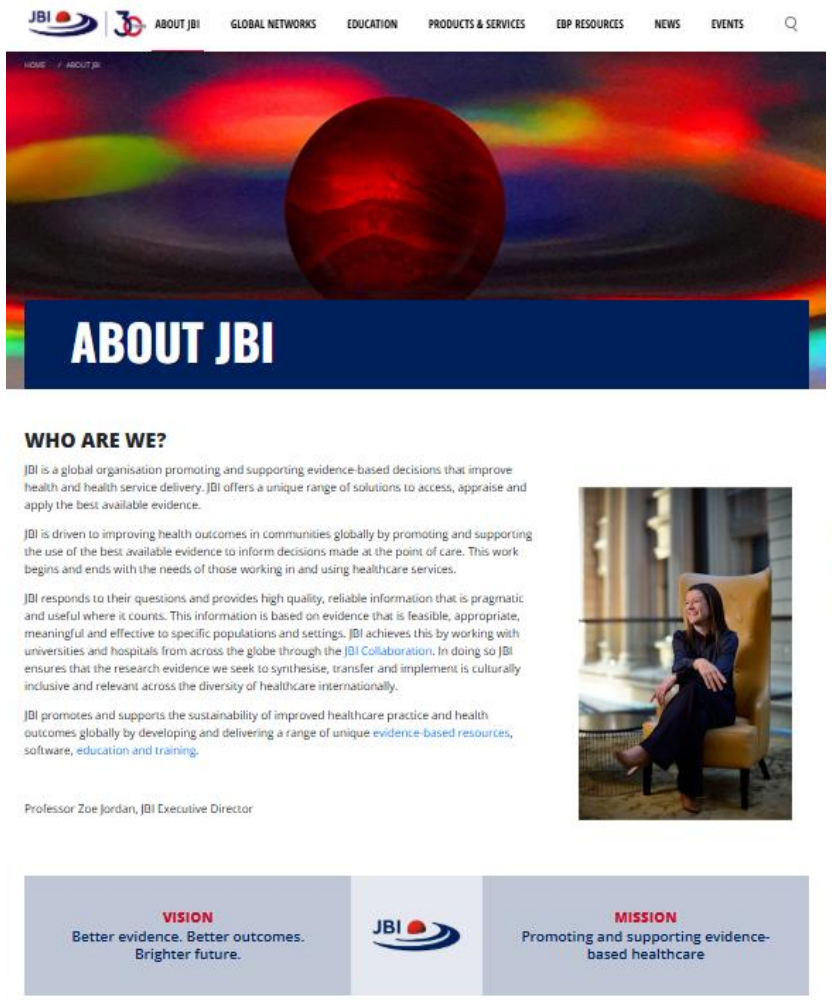


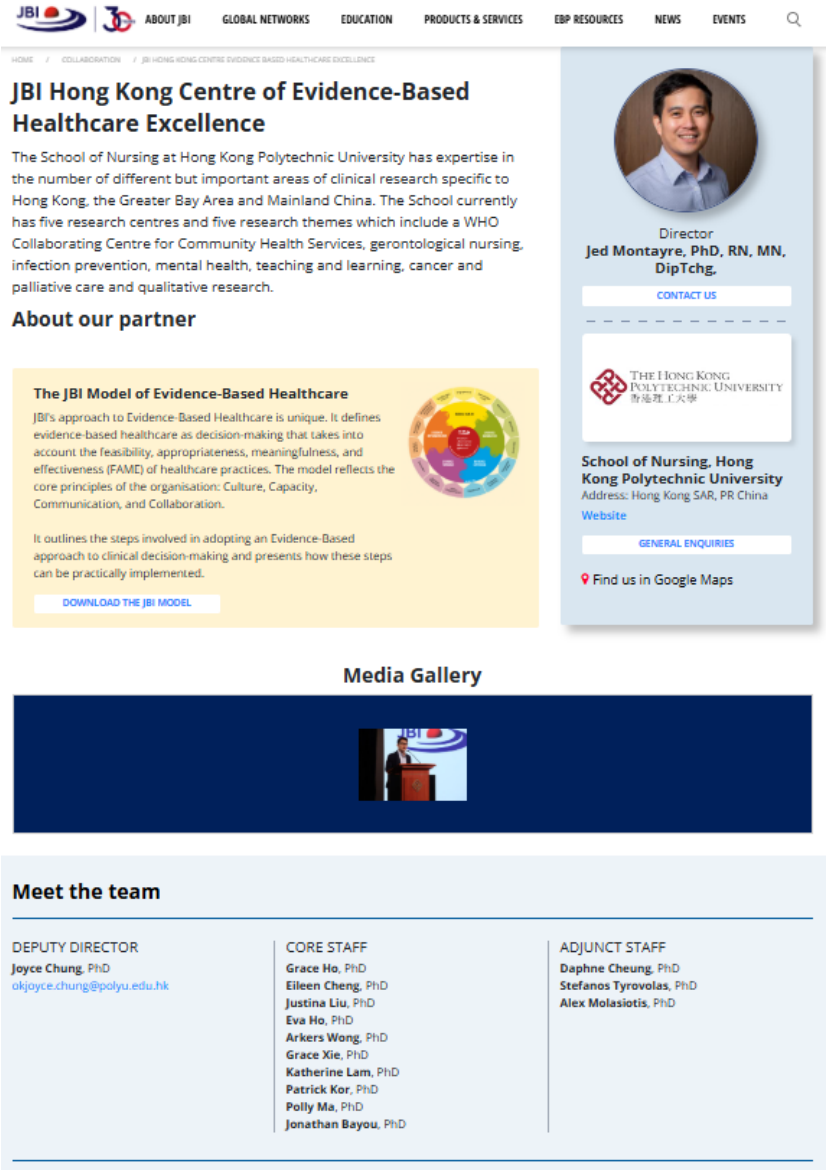
Combining Numbers and Narrative

An introduction to JBI Mixed Methods Systematic Review

Lucy Lizarondo, PhD
Senior Research Fellow, JBI, Adelaide University

Adelaide University respectfully acknowledges the Kaurna, Boandik and Barngarla First Nations Peoples and their Elders, past and present, who are the First Nations' Traditional Owners of the lands that are home to our campuses across South Australia. We also acknowledge other First Nations lands across Australia with which we conduct business, their Elders, ancestors, cultures and heritage.





