Stoke remains the third leading cause of death in women affecting 3.8 million women compared with 3 million men.1,2 Almost half of the women surviving stroke are anticipated to have residual deficits, including cognitive dysfunction and weakness 6 months later.3 With the aging population and increased longevity of women in our society, there is an urgent need to concentrate on stroke prevention for women, identify those most at risk, and then take immediate action. Nurses practice in a variety of clinical settings (eg, hospitals, clinics, schools, community outreach programs, etc), thereby having numerous opportunities to empower others to reduce the likelihood of stroke through education and management of personal risk behaviors. The purpose of this article is to summarize best evidence underpinning essential nursing activities targeting stroke prevention in women.

Identification of Key Stroke Risk Factors for Women

A variety of risk factors trigger nurses and other healthcare providers (HCPs) to immediately act. The most prominent stroke risk factors for women are the following:

- Hypertension: Stage I hypertension with systolic blood pressure (SBP) 140 to 159 or diastolic blood pressure (DBP) of 80 to 90; stage 2 SBP ≥160 or DBP ≥100.4
- Preeclampsia and eclampsia and pregnancy-induced hypertension. High blood pressure during pregnancy is defined as mild (SBP 140–149 mm Hg or DBP 90–99) and moderate (SBP 150–159 mm Hg or DBP 100–109 mm Hg) or severe SBP ≥160 mm Hg or DBP ≥110 mm Hg).5
- Obesity: defined as a body mass index of ≥30 kg/m² is associated with increased risk of stroke even after adjustment for other factors, such as age, physical activity, smoking, alcohol consumption, and conditions, such as hypertension and diabetes mellitus.1,5
- Atrial fibrillation (AF): note if present recognizing that elderly women (ie, ≥75 years) are at higher risk for stroke if AF is present.5
- Oral contraception: may be harmful to women with additional stroke risk factors, such as cigarette smoking, prior thromboembolic events.5
- Hormone replacement therapy: concerns seem similar to cardiovascular disease and should not be used as primary or secondary prevention of stroke in postmenopausal women.5
- Migraine with aura: increased stroke risk occurs in women who also smoke and have the aura.5

Most research studies indicate no sex differences in treatment seeking time when a stroke is suspected, a few others suggest some women, especially from minority groups, tend to wait longer than men.6,7 When assessing women, HCPs should always emphasize the importance of seeking immediate treatment (<3 hours) when a stroke or transient ischemic attack is suspected and to review signs and symptoms of stroke or transient ischemic attack during every teachable moment. Ongoing monitoring of these risk factors must occur and women need to understand the significance of assuming responsibility for their own self-care management and adherence to the prescribed evidence-based treatment regimen.

Advance practice nurses must refer to the 2014 eighth Joint National Committee (JNC8) evidence-based hypertension management algorithm recognizing that the current recommendations for women are the same as for men. 2014 JNC8 further emphasizes these recommendations apply to most patients, but individual management should incorporate clinical judgment, provider capabilities, and individual patient characteristics in all decision-making.8 Advance practice nurses and other HCPs must further recognize that even though β-Blockers, B Blockers, calcium channel blockers, hydralazine, and thiazide can be used during pregnancy, they do transfer across the placenta and side effects of the mother and fetus must be monitored.7 Women with chronic primary or secondary hypertension or previous pregnancy-related hypertension should be prescribed low-dose aspirin from the 12th week of gestation until delivery and calcium supplementation considered for women with low dietary intake of calcium (<600 mg/d) to prevent preeclampsia.9 For women who have a history of preeclampsia, it is reasonable to consider evaluating them 6 months to 1 year postpartum, as well as postchildbearing age. A review of 72 nursing studies targeting adults with hypertension describe how nurses concentrate on 7 major areas: BP management, weight control, alcohol consumption, physical activity, smoking cessation, adherence to medication regimen, and diet considerations (eg, increase fruit and vegetable intake, reduce excess salt intake, etc).9

For those women with AF, the CHA2DS2-VASc Calculator (see Table) that determines the ischemic stroke risk in patients with AF should be performed.10,11 A score of 0 is low risk for stroke, whereas a score of 1 is moderate, and any patient score ≥1 is considered at high risk.5,11 Oral anticoagulation in women <65 years with AF alone is not recommended.5,10,11 Advance practice nurses and other HCPs should follow the 2014 new guidelines for management of AF patients supporting oral anticoagulation in patients with a CHA2DS2-VASc ≥2, no treatment...
(not even aspirin) with a score of 0, and optional aspirin with a score of 1.11 For patients with a prior stroke, transient ischemic attack, or CHA2DS2-VASc score of ≥2, oral anticoagulants are recommended with options being warfarin, dabigatran, rivaroxaban, or apixaban.11 “In patients with AF, antithrombotic therapy should be individualized based on shared decision-making after discussion of the absolute and relative risks of stroke and bleeding, and the patient’s values and preferences” (January 24).11

