



SYSTEMATIC MIXED STUDIES REVIEW

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Disclaimer

- I am not an experienced systematic reviewer
- This is my first systematic review
- This seminar is purely to discuss my experience and decision making processes

Disclaimer

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Content

1. What is a systematic mixed studies review (SMSR)
2. Types of SMSR
3. Challenges and Considerations:
 - Inclusion / Exclusion Criteria
 - Search Strategy
 - Risk of Bias Assessment
 - Synthesis
 - Meta-integration
 - Confidence in the Cumulative Evidence
 - Publication (Word Count!)
4. Questions?

What is a systematic mixed studies review

Nomenclature

As with anything new, naming is a challenge:

- Mixed-methods systematic review (implies the review is of mixed-methods studies only)
- Mixed research synthesis?
- Mixed-method research synthesis?
- Systematic mixed studies review (seems most accurate)

FRANTZEN, K. K. & FETTERS, M. D. 2016. Meta-integration for synthesizing data in a systematic mixed studies review: insights from research on autism spectrum disorder. *Quality & Quantity*, 50, 2251-2277.

What is a systematic mixed studies review

- The mixed approach to conducting systematic reviews is a process whereby:
 1. comprehensive syntheses of two or more types of data (e.g. quantitative and qualitative) are conducted and then aggregated into a final, combined synthesis, or
 2. qualitative and quantitative data are combined and synthesized in a single primary synthesis.

JOANNA BRIGGS INSTITUTE. 2014. Joanna Briggs Institute Reviewers' Manual 2014: Methodology for JBI Mixed Methods Systematic Reviews. Available:
https://joannabriggs.org/assets/docs/sumari/ReviewersManual_Mixed-Methods-Review-Methods-2014-ch1.pdf

Types of systematic mixed studies review

Three Main Types

- Segregated
- Integrated
- Contingent / Sequential

Types of systematic mixed studies review

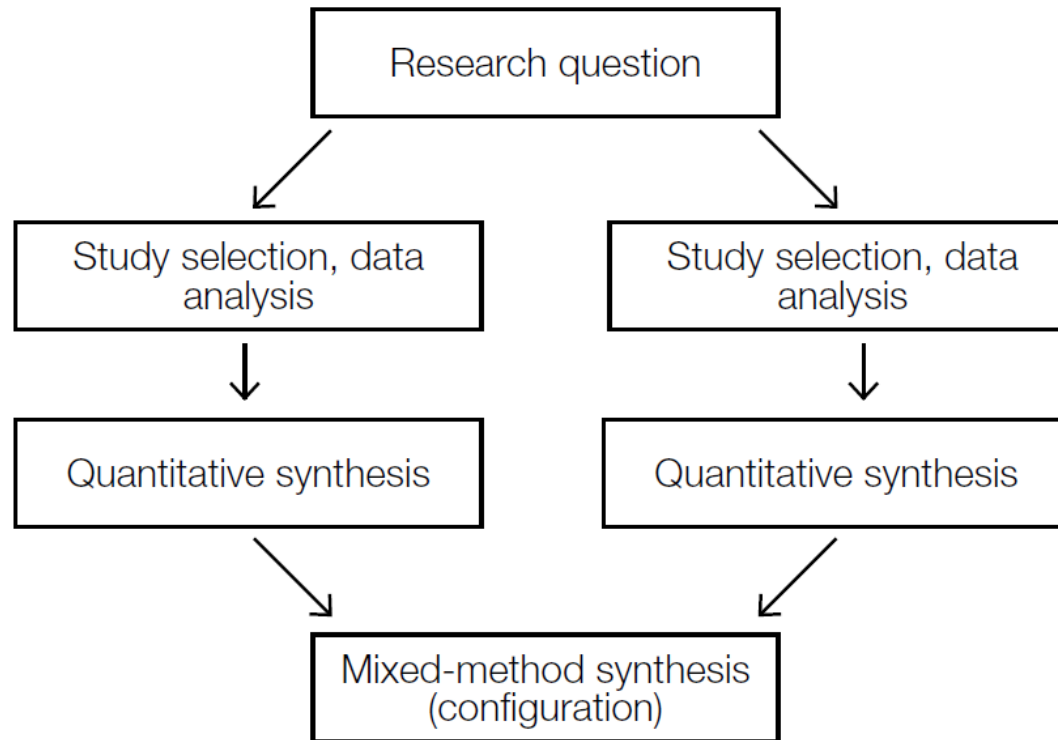
Segregated Method (Sandelowski)



SANDELOWSKI, M., VOILS, C. I. & BARROSO, J. 2006. Defining and Designing Mixed Research Synthesis Studies. *Res Sch*, 13, 29.

