Secondary prevention of stroke and transient ischaemic attack

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Abstract

Transient ischaemic attack (TIA) and stroke are clinical syndromes characterised by acute neurological deficits with vascular causes. People experiencing TIA or a first stroke are at significant risk of subsequent stroke. Risk factors have been identified and include factors associated with lifestyle such as tobacco use, diet, obesity, alcohol consumption, physical activity and stress. Targeted therapeutic interventions have the potential to reduce the burden of stroke substantially. The aim of this article is to provide an overview of the evidence relating to lifestyle risk factors for stroke. Health promotion theories and intervention techniques that nurses can use to address lifestyle behaviour change following stroke will also be discussed.

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STROKE AND TRANSIENT ISCHAEMIC attack (TIA) are clinical syndromes characterised by acute neurological deficits with vascular causes (Muir 2009). People experiencing a stroke or TIA for the first time are at significant risk of subsequent stroke; it is estimated that 30-40% of people will have a further stroke or TIA within five years (Mant et al 2004). As ischaemic stroke is a marker for systemic disease, prevention of recurrent stroke also reduces risk of myocardial infarction and peripheral arterial disease (Muir 2009).

TIA carries a significant risk of subsequent stroke – as high as 8.1% within 48 hours (Johnston et al 2007). Early identification of TIA by the public and healthcare professionals is essential, as is prompt treatment. Rapid access services have been established in response to this need, including ‘hotlines’ to specialist advice, nurse triage and immediate investigations and treatment. Simple tools such as FAST (Box 1) help lay people to identify possible stroke and TIA events, and risk stratification tools such as ABCD2 (Johnston et al 2007) (Box 2) allow non-stroke specialist healthcare professionals to identify those at highest risk of stroke after a TIA.

A recent study identified ten established and emerging risk factors for stroke, including hypertension, high waist-to-hip ratio, unhealthy diet, physical inactivity, diabetes mellitus, excessive alcohol intake, psychosocial stress, depression, cardiac causes (for example, atrial

BOX 1

Think FAST and save a life

- FACE – can they smile? Does one side droop?
- ARM – can they lift both arms? Is one weak?
- SPEECH – is their speech slurred or confused?
- TIME – to call 999.

If you see these signs call 999 FAST.
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BOX 2

ABCD2 scoring system

- **A** Age: 60 years or older, 1 point
- **B** Blood pressure at presentation: 140/90mmHg or greater, 1 point
- **C** Clinical features: unilateral weakness, 2 points; speech disturbance without weakness, 1 point.
- **D** Duration of symptoms: 60 minutes or longer, 2 points; 10-59 minutes, 1 point.
- **D** Presence of diabetes mellitus, 1 point.

Points from the individual items are added to give the ABCD2 score. If a patient has a score of 4 or more, they are at high risk of an early stroke after TIA.

(Johnston et al 2007)

fibrillation) and high ratio of high-density lipoprotein to cholesterol (O’Donnell et al 2010). These risk factors were associated with 90% of the risk of all stroke (O’Donnell et al 2010); therefore, interventions that target these factors have the potential to reduce the burden of stroke substantially.

The mainstay of medical preventive treatment for stroke and TIA is antiplatelet therapy. Atrial fibrillation carries a high risk of stroke, and therefore requires prompt investigation and treatment. Reduction in blood pressure, by use of an angiotensin-converting enzyme (ACE) inhibitor and the diuretic thiazide, and reduction of total cholesterol by statin therapy, reduce risk of stroke even in patients whose blood pressure and cholesterol levels are within the normal range. If significant narrowing of the major arteries in the neck is detected, carotid endarterectomy surgery to relieve the stenosis should be performed as soon as possible after the stroke event. For haemorrhagic stroke, long-term blood pressure reduction, even in normotensive individuals, is the only evidence-based intervention (Scottish Intercollegiate Guidelines Network (SIGN) 2008).

Secondary prevention of stroke has focused on these medical and surgical interventions. However, it is now recognised that healthcare professionals should use a multimodal approach, combining optimal medical therapies with interventions designed to support patients to make changes to lifestyle behaviours (Ovbiagele et al 2004, Joubert et al 2009). Behavioural change can be particularly challenging. Patients need to understand the effect of lifestyle behaviours on health, and they require support to enable them to initiate and sustain long-term changes in lifestyle behaviour. Evidence of a direct effect of modifying lifestyle behaviour is lacking; however, it is reasonable to extrapolate from population-based primary prevention studies.

