ISSN - Print: 2277 – 1522; Online: 2277 – 3517

ORIGINAL RESEARCH ARTICLE

DOI: 10.26727/NJRCM.2018.7.1.26-31 Year: 2018 Vol: 7 Issue: 1. Jan.-Mar. Page: 026-031

Stroke among slum dwellers: Risk factors and health-seeking behavior in elderly residents of Dharavi, Mumbai

AmitaMukhopadhyay[1*], Daksha Pandit[2], Uma Sundar[3], SikandarAdwani[4]

1 Associate Professor, Community Medicine, Akash Institute of Medical Sciences and Research Centre, Bengaluru.2 Professor and Head, Dept. of Community Medicine (Retd.)&3 Professor of Medicine and In-charge, Neurology Services, LokmanyaTilak Municipal Medical College and General Hospital,Mumbai.4 Director, Radiant Superspecialty Hospital, Amravati, Maharashtra

Date of Submission	**: 05-11-2017**	**Date of online Publication**	**: 07-01-2018**
Date of Acceptance	**: 25-11-2017**	**Date of Print Publication**	**: 31-03-2018**

***Author for correspondence**:Dr. AmitaMukhopadhyay, MD,408, Navami VarshaApts, Uttarahalli-KengeriMn Rd,Srinivasapura, Bangalore-560060. Email id: dr.amukho@gmail.com

Abstract

Background: Population ageing has led to an epidemic of cardiovascular diseases in developing countries. Poverty increases the vulnerability to chronic diseases such as hypertension and stroke, with the elderly poor being especially at risk, both in terms of disease incidence and challenges to secondary prevention.**Objectives:** To determine the prevalence of risk factors of stroke in elderly residents of Dharavi, Mumbai, and to study the health seeking behavior of stroke patients identified in the community.**Methods:** A random sample of 1726 individuals aged ≥60 years (730 men, 996 women, average age 66 years) was selected from a health post area in Dharavi and studied to evaluate stroke risk factors. Stroke survivors were interviewed in depth for health-seeking behavior.**Findings:** Approximately 60% of the participants were illiterate and from the lower economic class. In men, 30.55% smoked and 26.71% used alcohol, and 46.79% of the women used smokeless tobacco. Only 24.86% ate fruits and vegetables daily; 49.15% had high risk waist-hip ratios. Self-reported prevalence of hypertension and diabetes were 16.34% and 7.42% respectively. Of 66 stroke survivors identified, close to 80% found medicines and physiotherapy unaffordable, and 43.94% had tried unconventional treatments to cure paralysis.**Conclusions:** Our findings reflect widespread presence of risk factors and poor health care access in elderly slum-dwellers. The necessity for tobacco control, awareness campaigns and effective behaviour change interventions at the grassroots level has become imperative in the context of growing urbanization and population ageing.

Key-words: Epidemiology, Geriatrics, Health services, Non-communicable disease, Stroke, Substance-use, Tobacco

Introduction

Developing countries are witnessing a major public health challenge in the form of cardiovascular diseases. Populations are ageing due to multifarious factors including improved lifespan, access to health care facilities and well implemented health programs to manage infectious disease and maternal-child mortality. According to the Global Burden of Diseases 2015 study(1), cardiovascular diseases accounted for one-third of all deaths globally. The poor are more vulnerable to chronic diseases because of material deprivation and psychosocial stress, higher levels of risk behavior, unhealthy living conditions and limited access to good-quality health care (2). The elderly among the poor are especially at risk, due to the cumulative effects of long term tobacco and alcohol abuse, longstanding hypertension and diabetes and diets that become poorer as income shrinks. Furthermore, once affected by a major cardiovascular disease such as stroke, their age and poverty act as barriers to accessing health care and continuing secondary prevention. The objectives of the present study were to determine the prevalence of selected risk factors of stroke in slum-dwellers aged ≥60 years, and to study the health seeking behavior of stroke patients identified in the community.

