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# STROKE: ARE WOMEN WORSE OFF?

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Stroke is a leading cause of death and disability worldwide. Although the age standardized rates of stroke have fallen, the absolute number of strokes continue to rise, particularly in the low and middle income countries. It was long recognized that women have a lower age-standardized incidence of stroke. This understanding has been challenged by the Global burden of Disease Study 2019 which highlights that although the total number of Disability Adjusted Life Years (DALYs) from stroke were higher in males compared to females, the number of incident and prevalent strokes were higher in females. In addition, the study did not find significant difference in the age-standardized incidence rates between males and females.<sup>1</sup> Yet another study recently found that beyond 75 years of age women have a higher stroke incidence compared to men.<sup>2</sup> Additionally, women below 40 years in some South East Asian countries showed an increase in ischemic stroke incidence from 0.5% to 11.4% between 1990 and 2015.<sup>3</sup> This finding is duplicated in other studies, and a recent systematic review concluded that there were 44% more women than men with ischemic stroke in the under 35 years age group.<sup>4</sup> Risk of aneurysmal rupture has also recently been shown to be higher in women compared to their male counterparts.<sup>5</sup>

A number of stroke risk factors are common to men and women. Some of them like migraine and atrial fibrillation are not just more prevalent in women but also render them at a higher risk due to a stronger association with ischemic strokes. Diabetes, on the other hand, while not more common in women, confers a greater risk in the female gender when present. Hypertension becomes more prevalent as women age and its association with stroke is also stronger in older women.<sup>4</sup>

Besides the conventional vascular risk factors, a number of sex-specific risk factors are increasingly being recognized. Although uncommon, pregnant and post-partum women are at three times higher risk of stroke compared to other young adults. Hypertensive disorders of pregnancy confer a higher risk of both ischemic and haemorrhagic stroke not just in the ante and post-partum period but the risk has recently been shown to persist for up to seventeen years.<sup>6</sup> Other adverse pregnancy outcomes like miscarriages and stillbirth also confer a higher stroke risk among women. Moreover, exposure to oral contraception or hormone replacement therapy, an early menopause and a shorter reproductive lifespan have all been shown to increase a woman's risk of stroke.<sup>7</sup>

Despite having these additional risk factors, there is evidence to suggest that stroke may be missed in women. A recent systematic review has highlighted one of the reasons why this might be happening. Women tend to present with more atypical and non-focal stroke symptoms compared to men, such as dizziness, vertigo, and dysarthria. Women have also been reported to present with stroke mimics more frequently compared to men.<sup>8</sup> As a result, they may not be able to get timely diagnosis and acute therapies are either delayed or not given, both of which have serious implications on stroke outcomes.

Not surprisingly, a number of studies have reported worse functional outcomes for women.<sup>9,10</sup> Although globally, men have a higher stroke mortality, data from Middle East and North Africa shows a higher stroke mortality amongst women.<sup>2</sup> Potential factors behind this observation are a higher age at stroke onset in some countries, poor pre-morbid functional status, poor access to healthcare particularly in low and middle income countries, and poor recognition of stroke symptoms.<sup>11</sup> A number of social determinants of health are at play in low socio-economic set ups, where women are nutritionally depleted, conventional vascular risk factors are poorly recognized and managed, pregnancies and complications related to them are higher and household air pollution still poses a huge health hazard.

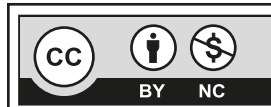
In conclusion, stroke is a serious health problem in women. Its incidence seems to be rising in certain age groups and it is important to recognize both conventional and sex-specific risk factors for women in order to effectively target them. Clinicians should be aware that stroke may present with atypical symptoms in females so as to avoid treatment delays. Pregnancy and its outcomes have serious implications on future risk of stroke, and this important area of women's health needs special attention particularly in low and middle income countries.

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