A model of the cumulative effect of combining medical treatment (aspirin, statins and antihypertensive medication) with comprehensive dietary modification and exercise on vascular events after stroke, suggested a relative risk reduction of 80% (Hackam and Spence 2007). Evidence-based guidelines recommend that lifestyle interventions should be comprehensive, personalised and informed by behaviour change theory (Sacco et al 2006, Royal College of Physicians Intercollegiate Stroke Working Party 2008, SIGN 2008). However, the few studies that have evaluated multimodal interventions have shown limited effect, highlighting the difficulty of achieving lifestyle changes (Sit et al 2007, Joubert et al 2009).

Health promotion is an important aspect of nursing care, and nurses have a key role in educating patients about risk factors for stroke and supporting them to make changes to their lifestyle. To deliver effective health promotion and secondary prevention interventions, nurses require a clear understanding of the lifestyle risk factors for stroke and of behaviour change theory (National Cancer Institute, US Department of Health and Human Services 2005). However, a survey of stroke nurses’ knowledge and practice in relation to secondary prevention in Scotland found that knowledge regarding healthy eating and sensible drinking, for example, was limited (Lawrence et al 2009). Lawrence et al (2009) concluded that nurses need appropriate knowledge and skills to enable them to deliver effective secondary prevention and health promotion interventions.

This article aims to provide an overview of the evidence base relating to lifestyle risk factors for stroke and an introduction to health promotion theories and intervention techniques that nurses can use to address lifestyle behaviour change following stroke.

**Lifestyle risk factors**

Modifiable lifestyle risk factors for stroke and recurrent stroke include tobacco use, unhealthy diet, excessive alcohol consumption, physical inactivity and psychological stress.

**Tobacco use**

Smoking is a major independent risk factor for stroke; smokers are at double the risk of ischaemic stroke (Shinton and Beevers 1989). Risk of stroke is proportional to the number of cigarettes smoked; the relative risk of heavy smokers (more than 40 cigarettes per day) was...
twice that of light smokers (less than ten cigarettes per day) (Wolf 1988). Studies that show an increased risk of stroke as a result of exposure to passive smoke suggest that smoking cessation strategies should incorporate the whole family (Bonita et al 1999, Qureshi et al 2005, Lee and Forey 2006). Five years after stopping smoking, the risk of stroke decreases to that of a non-smoker (Sacco et al 2006). To minimise cardiovascular risk, all people who smoke should be advised to stop and should be offered support to do so (SIGN 2008).

Diet
Many dietary factors are associated with stroke risk. Stroke risk is lowered by reducing total dietary fat intake (Hooper et al 2011). Reducing salt intake can lower blood pressure significantly and therefore reduce stroke risk, although patients should be advised that this change has to be maintained (He and MacGregor 2002, Hooper et al 2004). Increased consumption of fruit in particular, but also vegetables, results in a dose dependent decrease in risk of stroke (Dauchet et al 2005). Dietary recommendations for the reduction of stroke risk generally comply with Food Standards Agency (FSA) healthy eating advice, as illustrated in the ‘Eatwell plate’ (www.nhs.uk/Livewell/Goodfood/Pages/eatwell-plate.aspx).

Obesity
There are no studies demonstrating that weight reduction prevents recurrent stroke. However, obesity is related strongly to hypertension, diabetes and dyslipidaemia (Mann 1974, Turcato et al 2000), and weight reduction is known to decrease blood pressure, blood glucose and lipids and to increase physical endurance (Anderson and Konz 2001). Therefore, patients who are overweight should be advised of the health advantages associated with weight reduction.

Alcohol
Few research studies have investigated the relationship between alcohol consumption and recurrent stroke. There is strong evidence that alcohol dependence and regular excessive drinking are major risk factors for all stroke types (Sacco et al 2006). The association between alcohol and stroke is complex, and although moderate consumption of alcohol appears to reduce the risk of ischaemic stroke (Reynolds et al 2003, O’Donnell et al 2010), excessive consumption or binge drinking have been associated with a dose dependent increased risk of intracerebral haemorrhage (Reynolds et al 2003, O’Donnell et al 2010).