Materials and Methods

Dharavi is a large and well-known slum in Mumbai, with a population of roughly a million. It is the field practice area of the Community Medicine department of a major hospital and teaching institute. Primary health care needs are served by *health posts* with well-defined service

provision areas. Detailed methodology including sample size estimation and participant selection has been published elsewhere (3). For the present study, 1726 elderly residents of Kumbharwada Health Post area were interviewed to collect data on risk factors of stroke. Identified stroke patients and their family members were interviewed in-depth to study their health seeking behavior. Risk factors were grouped as follows:

Common modifiable factors:

1. Substance use: Smoking tobacco; alcohol; smokeless tobacco
2. Unhealthy diet: Low fruit and vegetable intake
3. Physical inactivity: Frequency of physical exercise; hours of inactivity in a day

Intermediate risk factors (4):

1. Overweight/Obesity: Waist and hip circumferences were measured following the technique described in the MONICA Manual(5).Waist Hip Ratio (WHR) was chosen over Body Mass Index (BMI) as an indicator of obesity because evidence indicates stronger association of measures of central obesity such as WHR with risk factors such as diabetes, while for cardiovascular mortality they are comparable to BMI (6).
2. Hypertension; Diabetes mellitus; Raised blood lipids/angina/ischemic heart disease: Self–reporting by participants was used to assess these factors, based on history of diagnosis of the respective condition/s by a health professional, with proof of diagnosis and/or treatment in the form of medical records and prescribed drugs.

Operational definitions: Substance use (smoking tobacco, alcohol and smokeless tobacco) was classified into 3 categories: Current - used the respective substance at least once during the last one year, Ex - used at least once in lifetime, but not during the last one year, and Never – not used even once in lifetime. Smoking more than 20 cigarettes/bidis per day was defined as high risk (7). Less than daily consumption of fruits and vegetables was defined as low intake considering the low income of the study population, which would have made the recommended 5 daily servings unaffordable for most of them. Participants were defined as mostly inactive if more than half of their daytime hours were spent sitting or lying down. Physical exercise was defined as any activity which resulted in sustained sweating, increased heart rate or increased breathing rate. Participants were carefully questioned to rule out similar symptoms resulting from coronary or respiratory disease. Frequent exercise was defined as exercising 4 or more days per week. Waist-hip ratio was defined as high risk if it exceeded 0.9 in men and 0.85 in women. Abdominal obesity was defined as waist circumference exceeding 102 cm in men and 88 cm in women (8).Stroke was defined as a clinical syndrome consisting of rapidly developing clinical signs of focal (or global in case of coma) disturbance of cerebral function lasting more than 24 hours or leading to death with no apparent cause other than a vascular origin (9).

Results

Out of 1726 participants interviewed, 66 individuals were identified with stroke.

Table 1. Socio-demographic characteristics

Characteri-stics	Men No. (%)	Women No. (%)	Total No. (%)	χ^2 value	P value
Population	730 (42.3)	996 (57.7)	1726	40.99	<0.001
Age (years completed)				29.01	<0.001
60 - 64	304 (38.4)	487 (61.6)	791		
65 - 69	221 (48.4)	236 (51.6)	457		
70 - 74	118 (50.9)	114 (49.1)	232		
75 - 79	49 (43.4)	64 (56.6)	113		
≥ 80	38 (28.6)	95 (71.4)	133		
Marital Status				521.54	<0.001
Married	623 (85.3)	305 (30.6)	928 (53.8)		
Widowed	93 (12.7)	675 (67.8)	768 (44.5)		
Other	14 (1.9)	16 (1.6)	30 (1.7)		
Education				354.67	<0.001
Illiterate	242 (33.2)	776 (77.9)	1018 (59.0)		
Primary (≤ std. X)	457 (62.6)	216 (21.7)	673 (39.0)		
Higher (≥ std. XI)	31 (4.2)	4 (0.4)	35 (2.0)		
Occupation				723.82	<0.001
Unskilled	224 (30.7)	203 (20.4)	427 (24.7)		
Skilled	119 (16.3)	42 (4.2)	161 (9.3)		
Unemployed	387 (53.0)	148 (14.8)	535 (31.1)		
Home-manager	0 (0.0)	603 (60.5)	603 (34.9)		
Economic status				11.28	<0.05
Lower (≤Rs.1000)	366 (53.4)	564 (61.6)	930 (58.1)		
Middle (Rs. 1000-2500)	306 (44.7)	340 (37.2)	646 (40.4)		
Upper (≥Rs.2500)	13 (1.9)	11 (1.2)	24 (1.5)		
Total	685 (100)	915 (100)	1600 (100)		