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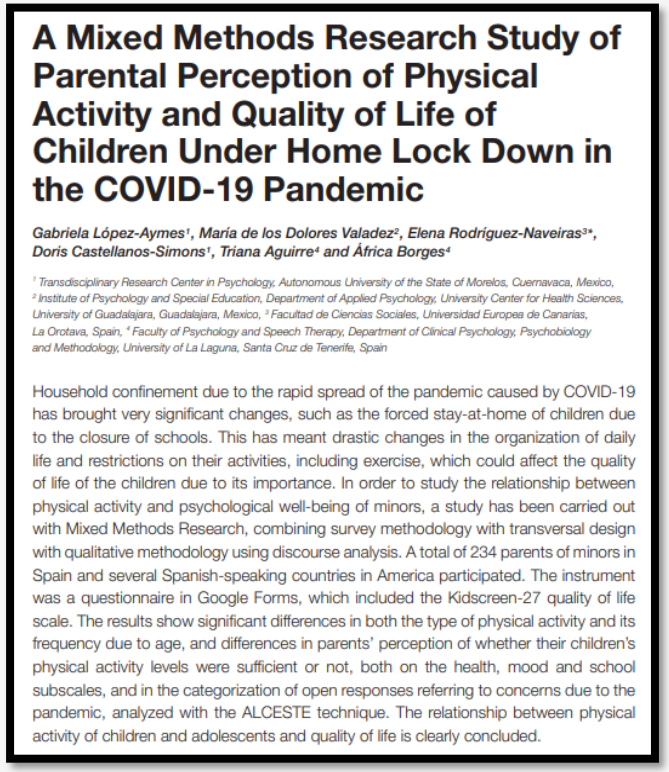
What do we mean by mixed methods research

- Combines elements of qualitative and quantitative research approaches (e.g. research question, methods/design, data collection and analysis)
- Why mix methods?
  - Triangulation
  - Expansion
  - Complementarity
- KEY element: **INTEGRATION**

Examples of primary mixed methods research



A Mixed Methods Research Study of Parental Perception of Physical Activity and Quality of Life of Children Under Home Lock Down in the COVID-19 Pandemic

Gabriela López-Aymes[1], María de los Dolores Valadez[2], Elena Rodríguez-Naveiras[3], Doris Castellanos-Simons[1], Triana Aguirre[4] and África Borges[4]*

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Household confinement due to the rapid spread of the pandemic caused by COVID-19 has brought very significant changes, such as the forced stay-at-home of children due to the closure of schools. This has meant drastic changes in the organization of daily life and restrictions on their activities, including exercise, which could affect the quality of life of the children due to its importance. In order to study the relationship between physical activity and psychological well-being of minors, a study has been carried out with Mixed Methods Research, combining survey methodology with transversal design with qualitative methodology using discourse analysis. A total of 234 parents of minors in Spain and several Spanish-speaking countries in America participated. The instrument was a questionnaire in Google Forms, which included the Kidscreen-27 quality of life scale. The results show significant differences in both the type of physical activity and its frequency due to age, and differences in parents' perception of whether their children's physical activity levels were sufficient or not, both on the health, mood and school subscales, and in the categorization of open responses referring to concerns due to the pandemic, analyzed with the ALCESTE technique. The relationship between physical activity of children and adolescents and quality of life is clearly concluded.

A mixed-methods sequential explanatory design comparison between COVID-19 infection control guidelines' applicability and their protective value as perceived by Israeli healthcare workers, and healthcare executives' response

Anat Gesser-Edelsburg[1,2*], Ricky Cohen[1], Nour Abed Elhadi Shahbari[1] and Rana Hijazi[1]

Abstract

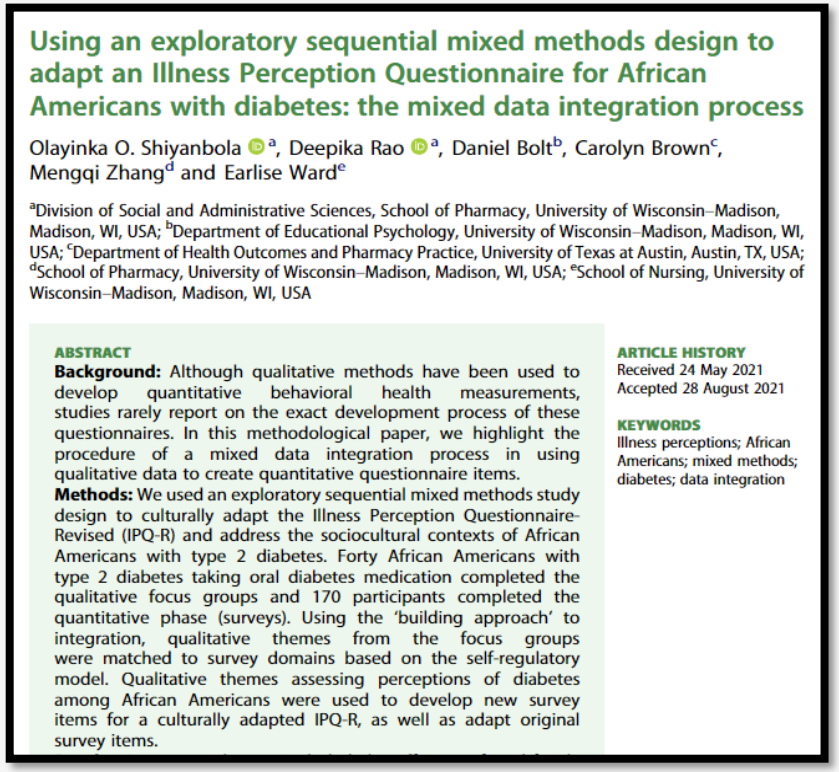
Background: Healthcare workers (HCWs) are on the front line of the COVID-19 outbreak, and their constant exposure to infected patients and contaminated surfaces puts them at risk of acquiring and transmitting the infection. Therefore, they must employ protective measures. In practice, HCWs in Israel were not fully prepared for this sudden COVID-19 outbreak. This research aimed to identify and compare: (1) Israeli HCWs' perceptions regarding the official COVID-19 guidelines' applicability and their protective value, and (2) HCWs executives' response to HWCs' concern regarding personal protective equipment (PPE) shortage.

Methods: A mixed-methods sequential explanatory design consists of: (1) An online survey of 242 HCWs about the application of the guidelines and PPE, and (2) Personal interviews of 15 HCWs executives regarding PPE shortage and the measures they are taking to address it.

Results: A significant difference between the perceived applicability and protective value was found for most of the guidelines. Some of the guidelines were perceived as more applicable than protective (hand hygiene, signage at entrance, alcohol rub sanitizers at entrance, and mask for contact with symptomatic patients). Other were perceived as less applicable than protective (prohibited gathering of over 10 people, maintaining a distance of 2 m', and remote services).

Conclusions: HCWs need the support of the healthcare authorities not only to provide missing equipment, but also to communicate the risk to them. Conveying the information with full transparency, while addressing the uncertainty element and engaging the HCWs in evaluating the guidelines, are critical for establishing trust.

