Accessing Young Black Stroke Survivors for Secondary Prevention
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Abstract

ABSTRACT

Background- Stroke rates and risk factors may be increasing in young adults aged 18-64, especially black individuals. We sought to identify whether young high risk stroke survivors could be found at community health centers.

Methods- This was a cross-sectional analysis of the National Ambulatory Medical Care Survey from 2006-2011. We used chi-square analyses, t-tests, and proportions to compare and describe stroke survivor visits at community health centers and private offices.

Results- Young stroke survivor visits comprise 48% of stroke survivor visits at community health centers compared to 31% of stroke survivor visits at the private office setting. Among young stroke survivors cared for at community health centers, 47% were black individuals compared to 14% at a private office setting. The prevalence of hypertension and cigarette smoking was higher in young stroke survivors at the community health center.

Conclusions- The community health center is a setting to access young black stroke survivors. Stroke prevention and preparedness interventions should be considered at community health centers.

Keywords

community health centers; stroke; young adult

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INTRODUCTION

Stroke hospitalization rates are increasing in young adults (George, Tong, & Bowman, 2017; Kissela et al., 2012) resulting in years of dependence, loss of work productivity and high health care costs. Black people are disproportionately represented in the young stroke population (Howard et al., 2016). Higher incidence of strokes in black people has been partly attributed to a greater prevalence of risk factors, such as hypertension and diabetes (Howard et al., 2011). Risk factor control is fundamental to preventing incident and recurrent strokes in young stroke patients, particularly young black people. Yet, reaching young black people to optimize risk factors is a major challenge.

Secondary stroke interventions reaching young black stroke survivors are few in number and success. Prior interventions have targeted stroke survivors in general, without focusing specifically on the young stroke population, and have had mixed results. Specifically, systolic blood pressure reduction did not differ between stroke survivors who received group and individualized sessions on stroke risk factor reduction compared to those who received a stroke educational pamphlet (Cheng et al., 2018). By contrast, a program for stroke survivors implemented at hospital discharge led to high rates of medication adherence and behavioral risk factor modification at 3 months compared to what has been observed in historical controls (Ovbiagele et al., 2004). In black patients across the adult age spectrum, healthy lifestyle modification may be limited by economic hardship, low health literacy, and unsafe environments (Carnethon et al., 2017). The specific barriers to behavioral change in young black stroke survivors are understudied, but limited data suggest that some barriers include poor health literacy and difficulty implementing behavior change (Blixen et al., 2014). Designing interventions that overcome these challenges is imperative.

One strategy is to bring stroke interventions to the primary care setting. Community health centers (CHCs) are community-based organizations serving populations with limited access to health care. Patients are mostly under the age of 65, more likely to be Hispanic or black, and have a high prevalence of cardiovascular (CV) risk factors (Hing, Hooker, & Ashman, 2011; Shi, Lebrun, Tsai, & Zhu, 2010). We sought to quantify the CV risk of stroke survivors in CHCs and the prevalence of young stroke survivor visits at CHCs compared to the private clinic setting. Our overarching goal is to understand the extent to which interventions targeting CHCs may improve care both in high risk stroke survivors, generally, and young black people, more specifically.

METHODS

Data Source

We used data from the National Ambulatory Medical Care survey (NAMCS) from 2006 to 2011, a national survey of office-based medical providers about characteristics of medical visits. The NAMCS three-stage, stratified sampling design enables nationally and regionally representative characterizations of ambulatory medical care. We used NAMCS data from CHCs and private practice settings (private practices, non-federal government clinics, health maintenance organizations), the locations at which the population receives primary care. Other practice locations surveyed in NAMCS were excluded.

Patient Characteristics

Young stroke survivors were defined as adult patients 18 to 64 years old identified by the provider as currently having cerebrovascular disease. Specifically, the provider is asked "regardless of the diagnoses written in 5a (the visit diagnoses), does the patient now have cerebrovascular disease?". Older stroke survivors were 65 years and older. Patient age was categorized as above and also analyzed as a continuous variable. The patient's race/ethnicity was provided by the clinician completing the survey. CV risk factors including diabetes, hyperlipidemia, hypertension, obesity, and current smoking were identified by the provider based on the patient's current medical problems as binary variables. We explored using a measured systolic blood pressure $\geq$ 140 mmHg during the index clinic visit to define patients with hypertension. However 27% of values were missing and the data was differentially missing by

setting (i.e. CHC, 4.5% vs private, 29%), thus we used provider-reported hypertension in all analyses.

Statistical Analysis

The continuous variable age was normally distributed and analyzed using a t-test. Chi-square tests were used to evaluate the association between categorical variables and practice location (CHC vs private). All analyses accounted for the weighted survey design. STATA 14 was used to analyze the data (StataCorp, 2015). This research was deemed exempt by the University of Michigan Institutional Review Board.

RESULTS

Stroke Survivor Visits

There were 201 stroke survivor visits at CHCs (representing over 1 million visits for stroke survivors at CHCs in the US) and 3,272 stroke survivor visits at private offices (representing over 90 million visits for stroke survivors at a private office setting in the US) from 2006 – 2011.

Young Stroke Survivor Visits

Young stroke survivors comprised 48% (95% CI, 37% – 60%) of stroke survivor visits at CHCs compared to 31% (95% CI, 29% - 33%) of stroke survivor visits in the private setting. Less than 1% of all ambulatory care visits at the CHC or at the private setting were young stroke survivor visits (table 1). Table 2 shows the proportion of all CHC and private setting visits that were stroke survivor visits by race and age.