Nurses should discourage heavy alcohol consumption and inform people of the recommended daily and weekly alcohol drinking limits and the risks to health and wellbeing if these are exceeded. For men, the recommendations are no more than three to four units per day and not exceeding 21 units per week, and for women, no more than two to three units per day not exceeding 14 units per week. For both men and women, the recommendations are that alcohol should not be consumed every day and at least two days per week should be alcohol free (NHS Health Scotland 2011).

Physical activity
Physical activity has beneficial effects on blood pressure, diabetes and weight, and reduces the risk of stroke (Lee et al 2003, Wendel-Vos et al 2004). Physical fitness training after stroke has positive health benefits, although the benefits are lost if exercise stops (Saunders et al 2009). However, the majority of research has included only ambulatory people and cannot be generalised. Guidelines recommend physical activity (enough to become slightly breathless) for 20 to 30 minutes on most days of the week (SIGN 2008).

Stress
Jood et al (2009) identified an association between certain subtypes of ischaemic stroke and self-perceived stress in the five years preceding a stroke. O’Donnell et al (2010) found that stress (defined as generalised stress at home or in the workplace, either permanent or over several periods) was associated with increased risk for all strokes. This area requires further research and, importantly, identification of effective strategies is needed to help individuals reduce perceived stress.

Theories of behaviour change
Psychological theories can help nurses and other healthcare professionals to understand the mechanisms that influence lifestyle behaviour and behaviour change. There are three theories commonly used in health promotion.

The Theory of Planned Behaviour is a widely used, well-tested theoretical approach to understanding the personal and social processes that influence behaviour (Azjen 1991). According to this theory, people usually behave in a rational manner and make predictable choices in specific circumstances (Nurbeam and Harris 2004). An individual’s intention to engage in a particular behaviour is influenced by attitudes (beliefs concerning the value of a behaviour in terms of health outcomes), subjective norms (beliefs about
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the opinions of other people, such as family members and social peer groups, regarding a particular behaviour and perceived behavioural control (perception of the control exerted over the skills, resources and opportunities that enable the individual to engage in a particular behaviour) (Ajzen 1991). In summary, individuals are more likely to engage in the behaviour if they believe that doing so will benefit their health, other people approve of the behaviour, they have the appropriate skills and they are able to access the necessary resources (Ajzen 1991).

Social Cognitive Theory describes reciprocal determinism, a dynamic process in which people and their environment exert an influence on each other (Bandura 1986). Bandura (1986) also identified personal cognitive factors, such as observational learning (the capacity to learn by observing the behaviour of others) and expectation (the ability to anticipate and place value on the outcome of a particular behaviour and the observation of the rewards associated with particular behaviours) as influential factors. Another important concept associated with this theory is self-efficacy, or an individual’s perceived confidence in his or her ability to engage in a particular behaviour. Interventions to support self-efficacy include setting achievable goals and providing examples of the success of others. These influential factors need to be taken into consideration when designing and delivering theoretically-informed secondary prevention interventions (Nutbeam and Harris 2004).

The Transtheoretical or Stages of Change model describes processes associated with behaviour change (Prochaska and DiClemente 1983). Five stages are described, including pre-contemplation, contemplation, preparation, action and maintenance or relapse (Box 3). An individual may move through these stages of change several times before they are successful. Using this model, nurses can identify a patient’s readiness to change and tailor their intervention accordingly, taking into account any communication and cognitive impairments (Nutbeam and Harris 2004).

**BOX 3**

**Transtheoretical or Stages of Change model**

- **Pre-contemplation** – the individual is unaware of the problem so is unwilling to change or has not seriously considered making a change. At this stage, the individual is likely to be unreceptive, but an appropriate approach may be to raise awareness of the health issues and provide information and advice.

- **Contemplation** – the individual is thinking about the possibility of change, but may well be ambivalent about it; he or she is likely to have positive and negative feelings about the behaviour in question. At this stage, the individual is receptive and it might be appropriate to deliver a brief intervention using the most appropriate approach (see below).

- **Preparation** – the individual has decided to change his or her lifestyle behaviour. He or she prepares for action. For example, the person may set a date on which to start eating more healthily. It would be appropriate to discuss who and what strategies might help the individual make this change, and to consider setting some goals.

- **Action** – the individual initiates the planned change. At this stage, it would be appropriate to build the person’s confidence in his or her ability to change and to provide support and to give encouragement and praise.