Keywords: COVID-19, Infection control guidelines, Healthcare workers, Applicability and protective value, Perception



Using an exploratory sequential mixed methods design to adapt an Illness Perception Questionnaire for African Americans with diabetes: the mixed data integration process

Olayinka O. Shiyanbola[a], Deepika Rao[a], Daniel Bolt[b], Carolyn Brown[c], Mengqi Zhang[d] and Earlise Ward[e]

[a]Division of Social and Administrative Sciences, School of Pharmacy, University of Wisconsin–Madison, Madison, WI, USA; [b]Department of Educational Psychology, University of Wisconsin–Madison, Madison, WI, USA; [c]Department of Health Outcomes and Pharmacy Practice, University of Texas at Austin, Austin, TX, USA; [d]School of Pharmacy, University of Wisconsin–Madison, Madison, WI, USA; [e]School of Nursing, University of Wisconsin–Madison, Madison, WI, USA

ABSTRACT

Background: Although qualitative methods have been used to develop quantitative behavioral health measurements, studies rarely report on the exact development process of these questionnaires. In this methodological paper, we highlight the procedure of a mixed data integration process in using qualitative data to create quantitative questionnaire items.

Methods: We used an exploratory sequential mixed methods study design to culturally adapt the Illness Perception Questionnaire-Revised (IPQ-R) and address the sociocultural contexts of African Americans with type 2 diabetes. Forty African Americans with type 2 diabetes taking oral diabetes medication completed the qualitative focus groups and 170 participants completed the quantitative phase (surveys). Using the 'building approach' to integration, qualitative themes from the focus groups were matched to survey domains based on the self-regulatory model. Qualitative themes assessing perceptions of diabetes among African Americans were used to develop new survey items for a culturally adapted IPQ-R, as well as adapt original survey items.

ARTICLE HISTORY
Received 24 May 2021
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KEYWORDS
Illness perceptions; African Americans; mixed methods; diabetes; data integration

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What do we mean by mixed methods synthesis

Integrates evidence from quantitative, qualitative and mixed methods studies

Terms vary: *mixed methods research synthesis*, *mixed studies review*, *mixed research synthesis*, *mixed methods systematic review [MMSR]*

Context of this presentation:

- Systematic reviews (MMSR)
- Quantitative and qualitative

Follow the same steps of a single method/traditional systematic review, however, need to consider how data/evidence is combined or integrated

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Why are MMSR important

- Single method reviews address specific and focused healthcare questions
- MMSR can broaden the focus of systematic reviews to enhance their usefulness to guideline developers and decision-makers
  - ➢ e.g. consider public health and social policy that deal with complex interventions
- Broader approach to fully inform actionable findings in policy & practice
- Can offer a richer understanding on a topic/phenomena of interest

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Why are MMSR important

- Dependent on the nature of the review question MMSRs allow for:
  - an examination of the degree of agreement between quantitative and qualitative data to validate or triangulate results/findings
  - identification of discrepancies within the available evidence
  - one type of data that can explore, contextualize or explain the findings of the other type of data

When should I actually do a mixed methods review

- When effectiveness is insufficient
- When understanding experiences is equally important
- When implementation matters
- When complex interventions are being evaluated
- When guideline developers need multiple forms of evidence

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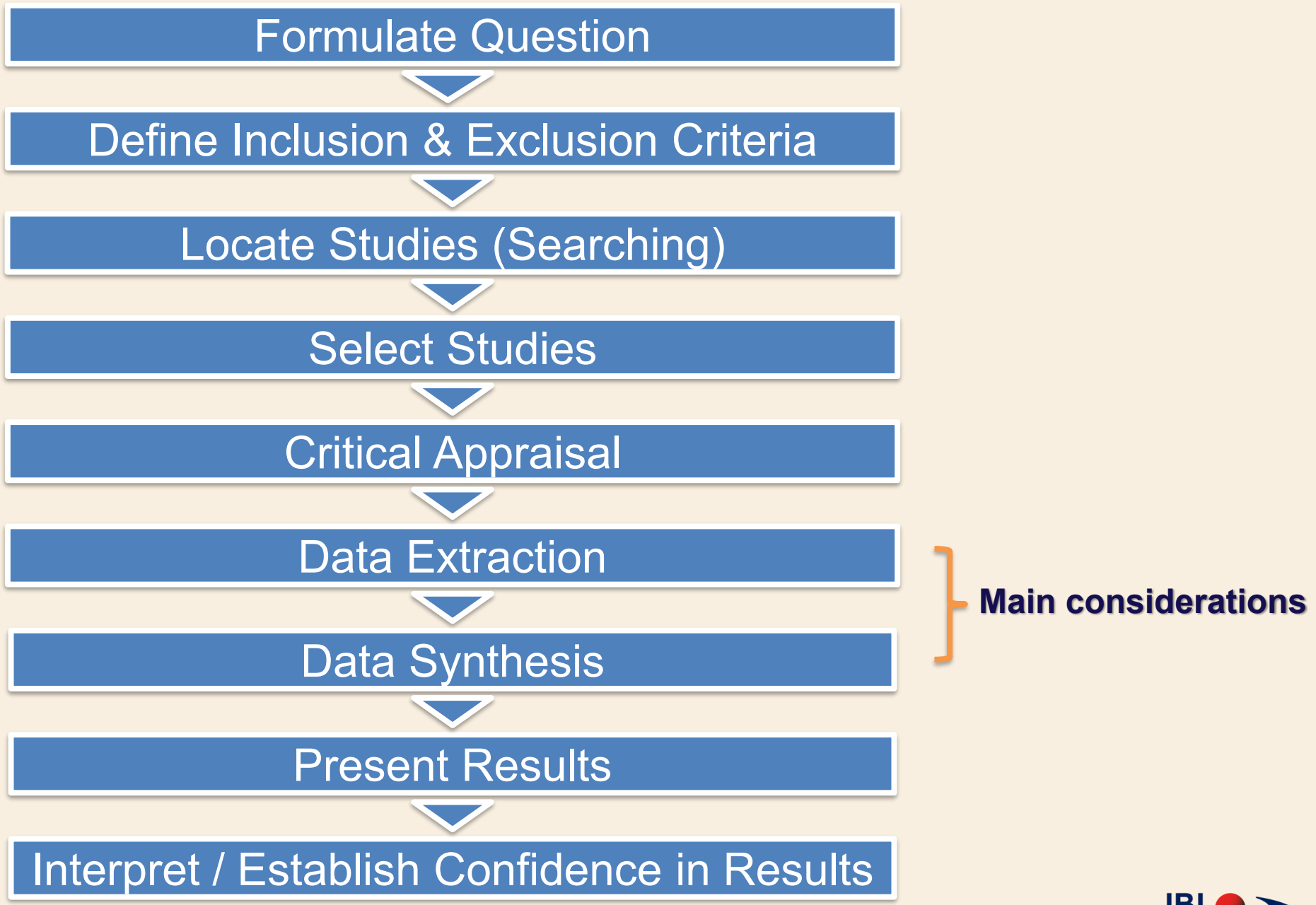
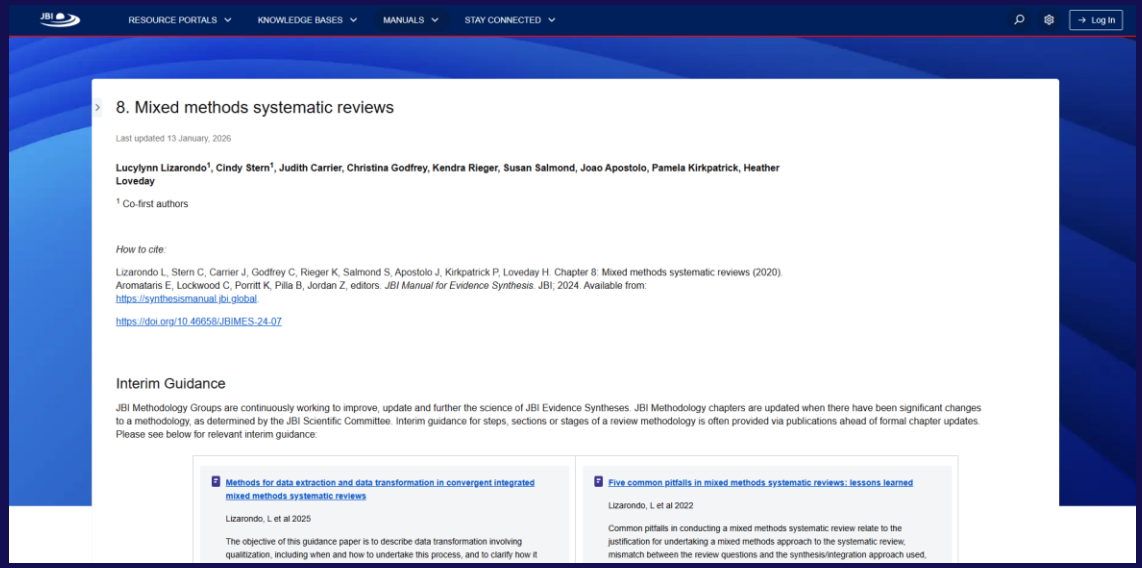