Types of systematic mixed studies review

Segregated Method (JBI)

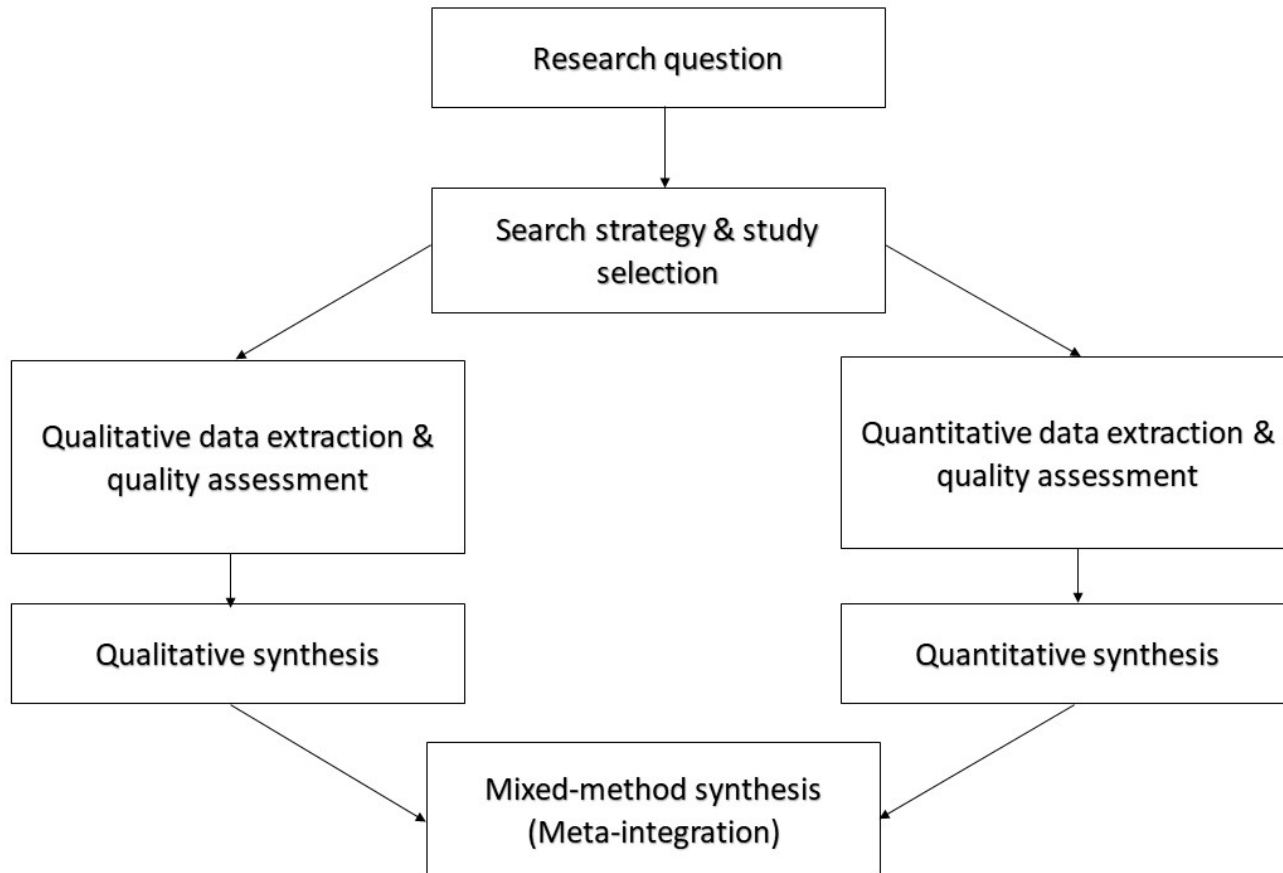


JOANNA BRIGGS INSTITUTE. 2014. Joanna Briggs Institute Reviewers' Manual 2014: Methodology for JBI Mixed Methods Systematic Reviews. Available: https://joannabriggs.org/assets/docs/sumari/ReviewersManual_Mixed-Methods-Review-Methods-2014-ch1.pdf



