

Reducing risk behaviours after stroke: an overview of reviews



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Executive summary

One in 4 strokes is a recurrent event, more likely to be fatal or result in nursing home care. Tailored lifestyle change in addition to best practice secondary prevention medications could reduce future events by up to 80%.

This overview of systematic reviews provides the best available evidence for lifestyle interventions after stroke. Moderate certainty of evidence supports multimodal interventions (those using a combination of any of the following: targeted active health education, behavioural counselling /behaviour change techniques, supervised exercise, and psychological therapies) to reduce future cardiac events and increase physical activity participation. Moderate certainty of evidence also supports psychological talk therapies to reduce depression post-stroke.

Findings from eligible primary studies from within the identified systematic reviews, summarises the quantity and quality of evidence supporting theoretically grounded interventions by intervention type and outcome, detailing the mediators for change to enable replicability. Theoretical domains of *Knowledge*, *Beliefs about Consequences*, and *Emotions* positively influence stroke risk-reducing behaviours.

Taken together these works highlight the lack of existing theory-based interventional research in stroke secondary prevention. Future research should at a minimum include these constructs known to be effective, in well conceptualized RCTs with adequate follow-up time.

The findings advance our knowledge and ability to be more directive in recommending effective approaches to support behaviour change and further highlights remaining knowledge gaps. These findings have relevance for individuals and their families after stroke, for clinicians and service providers in stroke care and for policy and guideline development groups.

Background

Stroke, a leading cause of death and disability, affects up to 15 million people worldwide annually(1). Comprehensive stroke care guidelines recommend optimised secondary prevention strategies that include lifestyle change.

Changing health behaviours is difficult, particularly in the context of cognitive and functional impairment barriers reported post-stroke(2). Additionally, chronic conditions like stroke require active self-management of treatment, symptoms, lifestyle, and physical and psychological sequelae(3).

Whilst multiple systematic reviews have address behaviour-change interventions, intervention definitions and associated outcomes differ between reviews.

To better understand the role of behaviour change theory in stroke secondary prevention, this overview synthesises high-level evidence for lifestyle-based, behavioural and/or self-management interventions to reduce risk in stroke secondary prevention in a structured, consistent way. Secondly, it identifies unique primary studies from within the systematic reviews to determine the mediator for change and map to the corresponding domain of the Theoretical Domains Framework (TDF)(4).



Methodology – what we did and how

In a two phased approach we summarise the available evidence, critically appraise the quality of included reviews, rate the quality of evidence for each outcome of interest, map the theoretical and conceptual landscape to secondary prevention outcomes of interest and provide a detailed compendium of theoretically grounded replicable interventions employed in the primary studies identified.

Phase 1 (5)



Phase 2 (6)

- 15 systematic reviews including 72 meta-analyses addressed 21 outcomes of interest
- We comprehensively summarised and conducted a best evidence synthesis of 28 meta-analyses demonstrating significant effect
- The certainty of the evidence was identified using the GRADE criteria

- Identifies and synthesises 19 primary studies from within the systematic reviews, which reported and measured theoretical rationales
- Classifies the theoretical approach mapping to the corresponding domain of the TDF
- Synthesises results of effect by outcomes of interest measured and mediator for change

Key Findings

- 4 broad categories of interventions identified:
 - Psychological talking therapies
 - Education/Behavioural counselling
 - Multimodal lifestyle interventions
 - Self-management support
- Best evidence synthesis supports
 - ✓ multimodal lifestyle interventions to reduce cardiac events and increase physical activity participation
 - ✓ psychological talk therapies to reduce post-stroke depression
- 3 domains of the TDF positively influence risk reducing behaviour
 - ✓ *Knowledge*
 - ✓ *Beliefs about Consequences*
 - ✓ *Emotions*
- Best evidence synthesis of theoretical domains and secondary prevention outcomes supports
 - *Knowledge* to improve medication adherence, physical activity participation and smoking cessation
 - *Emotions* to improve post-stroke depression
 - *Beliefs about Consequences* to improve medication adherence