Formulate Question
Define Inclusion & Exclusion Criteria
Locate Studies (Searching)
Select Studies
Critical Appraisal
Data Extraction
Data Synthesis
Present Results
Interpret / Establish Confidence in Results
Main considerations

Data	Refers to the primary data obtained from quantitative studies, qualitative studies or mixed methods studies.
Data transformation	Refers to the process of transforming qualitative data into a quantitative format ('quantitizing') or quantitative data into a qualitative format ('qualitizing').
Integration	Refers to the combining of quantitative data with qualitative data following transformation OR of combining quantitative evidence and qualitative evidence without transformation.
Synthesis	Can either be a quantitative synthesis or a qualitative synthesis. Quantitative synthesis refers to the process of combining extracted data from quantitative studies (including data from the quantitative component of a mixed methods study), resulting in the generation of quantitative evidence. Qualitative synthesis refers to the process of combining extracted data from qualitative studies (including data from the qualitative component of a mixed methods study), resulting in the generation of qualitative evidence.
Sequence of synthesis	Refers to whether the quantitative synthesis and qualitative synthesis occurs *simultaneously* (i.e. convergent) or *consecutively* (i.e. sequential, where the results/findings from a synthesis of one type of evidence inform the synthesis of the other type of evidence).

JBI Methodology for MMSR

- Guidance revised in 2019
- Based on a review of the international literature and consensus from a group of evidence synthesis experts
- Aligns to seminal work undertaken in the field
  - ❖ Review by Hong et al., 2017
  - ❖ Margaret Sandelowski's work



Stern C, Lizarondo L, Carrier J, Godfrey C, Rieger K, Salmond S, Apóstolo J, Kirkpatrick P, Loveday H. Methodological guidance for the conduct of mixed methods systematic reviews. JBI Evid Synth. 2020 Oct;18(10):2108-2118.

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JBI Methodology for MMSR

At present, the JBI guidance focuses on convergent approaches to mixed methods systematic reviews.

Convergent Integrated

- Involves data transformation that allows reviewers to combine quantitative and qualitative data

Convergent Segregated

- Involves independent synthesis of quantitative data and qualitative data leading to the generation of quantitative evidence and qualitative evidence which are then integrated together

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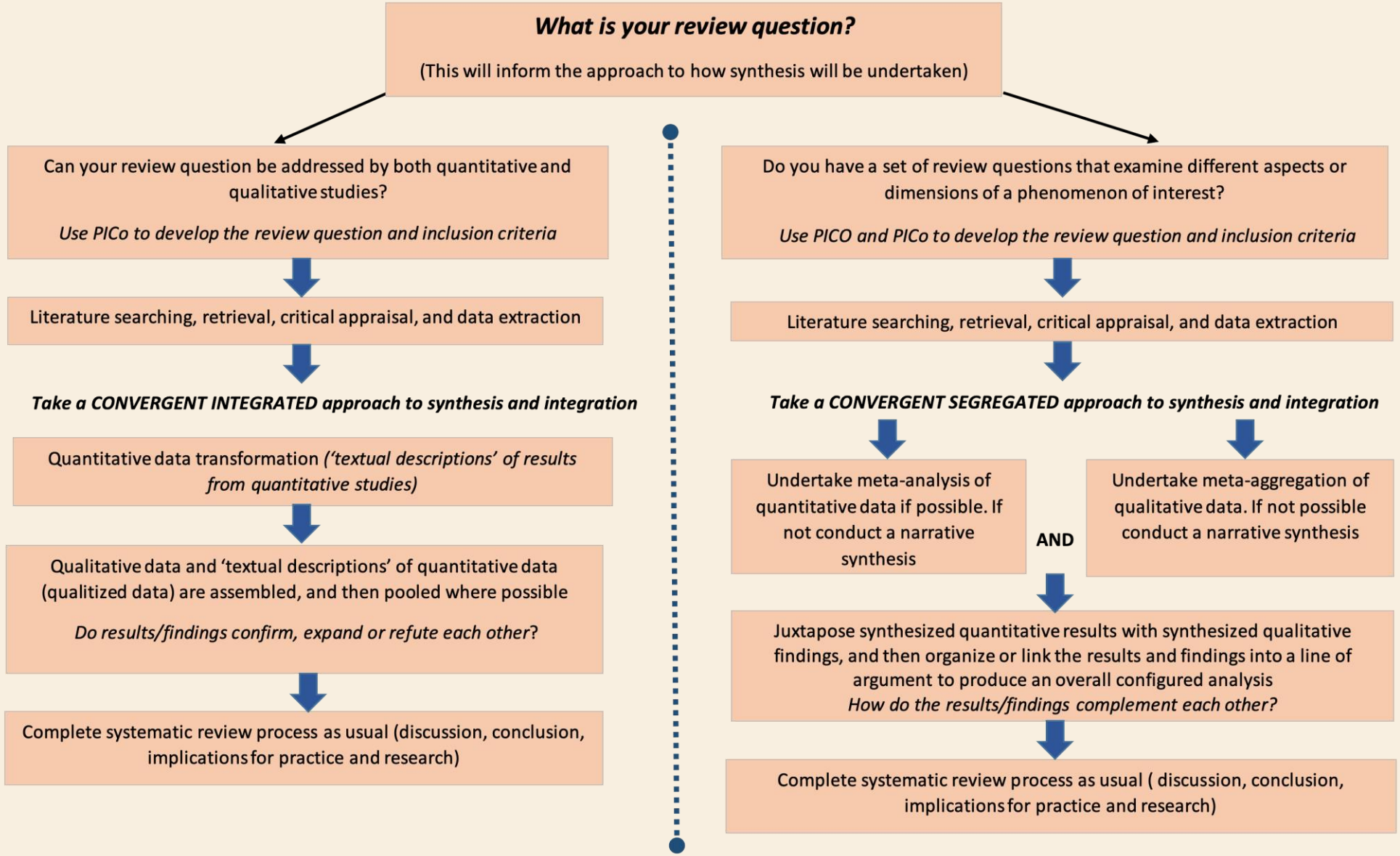
Which approach do you select