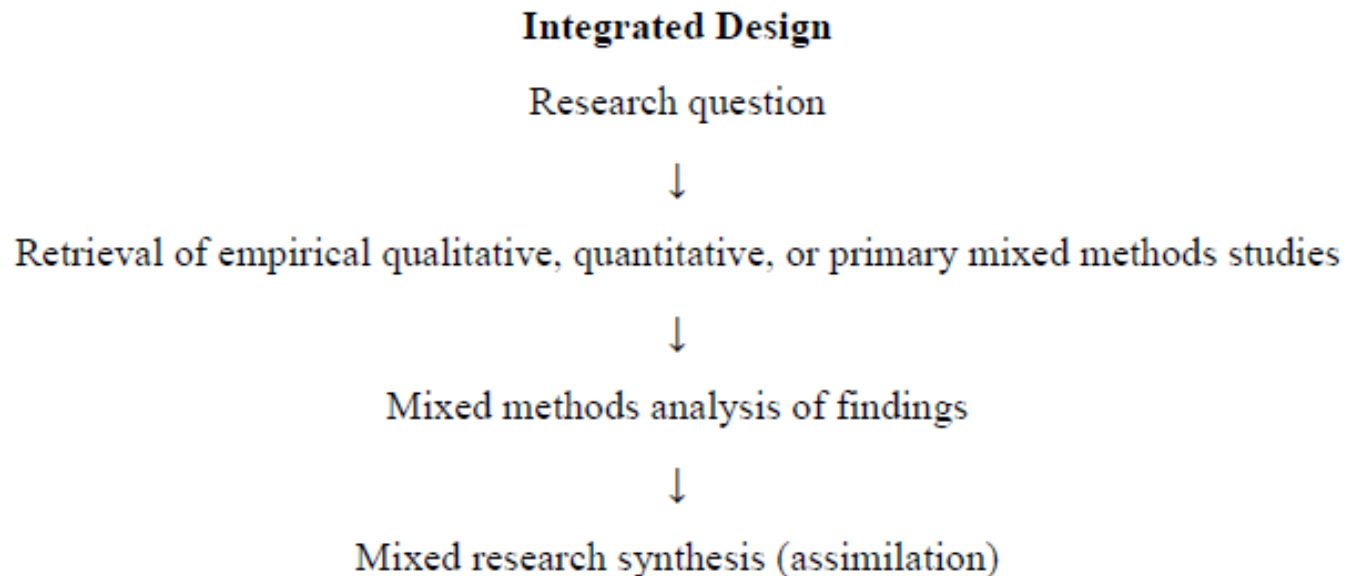
Types of systematic mixed studies review

Segregated Method (my approach)



Types of systematic mixed studies review

Integrated Method (Sandelowski)

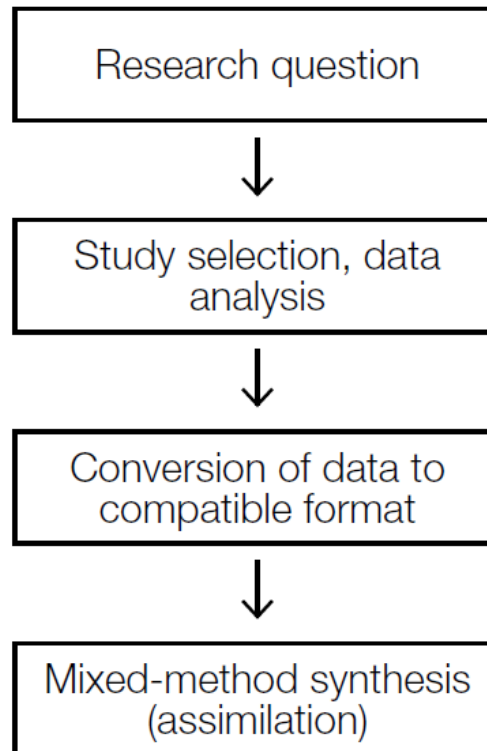


SANDELOWSKI, M., VOILS, C. I. & BARROSO, J. 2006. Defining and Designing Mixed Research Synthesis Studies. *Res Sch*, 13, 29.



Types of systematic mixed studies review

Integrated Method (*JBIR*)