**Economic status based on monthly per capita income in rupees. †126 respondents did not provide information on economic status.*

Table 2. Stroke risk factors

	Men		Women		Total		χ^2 value	P value
Risk factors	C	PR%	C	PR%	C	PR%		
Smoking								
Current	223	30.55	11	1.1	234	13.56	192.07 52.67	<0.001
Ex-smokers	68	9.32	5	0.5	73	4.23		<0.001
Alcohol use								
Current	195	26.71	4	0.4	199	11.53	181.41 87.78	<0.001
Ex-drinkers	101	13.84	4	0.4	105	6.08		<0.001
Smokeless T.								
Current	298	40.82	466	46.79	764	44.26	36.94	<0.001
Ex-users	29	3.97	25	2.51	54	3.13		NS
Fruit/vegetable intake								
Daily	169	23.15	260	26.1	429	24.86		NS
<Daily	561	76.85	736	73.9	1297	75.14		NS
Obesity								
High WHR	355	51.37	451	47.52	806	49.15	132.03	NS
Abd. Obesity	12	1.74	163	17.18	175	10.67		<0.001
Physical exercise								
Never	285	39.04	387	38.86	672	38.93		NS
Frequent	100	13.7	253	25.4	353	20.45	65.45	<0.001
Physical inactivity								
Inactive	81	11.1	126	12.65	207	11.99		NS
Active	333	45.62	491	49.3	824	47.74		NS
Intermediate RF								
HTN	89	12.19	193	19.38	282	16.34	38.36	<0.001
DM	51	6.99	77	7.73	128	7.42		NS
IHD	19	2.6	36	3.61	55	3.19		NS

*C indicates prevalent cases; PR, prevalence rate; P, Chi square P value; Smokeless T, Smokeless tobacco; WHR, Waist-hip ratio; Abd. Obesity, Abdominal obesity; RF, Risk factors; HTN, Hypertension; DM, Diabetes mellitus; IHD, Ischemic heart disease; NS, Not significant. * Waist and hip circumference could not be measured in 39 men and 47 women, therefore group totals for this section are Men: 691, Women: 949 and Total: 1640.*

Demographic characteristics (*Table 1*): Mean age of the participants was 66.06 years (range 60-105 years). More than half of them were female. Hinduism and Buddhism were the predominant religions practiced. The proportion of widows was much higher among women than men, and the literacy rate in women was much less than in men. Most of the participants belonged to the lower economic class; a majority of the men reported being unemployed or engaged in unskilled occupations. Most of the women were home-managers.

Prevalence of risk factors of stroke (*Table 2*)

Substance use:

Among 234 participants (13.56%) who were current tobacco smokers, a majority preferred bidis (192, 82.05%) followed by cigarettes (39, 16.67%) and hookah (2, 0.85%). Only 11 women (1.10%) smoked compared to 223 (30.55%) men. Seventy-three participants (4.23%) reported being ex-smokers. Mean frequency of smoking was 9.33per day (range 1-50 per day). High risk smoking (≥20/day) was reported by43 (18.38%) individuals; 3 (1.28%) of them smoked more than 40 a day. Mean

duration of smoking habit was 29.95 years (range 5 to 60 years).