The nature/type of question(s) that is(are) posed in the systematic review dictates the approach the reviewer should follow for the synthesis



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Convergent Integrated

- Follows the same steps as single method review – inclusion criteria, search, selection, appraisal and extraction
- Integration of the quantitative and qualitative data requires data transformation

What are the barriers and facilitators of pediatric vision screening for children aged 3 to 17 years in the primary care setting in the US?

Barriers and facilitators of vision screening in the US pediatric primary care setting: a mixed methods systematic review protocol

Olivia J. Killeen[1,2] · Kate M. Saylor[3] · Caroline Hogan[1,4] · Adam Jacobson[2] · Megan Collins[5] · Joshua R. Ehrlich[1,2,6]

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ABSTRACT

Objective: The objective of this review is to understand the barriers and facilitators of vision screening in the US primary care setting for children aged 3 to 17 years.

Introduction: Childhood vision screening is crucial because it detects children at risk of undiagnosed vision problems. Previous studies report low rates of appropriate vision screening in the primary care setting. We aim to identify barriers and facilitators of pediatric primary care vision screening to inform future interventions to improve childhood vision screening.

Inclusion criteria: Studies of all types that identify barriers and facilitators of vision screening in children aged 3 to 17 years in the pediatric primary care setting in the US will be considered for inclusion.

Methods: We will search PubMed, CINAHL Complete (EBSCO), Scopus, Web of Science (SCI-EXPANDED, ESCI, CPCI-S, SSCI), Cochrane Library, and Embase. We will also search gray literature, including conference proceedings, professional organization reports, and clinical trials. We will use supplemental search strategies, including citation tracking and contacting authors for unpublished data. Titles and abstracts will be screened independently by 2 reviewers and selected for full-text screening based on prespecified inclusion criteria. Only studies in English will be considered. Each included study will be appraised using the mixed methods appraisal tool. Data will be extracted using a modified JBI mixed methods data extraction form. Qualitative and quantitative data will be integrated using a convergent integrated approach.

Details of the review available at: Open Science Framework https://osf.io/nhf5d/

Keywords: pediatric; primary care; vision screening

JBI Evid Synth 2023; 21(5):985–992.

Introduction

Visual impairment is the most common cause of disability in children.[1] Undiagnosed childhood vision problems can cause permanent vision loss[2] and decrease school performance,[3] negatively impacting a child's life course. Childhood vision screening is crucial because early detection of children at risk of vision problems increases the likelihood of successful treatment.[4] Yet in the US, less than 22% of preschool children receive any type of vision screening and less than 15% receive eye exams in the preschool years.[1] Rates of vision screening are higher in older children; approximately 75% of children aged 6 to 17 years receive vision testing yearly.[5]

In the US, vision screening may occur in schools or as part of primary care health maintenance exams, known as "well child exams." Because not all states mandate school vision screening, some children may only receive vision screenings during well child exams[6]; thus, US medical organizations have created guidelines recommending routine vision screening in the primary care setting. The American Academy of

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The authors declare no conflicts of interest.

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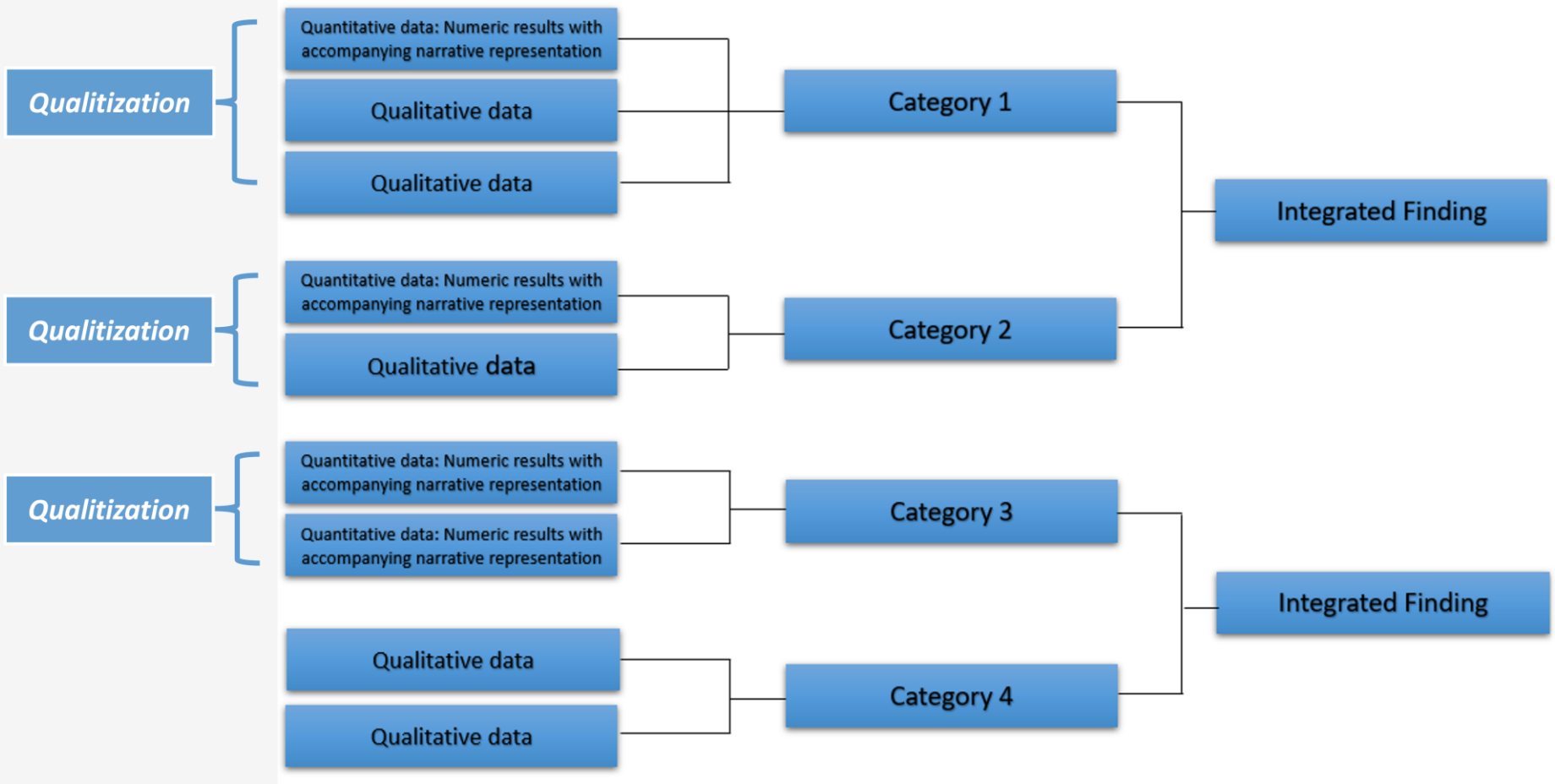
Data transformation in convergent integrated reviews