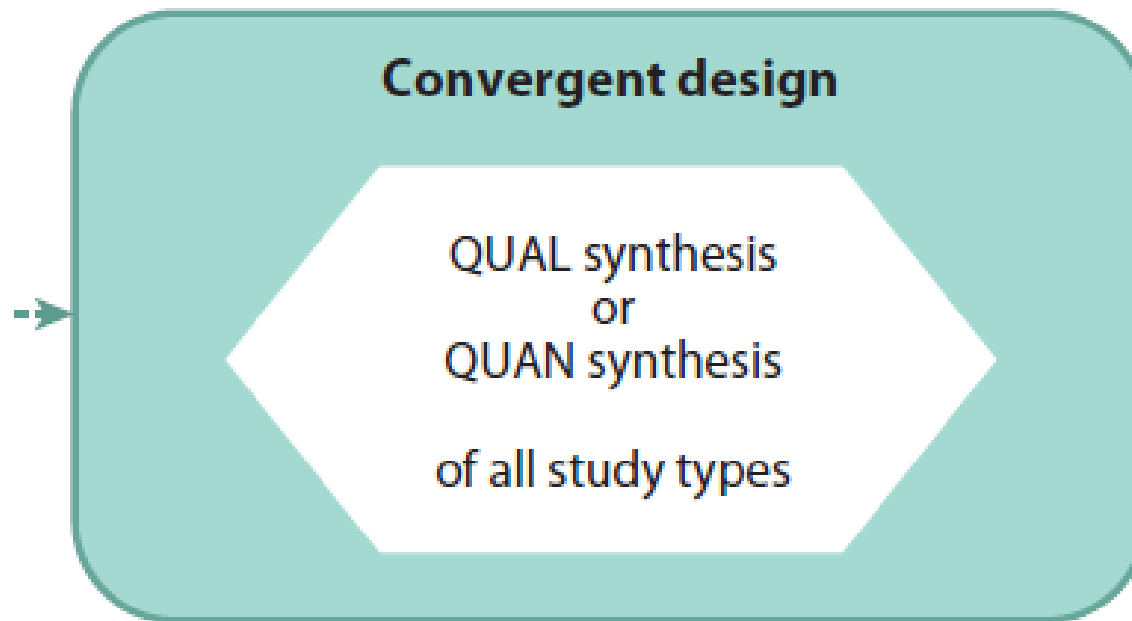


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Types of systematic mixed studies review

Integrated (convergent) Method (Pluye & Hong)



PLUYE, P. & HONG, Q. N. 2014. Combining the power of stories and the power of numbers: mixed methods research and mixed studies reviews. *Annu Rev Public Health*, 35, 29-45.

Types of systematic mixed studies review

‘Convergent’

Convergent Synthesis

In convergent synthesis designs, results of included studies are integrated using data transformation techniques: QUAL or QUAN transformation. In convergent QUAL synthesis design, results

PLUYE, P. & HONG, Q. N. 2014. Combining the power of stories and the power of numbers: mixed methods research and mixed studies reviews. *Annu Rev Public Health*, 35, 29-45.

are transformed to a QUAL format. When there is no data transformation, researchers conduct a convergent meta-integration (Fig. 1). When data transformation occurs, there

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Types of systematic mixed studies review

Differences between segregated and integrated method

	Segregated	Integrated
Transformation of data required?	No	Yes
Integration	Complementarity (data can only complement each other)	Confirmation / Refutation
Conclusion	Configuration (lego bricks lined up)	Assimilation (lego bricks make a house)

SANDELOWSKI, M., VOILS, C. I. & BARROSO, J. 2006. Defining and Designing Mixed Research Synthesis Studies. *Res Sch*, 13, 29.

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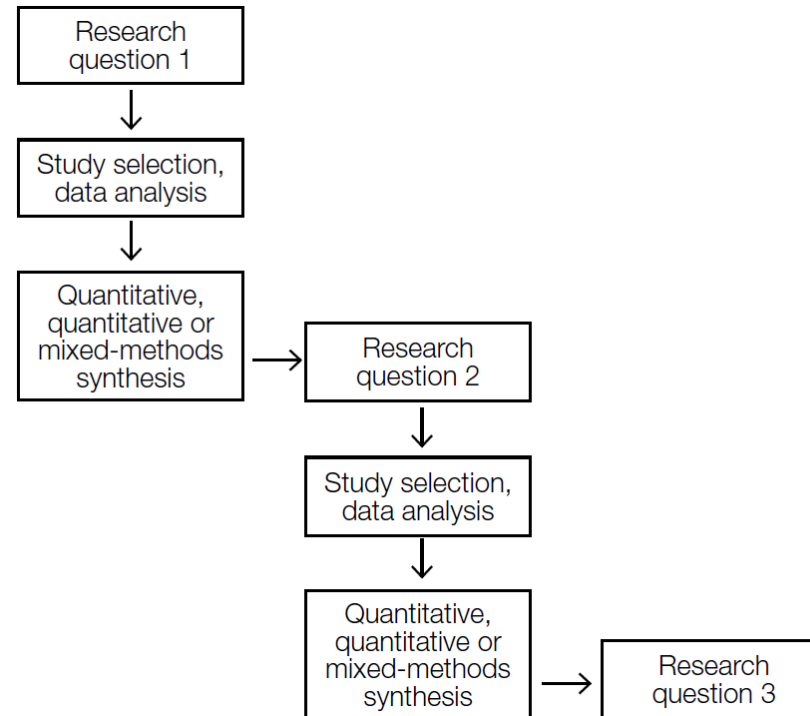
Techniques for Data Transformation