- **Maintenance** – the individual successfully maintains the change to his or her lifestyle behaviour by focusing on coping strategies and relapse prevention.

Or

- **Relapse** – the individual does not maintain the planned change to his or her lifestyle behaviour. Appropriate interventions include reminding the individual that relapse is part of the change process and supporting him or her to prepare for another attempt.

(Prochaska and DiClemente 1983)

Brief interventions and motivational interviewing

A brief intervention is defined as ‘a short, evidence-based, structured conversation with a patient/service user that seeks in a non-confrontational way to motivate and support the individual to think about and/or plan a change in their behaviour’ (NHS Health Scotland 2011). Brief interventions, incorporating motivational interviewing, can be used by healthcare professionals who want to raise and address lifestyle issues with patients. The evidence base for brief interventions is firmly established for substance use, however it is now widely recognised that the same principles can be applied when intervening in a range of lifestyle and health behaviours.

In clinical settings, particularly in primary care, nurses and other healthcare professionals are well placed to raise and discuss health behaviour issues with patients. For these discussions to be effective in bringing about change, emphasis should be placed on communication style, which establishes the attitude and approach that practitioners take when engaging with patients. Rollnick et al (2008) described three communication styles: following, directing and guiding, of which guiding is best suited to helping patients solve behaviour-change problems. Central to guiding is the need to understand and appreciate the patient’s perspective on the health behaviour in question. By skilful questioning, active listening, reflecting and summarising, the healthcare professional aims to clarify the person’s strengths and aspirations, evoke the patient’s own motivations for change and support autonomous decision making. The
FRAMES acronym (Box 4) is a useful reminder of the key elements of a brief intervention (Miller and Spilker 2003). Brief interventions should be supportive, non-judgemental and motivational. The aim is to motivate the patient to consider the advantages and disadvantages of his or her lifestyle behaviour and for him or her to decide whether to make a change. The healthcare professional must not tell the patient what to do or direct him or her in any way. The intention is to elicit the patient’s own motivation for making behaviour changes in the interests of his or her own health.

**Box 4**

**FRAMES acronym**
- **Feedback** – give feedback about personal risk or impairment.
- **Responsibility** – emphasise personal responsibility for change.
- **Advice** (with permission) – give advice that will help the individual in the change process.
- **Menu** (options for change) – provide alternative strategies for modifying the behaviour.
- **Empathic interviewing** (rapport and empathy) – listen reflectively, without trying to persuade or confront, be supportive and respectful.
- **Self-efficacy** (building confidence) – use an interviewing style that enhances people’s belief in their ability to change.

(Miller and Spilker 2003)

**Box 5**

**Useful resources**
- **Identification of stroke**
  - FAST
    - www.stroke.org.uk/information/about_stroke/recognising_symptoms/index.html
  - ABCD2
    - www.cks.nhs.uk/stroke_and_tia/management/detailed_answers/tia_completed/assessing_the_abcd2_score
- **Lifestyle risk factors**
  - Smoking
    - www.canstopsmoking.com
    - www.nice.org.uk/PHI001
    - www.tobaccoinscotland.co.uk
  - Exercise
    - www.exerciseafterstroke.org.uk
  - Diet
    - www.nhs.uk/Livewell/Goodfood/Pages/eatwell-plate.aspx
    - www.eatwell.gov.uk
    - www.nationalobesityforum.org.uk
  - Alcohol
    - www.drinkaware.co.uk
    - www.drinking.nhs.uk
- **General lifestyle information**
  - www.healthscotland.com
  - www.chss.org.uk/publications/stroke_publications.php
  - www.stroke.org.uk/information
- **Behaviour change**
  - Theory of Planned Behaviour
    - www.people.umass.edu/aizen/tpb.html
  - Readiness-To-Change Ruler
    - www.tobaccoteacher.com/readytogoquitposter.pdf
  - Stroke Training and Awareness Resources
    - www.strokeadvancingmodules.org/node.asp?id=risk
- **Brief interventions and training**
  - England
    - Training can be accessed via local health authorities
  - Scotland
  - Wales
- **Courses endorsed by SkillsActive**
  - www.skillsactive.com/training
- **Brief interventions and referral for smoking cessation**
  - www.nice.org.uk/PHI001

Interventions should be individually tailored and should take into account communication or cognitive impairments. This article has provided an introduction to these issues NS.

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