- Qualitizing versus quantitizing
- Data transformation (qualitization) in JBI convergent integrated reviews means:
  - *The integrative process in which extracted quantitative and qualitative data from primary studies are analyzed for identifiable patterns and systematically grouped into descriptive categories developed from mixed evidence sources. This process also applies where only quantitative data are grouped into categories.*

Lizarondo L, Stern C, Salmond S, Carrier J, Cooper K, Godfrey C, Vandyk M, Pollock D, Rieger K, Apostolo J, Kirkpatrick P, Borges Dos Santos K, Loveday H. Methods for data extraction and data transformation in convergent integrated mixed methods systematic reviews. JBI Evid Synth. 2025 Mar 1;23(3):429-440.

Convergent Integrated



Lizarondo L, Stern C, Salmond S, Carrier J, Cooper K, Godfrey C, Vandyk M, Pollock D, Rieger K, Apostolo J, Kirkpatrick P, Borges Dos Santos K, Loveday H. Methods for data extraction and data transformation in convergent integrated mixed methods systematic reviews. JBI Evid Synth. 2025 Mar 1;23(3):429-440.

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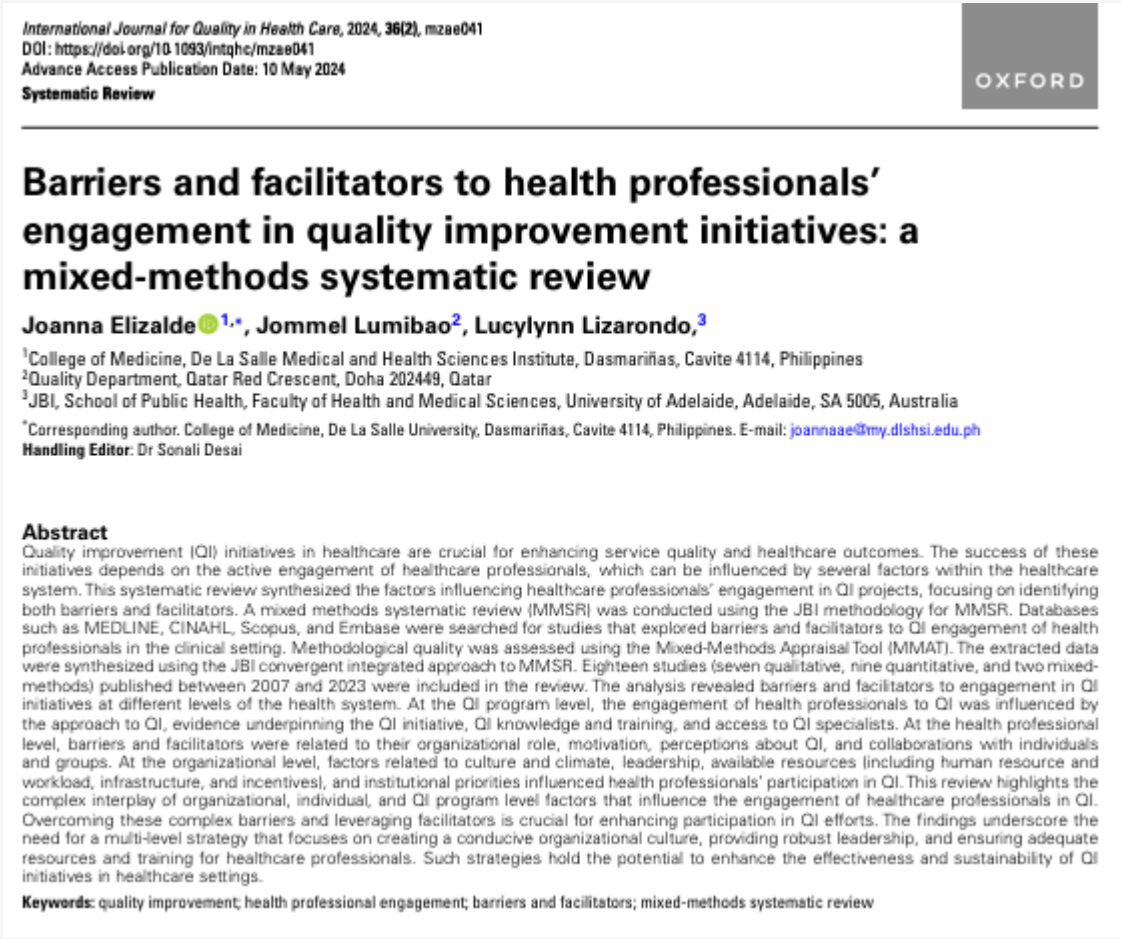
Convergent Integrated - Exemplar

Review question: What are the barriers and facilitators to engagement in QI projects identified in existing studies on healthcare professionals?

- For the qualitative studies (and qualitative component of the mixed methods studies), key findings included the perceptions or experiences of participants relating to barriers and facilitators to QI participation. Findings were verbatim themes or subthemes identified by the primary authors' interpretation of participants' experiences, with a supporting quotation that represented the participant's voice.
- For the quantitative studies (and the quantitative component of the mixed methods studies), key findings included the numerical results and their corresponding narrative.
- Key findings (i.e. qualitative data and quantitative data) from all included studies were coded to facilitate integration



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Advance Access Publication Date: 10 May 2024
Systematic Review

OXFORD

Barriers and facilitators to health professionals' engagement in quality improvement initiatives: a mixed-methods systematic review

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Handling Editor: Dr Sonali Desai

Abstract

Quality improvement (QI) initiatives in healthcare are crucial for enhancing service quality and healthcare outcomes. The success of these initiatives depends on the active engagement of healthcare professionals, which can be influenced by several factors within the healthcare system. This systematic review synthesized the factors influencing healthcare professionals' engagement in QI projects, focusing on identifying both barriers and facilitators. A mixed methods systematic review (MMSR) was conducted using the JBI methodology for MMSR. Databases such as MEDLINE, CINAHL, Scopus, and Embase were searched for studies that explored barriers and facilitators to QI engagement of health professionals in the clinical setting. Methodological quality was assessed using the Mixed-Methods Appraisal Tool (MMAT). The extracted data were synthesized using the JBI convergent integrated approach to MMSR. Eighteen studies (seven qualitative, nine quantitative, and two mixed-methods) published between 2007 and 2023 were included in the review. The analysis revealed barriers and facilitators to engagement in QI initiatives at different levels of the health system. At the QI program level, the engagement of health professionals to QI was influenced by the approach to QI, evidence underpinning the QI initiative, QI knowledge and training, and access to QI specialists. At the health professional level, barriers and facilitators were related to their organizational role, motivation, perceptions about QI, and collaborations with individuals and groups. At the organizational level, factors related to culture and climate, leadership, available resources (including human resource and workload, infrastructure, and incentives), and institutional priorities influenced health professionals' participation in QI. This review highlights the complex interplay of organizational, individual, and QI program level factors that influence the engagement of healthcare professionals in QI. Overcoming these complex barriers and leveraging facilitators is crucial for enhancing participation in QI efforts. The findings underscore the need for a multi-level strategy that focuses on creating a conducive organizational culture, providing robust leadership, and ensuring adequate resources and training for healthcare professionals. Such strategies hold the potential to enhance the effectiveness and sustainability of QI initiatives in healthcare settings.