Qualitative methods	Description	Product
(QUAL + QUAN → QUAL)		
Thematic analysis	To identify patterns through the process of coding and describe a relevant phenomenon or associations	Themes
Critical interpretive synthesis	To develop new theoretical models to provide a comprehensive understanding	Framework
Meta-narrative synthesis	To establish concepts through a process of identifying different theories from different disciplines	Storylines
Realist synthesis	A theory-driven evaluation of public health interventions and programs	Theory
(QUAL + QUAN → QUAN)		
Content analysis	Reducing large amount of textual data into a small number of variables	Variables
Bayesian	Measuring the probability of an association between two variables	Probabilities
Boolean	To identify commonalities in the relationships between conditions and outcomes across studies, referred to as configurations	Configurations



Types of systematic mixed studies review

Contingent Method (JBI)

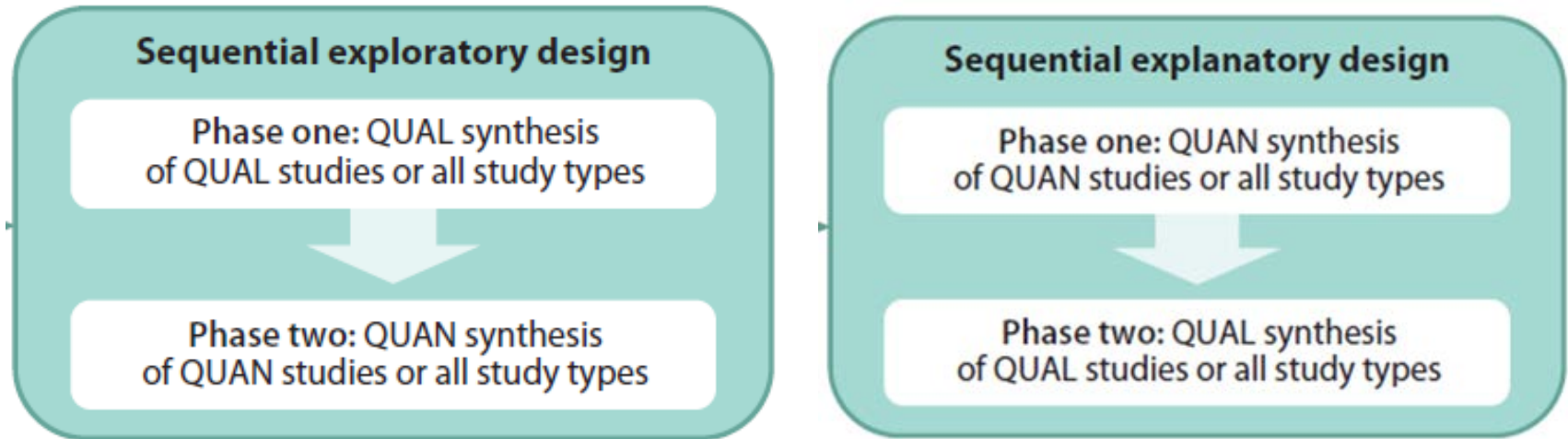


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Types of systematic mixed studies review

Sequential Method (Pluye & Hong)



PLUYE, P. & HONG, Q. N. 2014. Combining the power of stories and the power of numbers: mixed methods research and mixed studies reviews. *Annu Rev Public Health*, 35, 29-45.

Challenges and Considerations

Inclusion / Exclusion Criteria

- Consider separate inclusion and exclusion criteria for quantitative, qualitative and mixed studies.
- Consider whether to include mixed-methods studies.
- We used a PICO approach:
 - Participants
 - Phenomena of Interest
 - Context

Challenges and Considerations

Search Strategy

- Consider performing one search strategy, keeping the terms broad.
- My research question was:
 - *What are the predictors, barriers and facilitators to effective management of acute pain in children by ambulance services?*

Searches

- 1 Infant*.mp.
- 2 Child*.mp.
- 3 Pediatric*.mp.
- 4 Paediatric*.mp.
- 5 Adolescen*.mp.
- 6 1 or 2 or 3 or 4 or 5
- 7 Ambulance*.mp.
- 8 “Emergency Medical Service*”.mp.
- 9 Prehospital.mp.
- 10 Pre-hospital.mp.
- 11 “Out of hospital”.mp.
- 12 Paramedic*.mp.
- 13 7 or 8 or 9 or 10 or 11 or 12
- 14 Pain.mp.
- 15 Analgesi*.mp.
- 16 Oligoanalgesia.mp.
- 17 14 or 15 or 16
- 18 6 and 13 and 17



Challenges and Considerations

Risk of Bias Assessment

- Consider using the Mixed Methods Appraisal Tool (MMAT)
- Developed for systematic mixed studies reviews
- I chose individual risk of bias assessment tools suitable for each study type.
- If I was to perform another systematic mixed studies review, I would use MMAT

PACE, R., PLUYE, P., BARTLETT, G., MACAULAY, A. C., SALSBERG, J., JAGOSH, J. & SELLER, R. 2012. Testing the reliability and efficiency of the pilot Mixed Methods Appraisal Tool (MMAT) for systematic mixed studies review. *International Journal of Nursing Studies*, 49, 47-53.

