



Symptoms and risk factors for stroke in a community-based observational sample in Viet Nam

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Abstract *Background:* Viet Nam is experiencing a health transition from infectious to chronic disease. Data on cardiovascular diseases, including strokes, are limited.

Methods: Data were randomly collected from six communities in Da Nang, Viet Nam, on participant demographics, medical history, blood pressure, anthropometrics and health behavior using World Health Organization (WHO) guidelines. Stroke symptoms were collected by self-report with the standardized Questionnaire for Verifying Stroke Free Status. Multivariate logistic regression was used to identify factors associated with the presence of stroke symptoms.

Results: One thousand six hundred and twenty one adults were examined with a mean age of 52.0 years (± 12.5 years), of which 56.1% were women. 27.3% of the participants were found to have hypertension, 26.2% used tobacco, and 16.1% were overweight. More than two-thirds of the participants with hypertension were unaware of their condition. Almost one fourth of the participants were identified by the questionnaire as previously experiencing at least one stroke symptom. Age,

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rural residence, and education were associated with the presence of stroke symptoms. Models adjusted for demographics found hypertension, high cholesterol, reported severe chest pain, former smoking, and being overweight to be associated with a higher prevalence of stroke symptoms.

Conclusions: The high frequency of stroke symptoms in Da Nang calls for further evaluation and interventions to reduce hypertension and other risk factors for chronic disease in Viet Nam and other health transition countries.

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1. Introduction

By the year 2030, stroke will account for the highest percentage of disability-adjusted life years worldwide [1] reaching epidemic proportions [2]. Low- and middle-income countries have the largest burden of stroke, accounting for more than 85% of stroke deaths globally [2,3]. Developing countries such as Viet Nam are currently experiencing a health transition from infectious to chronic diseases in which the impact on the health of the population from chronic diseases will be especially devastating. The need to develop population-based studies to evaluate stroke prevalence, incidence and risk factors is imperative [4,5].

The prevalence of key risk factors, such as smoking [6], hypertension [7–9] and body mass index (BMI) [10,11], for stroke is high and is increasing in Viet Nam. Documenting the incidence of stroke in countries such as Viet Nam is difficult because patients with mild or transient symptoms may not present to hospitals or clinics for diagnosis, and longitudinal studies following patients for incident cerebrovascular disease are expensive and rarely done. A practical solution to identify persons at high risk for stroke involves the collection of stroke symptoms. In developed countries it has been postulated that a high proportion of such symptoms outside of a diagnosed stroke or transient ischemic attack (TIA) may be indicative of “silent” or “whispering” strokes—those that are not severe enough to motivate the individual to consult a physician or, if clinical care was sought, symptoms were not defined well enough to result in a proper diagnosis [12,13]. This may be even more relevant in resource-poor countries where access to health care can be more difficult.

The present study was initiated in collaboration with the Da Nang Department of Health (DOH) to establish a cohort of randomly selected participants to focus on stroke risk and symptoms. The aims of this study were to: (1) describe self-reported and measured risk factors in a community-based study of residents in Da Nang Province; (2) document stroke symptoms occurring in the com-

munity; and (3) determine factors that are associated with the prevalence of stroke symptoms in the sample.

2. Methods

2.1. The sample

Da Nang Province is located in the central part of Viet Nam, approximately 700 km south of Ha Noi and 1000 km north of Ho Chi Minh City. It encompasses 1255 km² and has a population of 887,100 people (2009 census). The Province is geographically divided into mutually exclusive units in several layers based on administrative and geographic characteristics. In Da Nang there are seven districts subdivided into 56 communes (similar to a U.S. county), which are further subdivided into hamlets (villages or towns). The communes are characterized according to their urbanicity by the Vietnamese government, ranging from 100% urban to 100% rural. This designation was used to classify communes into urban or rural to distinguish lifestyles. A commune was designated as half rural/half urban if it had more than 30% agricultural land and respective farm workers. In Da Nang, the social characteristics of a mountainous and rural commune are very similar, although geographic characteristics are different.

Households were selected for inclusion in the study based on a clustered sampling design in which the highest tier was the commune and the second tier was the hamlet from which households were randomly selected. Of 56 communes located in Da Nang, 3 urban (from a total of 37 urban communes), 2 rural (from 13) and 1 mixed urban–rural (from 6) communes were randomly selected, in which five hamlets were also randomly selected within each. From a census list of households in each hamlet, 30 households were randomly selected and adults, aged 35 years or older, living in these households were approached for inclusion in the study.

Research staff conducted door-to-door visits of each selected household, described the study,

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