### Table. CHA2DS2-VASc Calculator

<table>
<thead>
<tr>
<th>Criteria</th>
<th>Scoring Response</th>
<th>Possible Points</th>
</tr>
</thead>
<tbody>
<tr>
<td>Congestive heart failure</td>
<td>Yes/No</td>
<td>+1</td>
</tr>
<tr>
<td>• Confirmed with objective evidence</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hypertension</td>
<td>Yes/No</td>
<td>+1</td>
</tr>
<tr>
<td>• Resting BP &gt;140/90 on 2 separate occasions</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Age of ≥75 years</td>
<td>Yes/No</td>
<td>+1</td>
</tr>
<tr>
<td>Diabetes mellitus</td>
<td>Yes/No</td>
<td>+1</td>
</tr>
<tr>
<td>• Fasting glucose &gt;125 mg/dL or receiving</td>
<td></td>
<td></td>
</tr>
<tr>
<td>stroke or TIA</td>
<td>Yes/No</td>
<td>+1</td>
</tr>
<tr>
<td>• History of cerebral ischemia</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Vascular disease</td>
<td>Yes/No</td>
<td>+1</td>
</tr>
<tr>
<td>• Prior myocardial infarction, peripheral artery disease or aortic plaque</td>
<td>Yes/No</td>
<td>+1</td>
</tr>
<tr>
<td>Age 65 to 74 years</td>
<td>Yes/No</td>
<td>+1</td>
</tr>
<tr>
<td>Sex</td>
<td>Yes/No</td>
<td>+1</td>
</tr>
<tr>
<td>• Females at higher risk</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

BP indicates blood pressure; and TIA, transient ischemic attack.

### Essential Considerations in Designing and Implementing Nursing Interventions

Advance practice nurses recognize that long-term care management is characterized by a multifaceted and dynamic interaction of factors affecting knowledge, as well as attitudinal and behavioral outcomes. Essential considerations include sex, age, culture and race/ethnicity, learning styles, emotional status, readiness to learn, readiness to change, developmental stage, literacy, and self-efficacy.12–15 Kulturel-Konak and colleagues14 found that women prefer hands-on learning experiences, make intuitive or feeling-based judgments, are more people-oriented, and more comfortable with ambiguity. Educational interventions are also more effective when the teaching is learner-centered and individualized.13,16

Fundamental nursing care aspects producing successful behavioral change outcomes include consistent patient monitoring, scheduling regular follow-up and healthcare support (eg, education, counseling), control of substance abuse, such as alcohol and smoking, individualized dietary regimen, including fat, salt, fruit, and vegetable intake along with medication regimen monitoring and adjustment to manage BP.14–15 Results from Chiu and Wong’s randomized control trial further revealed that nurse-run clinics have positive effects on BP control, and adherence to health lifestyle and follow-up telephone call reinforce the coaching efforts of nurse clinical consultations.15 Another 2014 nursing study targeting adults with AF emphasized the importance of individualized patient education to achieve positive outcome for older adults who had cognitive, as well as functional, limitations.16

Providing quality evidence-based care requires that nurses and other HCPs receive consistent continuing education to maintain their stroke knowledge (eg, risk factors, treatment guidelines, etc) and how to translate this knowledge into practice.12,13,16–20 Sustainability of staff, patient, and family stroke knowledge and behavior change remains a persistent challenge requiring multiple teaching/learning events and reinforcement to achieve targeted outcomes.12,13,15–21 There is no simple formula pertaining to the timing, frequency, and length of each educational intervention.12,13,15,19 Assessing the immediate outcome of each encounter is essential along with structuring a plan of a focused individualized educational encounters with repetition of content through alternative learning modes (eg, patient teachback what is learned, handout listing key points, review questions with short quiz/assessment of learning, simulations, small group discussions) to reinforce learning retention.12,13,15–19

So how is the learning experience best packaged to maximize stroke prevention in women? For most Americans, the average reading level is at the 8th or 9th grade level with 1 out of 5 adults reading at or below the 5th grade level.11,19,20 Yet, the majority of patient educational materials (55% to 90%) are written at the 9th grade level or higher making reading and comprehension difficult for many citizens.21,22 Consistently, patients rate the provision of stroke education as a major care priority, but indicate providing a single brochure is not adequate.23–28 Patients want tailored educational strategies that extend over a period of time, perhaps as often as 6 to 8 times, with a consistent educator coordinating the experience (often identified as the nurse).12–17,23–29 Effective approaches include problem solving, goal setting with specific and tailored action plans, measurable outcomes, use of educational experiences incorporating not just printed materials, but video, internet resources, simulation, gaming, discussion groups, access to experts (eg, nurses, physicians, psychologists, case managers), stress management activities, and hands-on-training pertaining to medication management, diet choices, and feasible exercise.12–17,23–29

### Conclusions

HCPs and nurses in particular must take advantage of every opportunity to educate and reinforce stroke prevention in women (ie, stroke signs/symptoms, risk factors, strategies to reduce individual risk factors and importance of seeking treatment immediately) when a stroke or transient ischemic attack is suspected. Women of all ages should be targeted who are at risk and not just women ≥50 years. Numerous areas of investigation are still needed and should concentrate on the most salient risk factors and aspects affecting outcomes (eg, timing and intensity of nursing efforts, preferred combinations of teaching and care management approaches, cost effectiveness) for different age, race, education, socioeconomic, and cultural groups of women. Great strides have occurred, but more research and its translation into nursing practice must occur. For, nurses will continue to play a pivotal role in the prevention of stroke in women whether in a clinical or social setting.
Disclosures
None.

References

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