The effectiveness of secondary prevention lifestyle interventions designed to change lifestyle behavior following stroke: summary of a systematic review

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CRD summary
The authors concluded that lifestyle interventions for the secondary prevention of stroke were effective in improving lifestyle behaviour, physiological outcomes, and secondary outcomes. There was insufficient evidence for stroke recurrence. An unclear risk of error and bias during the review processes, heterogeneity, and the limited evidence suggest that the authors’ conclusions may not be reliable.

Authors’ objectives
To evaluate the effectiveness of secondary prevention lifestyle interventions designed to change lifestyle behaviour following stroke.

Searching
Ten electronic databases (including MEDLINE, EMBASE and CINAHL) were searched to August, 2009; search terms were reported. No date and language restrictions were applied.

Study selection
Experimental or non-experimental studies that assessed secondary prevention interventions for stroke survivors were eligible for inclusion. The primary outcomes were lifestyle behaviour changes (tobacco use, diet, alcohol consumption, and physical activity) and physiological outcomes (blood pressure, blood sugar, blood lipids, and body mass index). Eligible secondary outcomes included psychological and learning outcomes, recurrence of stroke, and other vascular events.

The included studies were conducted in Hong Kong, Australia, and Scotland. Interventions were delivered to groups or individually; content included education, counselling and pharmaceutical components, with education being the most common. Interventions were delivered using a shared-care model in a hospital and community setting, or via nurse-led models in the community or a hospital out-patient clinic. All interventions were short; their length and intensity of follow-up varied.

The authors did not state how many reviewers selected studies for inclusion, but it seems that two people were involved.

Assessment of study quality
Study quality was assessed using design-specific criteria from standardised instruments, developed by the Joanna Briggs Institute. Scores ranged from one to nine or 10, where the highest numbers indicated the best quality. Only studies with score of five or more were included.

Two reviewers independently assessed study quality; discrepancies were resolved by consensus.

Data extraction
Data were extracted for the treatment and control groups for each of the pre-specified outcomes; where possible odds ratios and 95% confidence intervals were calculated. The data were extracted independently by two reviewers. Authors of eligible studies were contacted for any missing information.

Methods of synthesis
Odds ratios and 95% confidence intervals were pooled into three separate meta-analyses for positive lifestyle behaviour change, physiological outcomes, and secondary outcome measures. Each meta-analysis was subdivided by behaviour and outcome. Statistical heterogeneity was assessed using $X^2$.

Where data could not be pooled statistically, a narrative synthesis was reported.
Results of the review
Three studies were included in the review (581 patients): two were randomised controlled trials (RCTs) and one was a quasi-experimental study (sample sizes not reported).

All three studies scored six or more on the relevant quality assessment scale. Quality limitations included inadequate random allocation of groups and differences between intervention and control groups in one study, and a small sample (102 patients) and lack of intention-to-treat analysis in another study. Smoking status was not bio-chemically validated in any of the studies. Two studies used self-reported measures (prone to misreporting) to assess outcomes, such as the number of cigarettes smoked, dietary intake, medical history and vascular recurrence.

Among intervention groups, the odds were higher, but of borderline statistical significance, for positive changes in lifestyle behaviour (OR 0.81, 95% CI 0.68 to 0.96) and physiological outcomes (OR 0.87, 95% CI 0.75 to 1.00), compared with control groups. A similar result was shown with secondary outcome measures, but this difference was statistically significant (OR 0.38, 95% CI 0.31 to 0.47; three studies). Heterogeneity was statistically significant for the meta-analyses of physiological outcomes (p=0.07) and secondary outcome measures (p<0.00001).

Authors’ conclusions
Lifestyle interventions for the secondary prevention of stroke were effective in improving lifestyle behaviour, physiological outcomes, and secondary outcomes. There was insufficient evidence for stroke recurrence.

CRD commentary
The review question was clear and the inclusion criteria appear to be replicable. A large number of electronic databases were searched and no language and date restrictions were applied, reducing the likelihood of language bias. Efforts were made to minimise bias and error during quality assessment and data extraction, but were not reported for study selection. Relevant, standardised quality assessment was used, and only studies of reasonable quality were included. Study details were reported, but not in detail.

Meta-analyses of the findings were not appropriate, as there were only three, clinically diverse studies, with small samples. The authors pooled different outcome measures into three behaviour change measures (lifestyle, physiological, and secondary), despite the clinical and statistical heterogeneity present. Most of the outcomes were assessed in only one study, and studies were included several times when several outcomes contributed to one behaviour change measure, such as lifestyle.

The studies were of fair quality, but the unclear risk of error and bias in the review processes, heterogeneity, and the limited evidence suggest that the authors’ conclusions may not be reliable.

Implications of the review for practice and research
Practice: The authors stated that following stroke, clinicians should implement interventions to change lifestyle behaviours that increase the risk of another stroke, and implement behavioural and educational secondary prevention interventions to improve quality of life, self-perceived health status, and stroke knowledge.

Research: The authors stated that further large-scale, well-designed randomised controlled trials, with appropriate objective outcome measures, were required to determine the frequency and intensity of interventions, the most effective time for initiation of secondary prevention, the most cost-effective models of delivery, and whether interventions were effective in the long term.

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Bibliographic details

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Record Status
This is a critical abstract of a systematic review that meets the criteria for inclusion on DARE. Each critical abstract contains a brief summary of the review methods, results and conclusions followed by a detailed critical assessment on the reliability of the review and the conclusions drawn.