Current alcohol use was prevalent in 199 participants (11.53%), with 105 (6.08%) being ex-drinkers. Only 4 women (0.40%) reported drinking, compared to 195 (26.71%) men. Among current drinkers, 42 (21.11%) reported consuming alcohol 5 or more times per week. Country liquor was the most frequently used type of alcohol, favored by 117 (58.79%) individuals, followed by "Indian Made Foreign Liquor" (IMFL) and beer, used by 65 (32.66%). Mean duration of drinking habit was 26.86 years (range6 months to50 years).The maximum amount of alcohol imbibed at a time ranged from half a glass to 4 bottles of country liquor, and half peg (15 ml) to 2 quart bottles (250 ml) of Indian Made Foreign Liquor (IMFL).

Smokeless tobacco in various locally available forms, such as masheri (a substitute for toothpaste), gutkha, pan masala, zarda, and dry snuff, was currently used by 764 (44.26%) participants. However, the proportion of current women users (466, 46.79%) was significantly higher than men (298, 40.82%), $p<0.05$. Mean duration of habit was 29.58 years (range6 months to70 years). Mean frequency of use was 3.5 times a day (range 1 to 20 times per day).

Diet

Daily consumption of fruits and vegetables was reported by 429 (24.86%) individuals. Of the remaining 1297 participants, 532 (30.82%) reported occasional or nil intake.

Physical exercise and inactivity

We noted a significant gender difference among the 353 (20.45%) participants who reported frequent physical exercise; 253 (25.40%) women compared to 100 (13.70%) men, $p<0.01$. This may have been because the strenuous household chores like washing clothes, sweeping and mopping were done by women. General inactivity levels were similar in both sexes, with 672 participants (38.93%) who never exercised, and 207 participants (11.99%) being inactive most of the time. The 824 (47.74%) individuals who were mostly active, kept busy in walking, buying groceries and doing light housework or yoga.

Obesity

A high risk WHR was seen in 806 (49.15%) out of 1640 participants measured and 175 (10.67%) were found to have abdominal obesity. The prevalence of abdominal obesity was significantly higher in women than in men, 17.18% versus 1.74%, $p<0.001$, which may be due to the lower cut-off in women.

Self-reported intermediate risk factors:

In the course of interviewing, 378 (21.90%) of the 1726 participants reported being diagnosed with hypertension by a health professional. However, only 282 had proof of diagnosis in the form of prescriptions or medicines, yielding a 16.34% prevalence rate. Prevalence was significantly higher in women than in men, 19.38% versus 12.19%, $p<0.001$. Diabetes mellitus was self-reported by 177 (10.25%) participants; 128 were confirmed, yielding a 7.42% prevalence rate. The prevalence of self-reported ischemic heart disease was 3.19%. Rheumatic heart disease was also documented in 8 individuals (0.46%), of whom 2 were stroke patients.

Stroke survivors in the community

Descriptive characteristics

Sixty-six stroke survivors (38 men, 28 women) were identified following clinical examination and medical records review. There was evidence of hypertension in 54 (81.82%) cases; 13 (19.70%) had diabetes mellitus, 22 (33.33%) reported smoking tobacco, 26 (39.40%) reported alcohol use, 38 (57.58%) reported using smokeless tobacco and 26 (39.40%) had high risk waist-hip ratios. Nineteen stroke survivors (28.79%) were severely disabled, requiring assistance for activities of daily living.

Health seeking behavior

A government health facility was initially accessed by 43 of 66 stroke patients (65.15%) at the time of stroke. Only one had continued the same for follow-up. The others cited overcrowding, lack of personalized attention and dissatisfaction with immediate treatment outcomes.The main reason reported for accessing government facilities in the first place was the low cost; given sufficient resources they would prefer to seek treatment from private health care providers. Irregular follow-upvisits were reported by 31 (46.97%) patients because of difficulties with expense, transportation or escort, and 52 (78.79%) reported poor compliance with antihypertensives,oral hypoglycaemics and cholesterol lowering agents chiefly due to unaffordable prices and irregular availability at hospital pharmacies. A majority had not had physiotherapy or rehabilitative exercises (56; 84.85%).