Keywords: quality improvement; health professional engagement; barriers and facilitators; mixed-methods systematic review

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Convergent segregated

- Follows the same steps as single method review – inclusion criteria, search, selection, appraisal and extraction
- For synthesis and integration
  - Undertake a meta-analysis of quantitative data if possible (if not conduct a narrative synthesis)
  - Undertake a meta-aggregation of qualitative data (if not possible conduct a narrative synthesis)
  - Juxtapose synthesized quantitative results with synthesized qualitative findings, and then organize or link the results and findings into a line of argument to produce an overall configured analysis

SYSTEMATIC REVIEW

Assisted bathing of older adults with dementia: a mixed methods systematic review update

Rie Konno[1] · Miyuki Suzuki[1] · Akiyo Hosomi[1] · Lucylynn Lizarondo[2] · Cindy Stern[2]

[1]School of Nursing, Hyogo Medical University, Hyogo, Japan, and [2]JBI, Faculty of Health and Medical Sciences, The University of Adelaide, Adelaide, SA, Australia

ABSTRACT

Objective: This review update aimed to determine the best strategies for assisted bathing or showering for older adults with dementia.

Introduction: Assisted bathing is a high-risk activity, as it can trigger agitated behaviors. Assisted bathing of older adults with dementia can create caregiver challenges and stress.

Inclusion criteria: This review update considered quantitative, qualitative, and mixed methods studies that investigated, firstly, older adults with dementia who required assistance with bathing and, secondly, their caregivers and family members who provided this assistance. The quantitative component considered randomized controlled trials and quasi-experimental studies testing interventions for reducing agitated behaviors in older adults with dementia during bathing, as well as perceived confidence or satisfaction in caregivers. The qualitative component considered studies that reported on experiences of clients or caregivers during the bathing process.

Methods: A JBI mixed methods review was conducted following the convergent segregated approach. The review considered studies published between 1990 and March 11, 2022. The databases searched were PubMed, CINAHL, and Embase. Gray literature was also searched. Two independent reviewers screened titles and abstracts. Full texts were retrieved for studies that met the inclusion criteria and were assessed further for eligibility. Two reviewers independently assessed the quality of included studies and extracted data using the standardized JBI tools. Due to methodological and clinical heterogeneity, the results were presented narratively in the quantitative section. For the qualitative component, meta-synthesis was conducted following the JBI approach of meta-aggregation. Finally, evidence from the 2 components was integrated following the convergent segregated approach.

Results: Ten quantitative and 4 qualitative studies were included. The methodological quality was poor to moderate in the quantitative studies and moderate to high in the qualitative studies. Results from 3 quantitative studies suggested that providing training to caregivers on person-centered bathing reduced agitated behaviors in older adults with dementia. Other interventions did not show conclusive evidence of their effectiveness in any outcomes of interest. Two synthesized findings highlighted i) the importance of working within each person's reality by having the skills and knowledge required to deliver person-centered assistance and ii) the challenges experienced by caregivers, such as lack of support, time pressure, and safety-related fears. The integrated evidence showed that the quantitative and qualitative components complemented each other to promote the training of caregivers to deliver person-centered bathing.

Discussion: Integrated findings can help inform an evidence-based strategy utilizing a person-centered bathing approach to reduce agitated behaviors in older adults with dementia. Due to the limited number of eligible studies, and the clinical and methodological heterogeneity of included quantitative studies, no statistical pooling was possible. More studies are needed, particularly intervention studies with high methodological quality.

Conclusions: This review update suggests that providing caregivers with person-centered bathing training should be encouraged prior to bathing older adults with dementia. Caregivers should have the knowledge and skills, such as relevant assessment and communication skills, enabling them to provide effective bathing experiences to older

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CS is deputy editor-in-chief of JBI Evidence Synthesis. LL is an academic staff member at JBI, The University of Adelaide. LL and CS are co-conveners of the JBI Mixed Methods Systematic Review Methodology Group. The other authors declare no conflicts of interest.

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Review questions

The review question for the quantitative component was:

i) What are the effective bathing/showering methods or other related supportive interventions for older adults with dementia in aged care facilities and community settings?

The review questions for the qualitative component were:

i) What are the experiences of older adults with dementia receiving assisted bathing/showering or supportive interventions in aged care facilities and community settings?

ii) What are the experiences of caregivers, including nurses, care staff, or family members, involved in delivering assisted bathing/showering or supportive interventions to older adults with dementia in aged care facilities and community settings?