Challenges and Considerations

Synthesis

- Segregated:
 - Quantitative: meta-analysis, narrative synthesis
 - Qualitative: meta-synthesis (numerous types*), narrative synthesis
- Integrated:
 - Transform Quan to Qual and perform meta-synthesis / narrative synthesis
 - Transform Qual to Quan and perform meta-analysis / narrative synthesis

*BARNETT-PAGE, E. & THOMAS, J. 2009. Methods for the synthesis of qualitative research: a critical review. *BMC Medical Research Methodology*, 9, 59.

Challenges and Considerations

Synthesis

- Mixed-methods studies are difficult to enter into a synthesis due to the inherent integration.

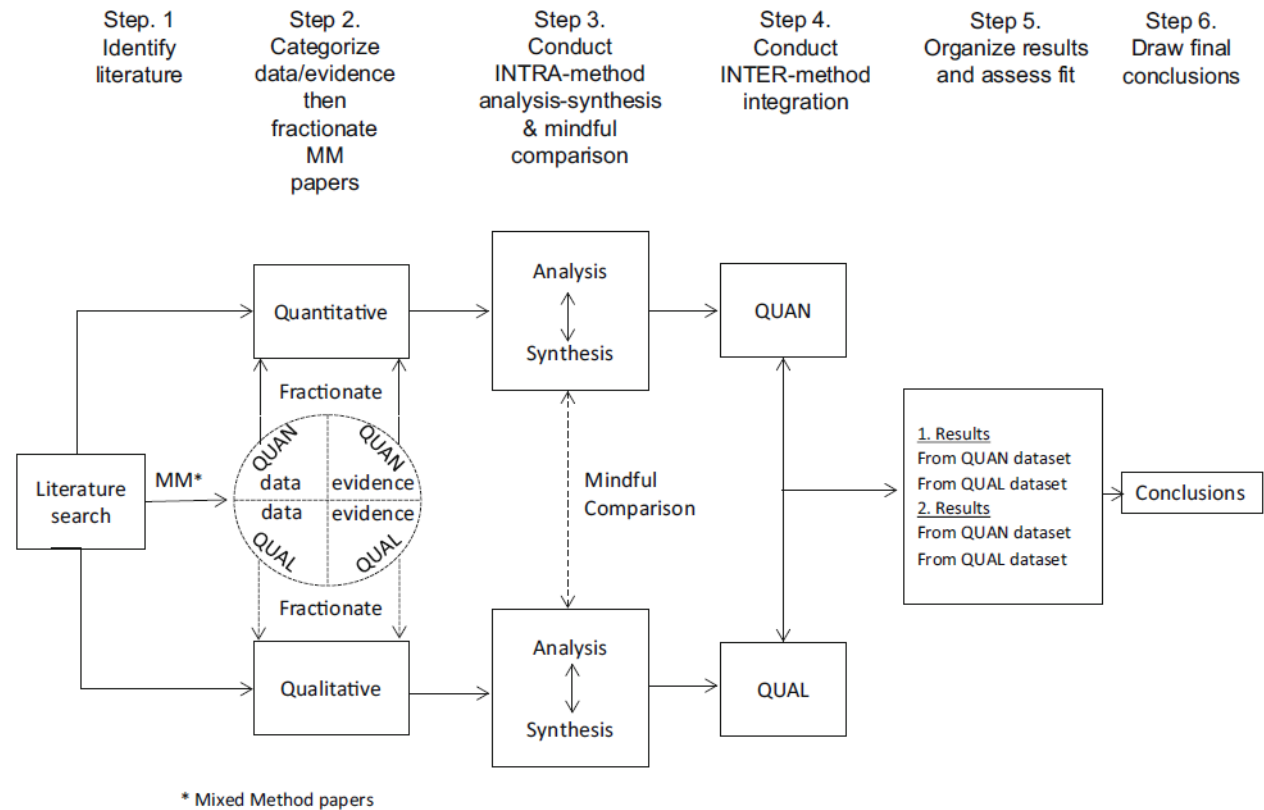


Fig. 4 Advanced convergent meta-integration

FRANTZEN, K. K. & FETTERS, M. D. 2016. Meta-integration for synthesizing data in a systematic mixed studies review: insights from research on autism spectrum disorder. *Quality & Quantity*, 50, 2251-2277.