Out of 66 stroke patients, 29 (43.94%)had utilised alternate/unconventional modes of treatment such as injection into the carotid sinus area, massage and Ayurvedic treatment either as a first choice or as follow-up to conventional treatment modalities, mainly due to a belief in the power of these therapies to cure residual paralysis.

Discussion

The association of tobacco usage with increased stroke risk is well documented (10), as are the benefits of cessation (11).We found widespread use of tobacco in both sexes, although smoking was rare in women. Our rates are higher than the results from the District Level Household and Facility Survey 2012-13 (DLHS-4) for Maharashtra state (12), which showed regular smokeless tobacco use in 29.0% of urban men and 6.0% of urban women, and smoking prevalence in the same group, of 6.2% 0.4% respectively. Many countries have incorporated fruits and vegetables in school meal programs in an effort to encourage healthy diets and reduce future mortality (13). However, the feasibility of increasing intake in the elderly in a low income setting is

questionable, given food inflation rates (14).Besides, a significant portion of the participants' income would have been diverted into buying tobacco and alcohol products. This would apply especially to men, of whom more than 25% drank and of those a fifth drank almost every day. Such high risk behavior is compounded by obesity and inactivity. Almost half of those we surveyed had a high risk waist-hip ratio, less than half reported high daytime activity and only about 20% reported frequent physical exercise. The India phytonutrient survey report 2016 shows that on average, respondents in the above 60 age group consumed only three servings of fruit and vegetable as against the WHO recommendation of five(15).The Indian Migration Study done in 2005-7(16),reports similar findings in its rural sample, with 75.7% of men and 93.1% of women aged 60-69 years, reporting low fruit and vegetable intake. In the same age group, alcohol consumption was 28.4% in men and 6.9% in women, and low physical activity was reported by 71.2% of men and 57.1% of women.

We observed a self-reported hypertension prevalence of 16.34%, which is indicative of very low awareness and poor access to health care; hypertension, being asymptomatic, is usually diagnosed when an individual seeks medical attention for other complaints. Low prevalence of self-reported cardiovascular conditions has also been observed in the rural study population, which included 1600 villages from 18 Indian states (16). The authors observed a clear social trend in self-reported hypertension, with prevalence being 3.6%, 5.5% and 8.6% in low, medium and high socio-economic groups respectively.

In addition to worsening risk, financial constraints are also a barrier to health care after the occurrence of a stroke. Most of the stroke patients we interviewed expressed dissatisfaction with government health services. Close to 80% of them were deprived of essential medicines and rehabilitative services due to problems with accessibility and expense. Low education and awareness levels would also have been responsible for many of them resorting to unconventional treatments for paralysis. Even stroke survivors from Britain, with its advanced health care system and relative economic well-being, report challenges to secondary prevention due to lack of knowledge, complexities of medication and influence of comorbidities (17).

Conclusion: Poverty, now recognised as an important underlying factor in chronic diseases, is linked in a vicious cycle with the three common and modifiable risk factors responsible for the vast majority of chronic disease deaths: unhealthy diet, physical inactivity and tobacco use (2). Our study of elderly adults in a low-income slum population reveals high rates of smoking, alcohol use and obesity coupled with low prevalence of protective behaviours like physical exercise and regular fruit and vegetable intake. The prevalence of intermediate risk factors, though self-reported, is not inconsequent, yet may reflect only the tip of the iceberg as far as the real load of undiagnosed disease in the community is concerned. Stroke survivors are unable to avoid further morbidity and disability due to financial restrictions on medicines and rehabilitation measures. Tobacco control, awareness campaigns, and lifestyle and behaviour change, supported by accessible and affordable secondary prevention facilities, are interventions that must be implemented without delay, on a national scale with grassroots level penetration.