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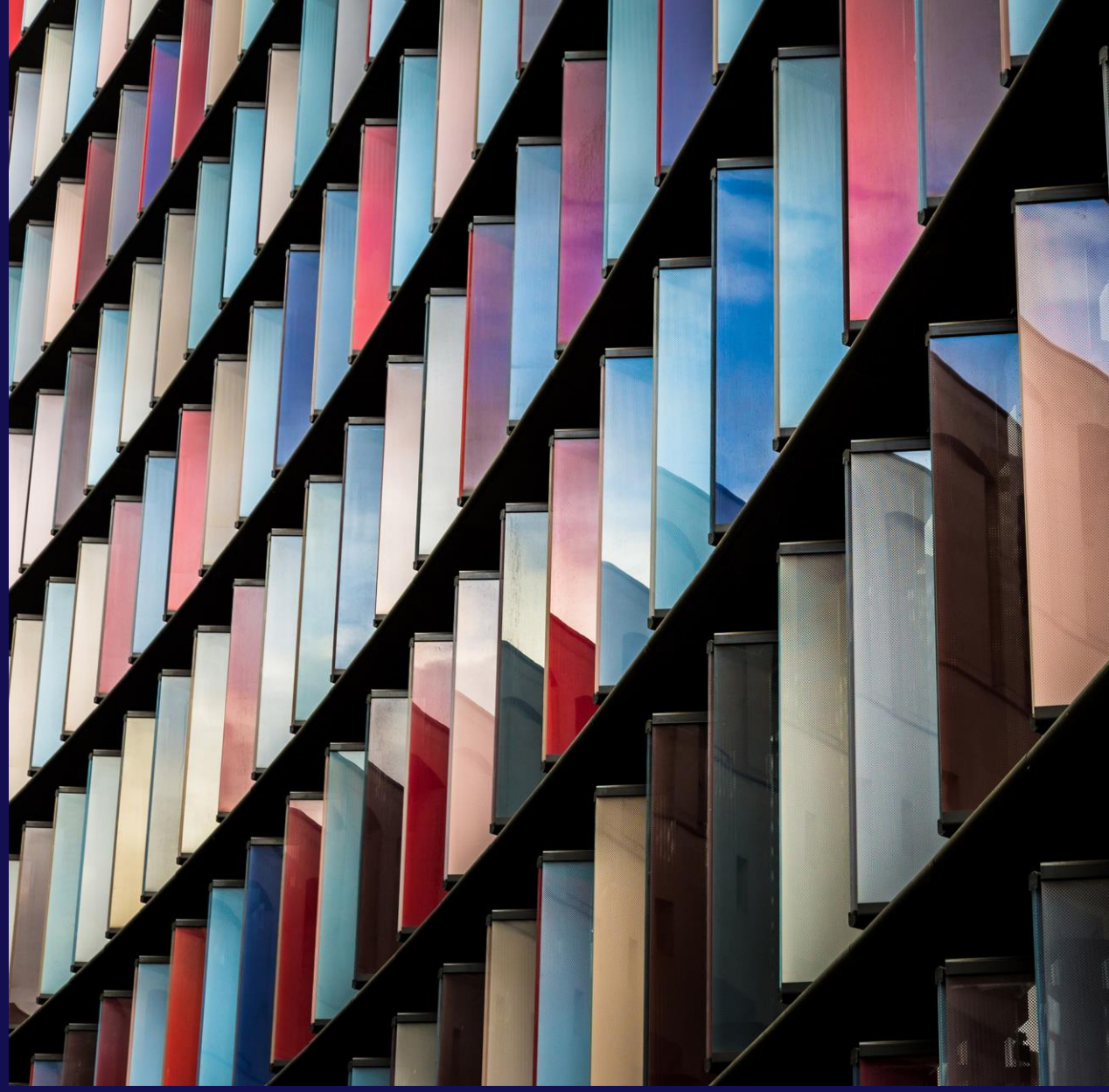
Convergent Segregated

For Integration: Use trigger questions

- Are the results/findings from individual syntheses supportive or contradictory?
- Does the qualitative evidence explain why the intervention is or is not effective?
- Does the qualitative evidence help explain differences in the direction and size of effect across the included quantitative studies?
- Which aspects of the quantitative evidence are/are not explored in the qualitative studies?
- Which aspects of the qualitative evidence are/are not tested in the quantitative evidence?



Convergent Segregated Exemplar

Review questions

- What are the effects of clinical supervision of healthcare professionals on organisational outcomes?
- What are healthcare professionals' experiences, views, and opinions regarding clinical supervision as it relates to organisational processes and outcomes?
- What can be inferred from the qualitative synthesis of healthcare professionals' experiences/views that can explain the effects of clinical supervision or inform its appropriateness and acceptability for health professionals?

PLOS ONE

RESEARCH ARTICLE

Impact of clinical supervision on healthcare organisational outcomes: A mixed methods systematic review

Priya Martin[1,2]*, **Lucylynn Lizarondo**[3], **Saravana Kumar**[4], **David Snowdon**[5,6]

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Data Availability Statement: All relevant data are within the manuscript and its Supporting Information files.

Abstract

Objective

To review the impact of clinical supervision of post-registration/qualification healthcare professionals on healthcare organisational outcomes.

Background

Clinical supervision is a professional support mechanism that benefits patients, healthcare professionals and healthcare organisations. Whilst evidence is growing on the impact of clinical supervision on patient and healthcare professional outcomes, the evidence base for the impact of clinical supervision on organisational outcomes remains weak.

Methods

This review used a convergent segregated approach to synthesise and integrate quantitative and qualitative research findings, as per the Joanna Briggs Institute's recommendations for mixed methods systematic reviews. Databases searched included CINAHL, Embase, PubMed, PschINFO, and Scopus. Whilst a narrative synthesis was performed to present the findings of the quantitative and qualitative studies, the evidence from both quantitative and qualitative studies was subsequently integrated for a combined presentation. The review followed the guidelines of the Preferred Reporting Items for Systematic Reviews and Meta-Analyses.

Results

Thirty-two studies including 27 quantitative, two qualitative and three mixed methods studies, were included in the review. The results of the quantitative analysis showed that effective clinical supervision was associated with lower burnout and greater staff retention, and effective supervisor was associated with lower burnout and greater job satisfaction.

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Convergent Segregated – Clinical Supervision

Eligibility criteria

- Population
- Intervention
- Outcomes
- Phenomena of interest
- Context
- Type of studies

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Quantitative results	Qualitative findings
Clinical supervision (CS) compared to control or historical control (pre-post implementation) • Variable results for burn-out, job satisfaction, well-being, workplace environment Association between effective CS and organisational outcomes • Effective CS positively associated with job retention; negatively associated with burn-out emotional exhaustion/depersonalisation; association with job satisfaction was unclear Association between effective supervisor and organisational outcomes • Effective supervisor positively associated with job satisfaction, and negatively associated with burnout • Association between effective supervisor and emotional exhaustion was mixed	Themes or synthesised findings • Adequate clinical supervision mitigates the risk of burn out and facilitates staff retention, while inadequate clinical supervision can lead to stress and burnout. • CS improves the work environment through boosting staff morale, motivation to work, staff well-being and team relationships.

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- Integration of evidence: mainly for triangulation rather than expansion or exploration
- Integrated results
  - Both the quantitative and qualitative evidence highlight that effective clinical supervision and effective clinical supervisors may be associated with positive organisational outcomes (i.e. burn-out, staff well-being, job satisfaction, job retention and workplace environment), whereas ineffective or inadequate clinical supervision and ineffective supervisors may have a negative impact on the well-being of the supervisee.

Five common pitfalls in mixed methods reviews

- Is an MMSR the best methodological approach to answer the review question/s?
- Was the right synthesis and integration approach followed to answer the review question/s?
- Where is the mixed methods primary research in the MMSR?
- Transforming the data--where is it and how was it done?
- Lack of integration--where is the mixing of the quantitative and qualitative components?

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Lizarondo L, Stern C, Apostolo J, Carrier J, de Borges K, Godfrey C, Kirkpatrick P, Pollock D, Rieger K, Salmond S, Vandyk A, Loveday H. Five common pitfalls in mixed methods systematic reviews: lessons learned. J Clin Epidemiol. 2022 Aug;148:178-183.

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Key take-home messages

- Choose a mixed methods systematic review only when the review question requires multiple forms of evidence.
- The review question should determine the synthesis and integration approach.
- JBI currently recommends convergent approaches—integrated or segregated—depending on the review question.
- Transparency in data transformation and integration is essential.
- Integration is the defining feature of a mixed methods systematic review.

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Thank you!

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