Gaps and Implications

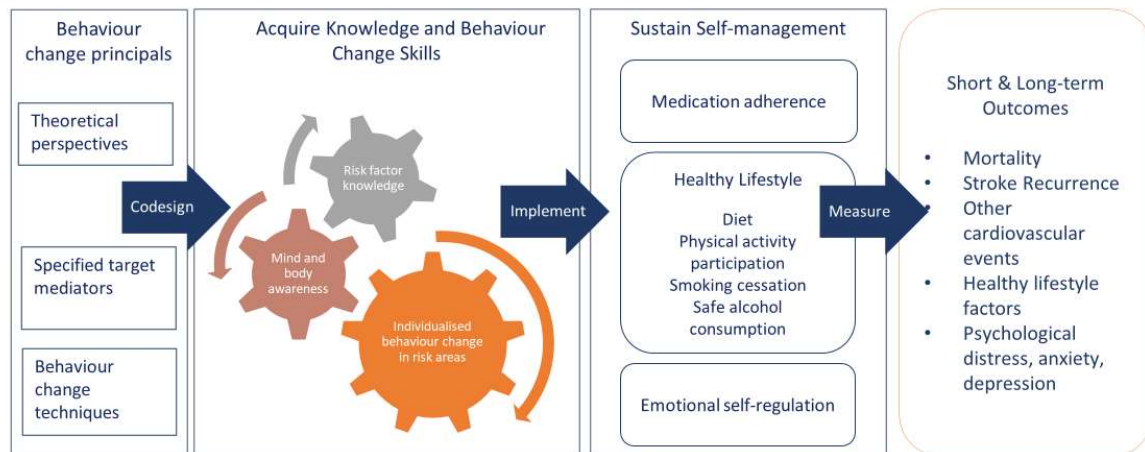
- Lack of long-term follow-up in the primary studies
- Lack of robust data for mortality and recurrent stroke outcomes
- Little evidence for healthy lifestyle activity
- Limited attention to theoretical framework
 - Mediators of behaviour change
 - Behaviour change techniques
- Lack of standardisation in outcomes

Where theory had been applied it often lacked a clear rationale and/or explicit use of the theory in the intervention delivery.

Future studies need to describe their behaviour change interventions in a more structured way, that links target behaviour change mediators and embedded behaviour change techniques with robust underpinning theory.

To this end we propose a Lifestyle/Behavioural Change and Self-management model which clearly lays out the underpinning theoretical framework, the related mediator/s targeted to affect behaviour change and the behaviour change techniques employed.

Lifestyle/Behavioural Change and Self-management model



Future Actions

- Recognise the importance of implementing non-pharmacological, non-surgical tailored risk reduction strategies after stroke
- Embed interventions with moderate GRADE evidence into routine care in stroke secondary prevention
- Ensure interventions for behaviour change are theory-based to maximise their efficacy
- Include outcomes that measure both the behaviour and the longer-term cardiovascular outcomes
- Make recommendations to guide reporting in future trials to grow the evidence base

References

1. Krishnamurthi RV, Ikeda T, Feigin VL. Global, Regional and Country-Specific Burden of Ischaemic Stroke, Intracerebral Haemorrhage and Subarachnoid Haemorrhage: A Systematic Analysis of the Global Burden of Disease Study 2017. *Neuroepidemiology*. 2020;54(2):171-9.
2. Bailey RR, Phad A, McGrath R, Haire-Joshu D. Prevalence of five lifestyle risk factors among US adults with and without stroke. *Disability and health journal*. 2019;12(2):323-7.
3. Lawrence M, Asaba E, Duncan E, Elf M, Eriksson G, Faulkner J, et al. Stroke secondary prevention, a non-surgical and non-pharmacological consensus definition: results of a Delphi study. *BMC Res Notes*. 2019;12(1):823-.
4. Cane J, O'Connor D, Michie S. Validation of the theoretical domains framework for use in behaviour change and implementation research. *Implementation Science*. 2012;7(1):37.
5. Hall P, Lawrence M, Blake C, Lennon O. Interventions for behaviour change and self-management of risk in stroke secondary prevention: an overview of reviews. *Cerebrovascular Diseases*. 2023.DOI: 10.1159/000531138.
6. Hall P, Lawrence M, Kroll T, Blake C, Matthews J, Lennon O. Reducing risk behaviours after stroke: An overview of reviews interrogating primary study data using the Theoretical Domains Framework. *PLOS ONE*. 2024;19(4):e0302364.DOI: 10.1371/journal.pone.0302364.