Table 1. Proportion of stroke survivor visits out of all visits at each setting by age

Age	Proportion of stroke survivor visits at the CHC[a] out of all CHC visits (95% CI)	Proportion of stroke survivor visits at the private setting out of all private setting visits (95% CI)
Old	0.0081 (0.005 – 0.01)	0.014 (0.013 – 0.016)
Young	0.0075 (0.006 – 0.01)	0.006 (0.006 – 0.007)

[a]CHC- community health center

Table 2. Proportion of stroke survivor visits at each setting out of all visits by race and age

Race	Age	Proportion of CHC stroke survivor visits out of all CHC visits (95% CI)	Proportion of private setting stroke survivor visits out of all private setting visits (95% CI)
White	old	0.003 (0.001 – 0.006)	0.01 (0.009 – 0.01)
	young	0.003 (0.002 – 0.004)	0.004 (0.003 – 0.004)
Black	old	0.002 (0.0007 - 0.006)	0.0009 (0.0006 – 0.001)
	young	0.003 (0.002 – 0.005)	0.0007 (0.0006 – 0.001)

Young Black Stroke Survivor Visits

Of the young black stroke survivor visits that occurred in the primary care setting (CHC and private setting), 10% occurred at CHCs. Within CHCs, 47% (95% CI, 33% - 62%) of young stroke survivor visits were made by black stroke survivors while within the private setting, 14% (95% CI, 10% - 18%) were made by black stroke survivors ($p<0.01$).

Demographic and Clinical Characteristics of Young Stroke Survivors

Stroke survivors at CHCs were younger (mean age ± standard deviation of 63 ± 15) than at the private office setting (mean age ± standard deviation of 70 ±14), $p<0.01$. Of the young stroke survivors, there was no significant difference in sex breakdown between the CHC and private settings (59% men (95% CI, 47% - 70%) at the CHC vs. 50% men (95% CI, 46% - 54%) at the private office setting, $p=0.17$). The prevalence of hypertension and cigarette smoking was higher in young stroke survivors attending the CHC than those attending the private office setting (table 3). There was no significant difference in the prevalence of diabetes, hyperlipidemia, and obesity between young stroke survivors at the CHC compared to the private setting (table 3).

Table 3. Proportion of visits of young stroke patients with vascular risk factors in the ambulatory setting

Risk Factor	CHC[a] (n=765,365) (95% CI)	Private (n=28,477,892) (95% CI)	p-value
Hypertension	0.77 (0.67-0.85)	0.57 (0.52-0.61)	<0.001[b]
Diabetes	0.29 (0.19-0.42)	0.23 (0.20-0.27)	0.29
Hyperlipidemia	0.52 (0.38-0.65)	0.40 (0.35-0.45)	0.11
Obesity	0.16 (0.10-0.25)	0.16 (0.13-0.19)	0.92
Smoking[c]	0.45 (0.34-0.57)	0.28 (0.23-0.34)	0.005[b]

[a]CHC- community health center
[b]$p<0.05$
[c]314 private patient visits and 29 CHC patient visits are missing data on smoking

DISCUSSION

In this nationally representative sample of ambulatory care visits, we found that the CHC stroke population is a young and high CV risk population, of whom 47% are black. CHCs are therefore an important setting to address stroke disparities.

Since fewer than 1% of ambulatory care visits at the CHC are young stroke survivor visits, secondary stroke prevention efforts at a single CHC are unlikely to have a major effect on stroke rates in the young. However, a significant impact can be made if secondary stroke prevention measures are implemented across the nearly 1400 CHCs nationwide which collectively serve over 27 million Americans. This population includes a large number of high risk stroke survivors including 10% of all young black people with strokes at a primary care setting in the US.

Among young stroke survivors, we found a greater proportion of patients at the CHC than private setting with hypertension. Factors likely contributing to the higher prevalence of hypertension among black people include behavioral and environmental factors (Whelton et al., 2016), psychosocial barriers to medication adherence (Cook et al., 2006), and cost-related medication non-adherence (Cook et al., 2006). Given the observed prevalence of hypertension in young stroke survivors, interventions at CHCs focusing on hypertension control have the potential to greatly reduce recurrent stroke rates in this high risk population.

Future secondary stroke prevention interventions that educate about the importance of medication adherence and risk factor control should be designed in partnership with young stroke survivors. Barriers to implementing secondary stroke prevention measures are best identified by the community of stroke survivors for whom the intervention is intended (Blixen et al., 2014, 2015; Carnethon et al., 2017; Perzynski, Blixen, Cage, Colon-Zimmermann, & Sajatovic, 2016). Successful interventions will incorporate solutions to address those barriers.

There are some limitations to our findings. Since the level of analysis is the ambulatory care office visit, the same patient might be represented in more than one visit. However, NAMCS randomly assigns physicians to a one-week reporting period so that multiple representations of the same patient should be infrequent. The cross-sectional nature of the data hinders our ability to determine control of CV risk factors over time.

CONCLUSION

The novel contribution of this study is that young stroke survivors, especially black individuals, with prevalent CV risk factors can be found at CHCs. Secondary stroke prevention efforts at CHCs have the potential to reduce recurrent stroke rates in this high risk population. Future research on the effectiveness and implementation of secondary stroke interventions at CHCs is warranted.

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