Challenges and Considerations

Synthesis

- If mixed-methods studies generate more data than the sum of their parts... how is that additional data incorporated into a systematic mixed studies review?



Challenges and Considerations

Meta-integration

- My interpretation:
- **Integration** is the bringing together of quantitative and qualitative primary data
- **Meta-integration** is the bringing together of quantitative and qualitative syntheses (meta-analysis & meta-synthesis for eg)
- Full paper of meta-integration methods:
 - FRANTZEN, K. K. & FETTERS, M. D. 2016. Meta-integration for synthesizing data in a systematic mixed studies review: insights from research on autism spectrum disorder. *Quality & Quantity*, 50, 2251-2277.

Challenges and Considerations

Meta-integration

- I performed a segregated design, therefore my syntheses could not confirm / refute each other, instead they could **complement** or **contrast** (my addition) each other.
- At present my meta-integration is under development but is presented in a table similar to this:

Challenges and Considerations

Meta-integration

Type	Model	Concept	QUAN	QUAL	MM	Integration
Basic convergent meta-integration	Convergent SMSR integration	Topic 1	Variable	Theme		Conclusion based on variables and themes
			Variable	Theme		
		Topic 2	Variable	Theme		
	Convergent QUAN synthesis		Variable	Theme		Conclusion based on variables
			Variable	Variable		
	Convergent QUAL synthesis	Topic 1	Theme	Theme		Conclusion based on themes
			Theme	Theme		
Advanced convergent meta-integration	Convergent SMSR integration with MM papers	Topic 1	Variable	Theme	Variable	Conclusion based on variables and themes
			Variable	Theme	Variable	
		Topic 2	Variable	Theme	Theme	
	Convergent QUAN synthesis with MM papers		Variable	Theme	Theme	Conclusion based on variables
		Topic 1	Variable	Variable	Variable	
			Variable	Variable	Variable	
	Convergent QUAL synthesis with MM papers	Topic 1	Variable	Variable	Variable	Conclusion based on themes
			Variable	Variable	Variable	
		Topic 2	Variable	Variable	Variable	

SMSR Systematic mixed studies review

FRANTZEN, K. K. & FETTERS, M. D. 2016. Meta-integration for synthesizing data in a systematic mixed studies review: insights from research on autism spectrum disorder. *Quality & Quantity*, 50, 2251-2277.



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Challenges and Considerations

Confidence in the Cumulative Evidence

- How I have determined the confidence in the cumulative evidence:
- Quantitative Synthesis use GRADE:
 - ATKINS, D., BEST, D., BRISS, P. A., ECCLES, M., FALCK-YTTER, Y., FLOTTORP, S., GUYATT, G. H., HARBOUR, R. T., HAUGH, M. C., HENRY, D., HILL, S., JAESCHKE, R., LENG, G., LIBERATI, A., MAGRINI, N., MASON, J., MIDDLETON, P., MRUKOWICZ, J., O'CONNELL, D., OXMAN, A. D., PHILLIPS, B., SCHÜNEMANN, H. J., EDEJER, T. T.-T., VARONEN, H., VIST, G. E., WILLIAMS, J. W., JR., ZAZA, S. & GROUP, G. W. 2004. Grading quality of evidence and strength of recommendations. *BMJ (Clinical research ed.)*, 328, 1490-1490.
- Qualitative Synthesis use CERQual:
 - LEWIN, S., BOHREN, M., RASHIDIAN, A., MUNTHE-KAAS, H., GLENTON, C., COLVIN, C. J., GARSIDE, R., NOYES, J., BOOTH, A., TUNÇALP, Ö., WAINWRIGHT, M., FLOTTORP, S., TUCKER, J. D. & CARLSEN, B. 2018. Applying GRADE-CERQual to qualitative evidence synthesis findings—paper 2: how to make an overall CERQual assessment of confidence and create a Summary of Qualitative Findings table. *Implementation Science*, 13, 10.

Challenges and Considerations

Confidence in the Cumulative Evidence - GRADE

- Design, Quality, Consistency and Directness

Quality assessment						Summary of findings					
No of studies	Design	Quality	Consistency	Directness	Other modifying factors*	No of patients		Effect		Quality	Importance
						SSRIs	Tricyclics	Relative (95% CI)	Absolute		
Depression severity (measured with Hamilton Depression Rating Scale after 4 to 12 weeks)											
Citalopram (8)	Randomised controlled trials	No serious limitations	No important inconsistency	Some uncertainty about directness (outcome measure)†	None	5044	4510	WMD 0.034 (−0.007 to 0.075)	No difference	Moderate	Critical
Fluoxetine (38)											
Fluvoxamine (25)											
Nefazodone (2)											
Paroxetine (18)											

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Challenges and Considerations

Confidence in the Cumulative Evidence – CERQual

CERQual Qualitative Evidence Profile

- Methodological limitations, coherence, adequacy and relavance

Summary of review finding	Studies contributing to the review finding	Methodological limitations	Coherence	Adequacy	Relevance ^a	<i>CERQual assessment of confidence in the evidence</i>	Explanation of CERQual assessment
1. While regular salaries were not part of many programmes, other monetary and non-monetary incentives, including payment to cover out-of-pocket expenses and “work tools” such as bicycles, uniforms or identity badges, were greatly appreciated by lay health workers.	2, 5, 11, 12, 22, 29	Minor methodological limitations (five studies with minor and one study with moderate methodological limitations (unclear recruitment and sampling strategy, no reflexivity))	Minor concerns about coherence (some concerns about the fit between the data from primary studies and the review finding)	Minor concerns about adequacy (six studies that together offered moderately rich data)	Minor concerns about relevance (studies of lay health worker programmes from three continents and including a fairly wide range of different clients and health issues)	Moderate confidence	Minor concerns regarding methodological limitations, relevance, coherence and adequacy.

LEWIN, S., BOHREN, M., RASHIDIAN, A., MUNTKE-KAAS, H., GLENTON, C., COLVIN, C. J., GARSIDE, R., NOYES, J., BOOTH, A., TUNÇALP, Ö., WAINWRIGHT, M., FLOTTORP, S., TUCKER, J. D. & CARLSEN, B. 2018. Applying GRADE-CERQual to qualitative evidence synthesis findings—paper 2: how to make an overall CERQual assessment of confidence and create a Summary of Qualitative Findings table. *Implementation Science*, 13, 10.

Challenges and Considerations

Confidence in the Cumulative Evidence – CERQual

CERQual Summary of Qualitative Findings

Table 6 CERQual Summary of Qualitative Findings table—Example A

Objective: To synthesise qualitative and quantitative evidence on the mistreatment of women during childbirth in health facilities.

Perspective: Experiences and attitudes of stakeholders in any country about the mistreatment of women during childbirth

Summary of review finding	Studies contributing to the review finding	CERQual assessment of confidence in the evidence	Explanation of CERQual assessment
1. Use of force: Women across the world reported experiencing physical force by health providers during childbirth. In some cases, women reported specific acts of violence committed against them during childbirth, but women often referred to these experiences in a general sense and alluded to beatings, aggression, physical abuse, a rough touch and use of extreme force. Pinching, hitting and slapping, either with an open hand or an instrument were the most commonly reported specific acts of physical violence.	6, 9, 10, 13, 21, 61, 67, 68, 73, 75, 77, 80, 84, 86, 87, 91, 96, 97	High confidence	15 studies with moderate methodological limitations. Data from 10 countries across all geographical regions, but predominantly sub-Saharan Africa. No or very minor concerns about coherence and adequacy.
2. Physical restraint: Women reported physical restraint during childbirth through the use of bed restraints and mouth gags.	86, 97	Very low confidence	Two studies (Tanzania and Brazil) with moderate methodological limitations. Limited, thin data from 2 countries. Minor concerns about coherence but

LEWIN, S., BOHREN, M., RASHIDIAN, A., MUNTHE-KAAS, H., GLENTON, C., COLVIN, C. J., GARSIDE, R., NOYES, J., BOOTH, A., TUNÇALP, Ö., WAINWRIGHT, M., FLOTTORP, S., TUCKER, J. D. & CARLSEN, B. 2018. Applying GRADE-CERQual to qualitative evidence synthesis findings—paper 2: how to make an overall CERQual assessment of confidence and create a Summary of Qualitative Findings table. *Implementation Science*, 13, 10.

Challenges and Considerations

Confidence in the Cumulative Evidence – GRADE & CERQual

- Overall grade:
- **High** = Further research is very unlikely to change our confidence in the estimate of effect
- **Moderate** = Further research is likely to have an important impact on our confidence in the estimate of effect and may change the estimate
- **Low** = Further research is very likely to have an important impact on our confidence in the estimate of effect and is likely to change the estimate
- **Very low** = Any estimate of effect is very uncertain.

Challenges and Considerations

Publication

- Huge challenge to squeeze a SMSR into 3000 words!
- Use a journal that allows supplementary data to be submitted.

***‘If you can’t explain it simply, you don’t
understand it well enough’***

Albert Einstein

Any Questions?

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