References

1. Roth GA, Johnson C, Abajobir A, Abd-Allah F, Abera SF, Abyu G, et al. Global, Regional, and National Burden of Cardiovascular Diseases for 10 Causes, 1990 to 2015. J Am CollCardiol. 2017 Jul 4;70(1):1-25. https://doi.org/10.1016/j.jacc.2017.04.052
2. World Health Organization. Chronic diseases and health promotion, Part Two. The urgent need for action. WHO 2017. Available at http://www.who.int/chp/chronic_disease_report/part2_ch2/en/index1.html. Accessed Nov 18, 2017.
3. Mukhopadhyay A, Sundar U, Adwani S, Pandit D. Prevalence of Stroke and Post-stroke Cognitive Impairment in the Elderly in Dharavi, Mumbai. JAPI.2012;60:29-32.
4. World Health Organization.Cardiovascular diseases (CVDs) Fact sheet. WHO, May 2017. Available athttp://www.who.int/mediacentre/factsheets/fs317/en/
5. World Health Organization. MONICA Manual, Part III: Population Survey. Available at http://www.ktl.fi/publications/monica/manual/part3/iii-1.htm.
6. Huxley R, Mendis S, Zheleznyakov E, Reddy S, Chan J. Body mass index, waist circumference and waist:hip ratio as predictors of cardiovascular risk—a review of the literature. Eur J ClinNutr. 2010 Jan;64(1):16-22. doi: 10.1038/ejcn.2009.68.
7. Schane RE, Ling PM, Glantz SA. Health Effects of Light and Intermittent Smoking: A Review. Circulation. 2010;121(13):1518-1522. doi:10.1161/CIRCULATIONAHA.109.904235.
8. World Health Organization. Waist circumference and waist–hip ratio: report of a WHO expert consultation, Geneva, 8–11. WHO, 2011. Available athttp://apps.who.int/iris/bitstream/10665/44583/1/9789241501491_eng.pdf
9. National Collaborating Centre for Chronic Conditions (UK). Stroke: National Clinical Guideline for Diagnosis and Initial Management of Acute Stroke and Transient Ischaemic Attack (TIA). London: Royal College of Physicians

(UK); 2008. (NICE Clinical Guidelines, No. 68.) 1, Introduction. Available from: https://www.ncbi.nlm.nih.gov/books/NBK53302/

10. Boffetta P, Straif K. Use of smokeless tobacco and risk of myocardial infarction and stroke: systematic review with meta-analysis BMJ2009; 339 :b3060
11. Stacey A. Kenfield, Meir J. Stampfer, Bernard A. Rosner, Graham A. Colditz. Smoking and Smoking Cessation in Relation to Mortality in Women. *JAMA*. 2008;299(17):2037–2047. doi:10.1001/jama.299.17.2037
12. Ministry of Health & Family Welfare, Government of India, and International Institute for Population Sciences. District Level Household and Facility Survey -4. State Fact Sheet Maharashtra. Available at http://rchiips.org/pdf/dlhs4/report/MH.pdf. Accessed November 23, 2017.
13. Qian Y, Nayga Jr.RM, Thomsen MR, Rouse HL. The effect of the Fresh Fruit and Vegetable Program on childhood obesity. Appl Econ Perspect Pol. 2016;38:260-275. doi:10.1093/aepp/ppv017
14. Dessus S, Herrera S, De Hoyos R. The impact of food inflation on urban poverty and its monetary cost: some back-of-the-envelope calculations. Agricultural Economics. 2008;39:417–429. doi: 10.1111/j.1574-0862.2008.00348.x
15. Mukherjee A, Dutta S, Goyal TM. India's Phytonutrient Report. ICRIER, 2016. Available at http://icrier.org/pdf/India_Phytonutrient_Report_Ex_summary.pdf
16. Kinra S, Bowen LJ, Lyngdoh T, Prabhakaran D, Reddy KS, Ramakrishnan L et al. Sociodemographic patterning of non-communicable disease risk factors in rural India: a cross sectional study *BMJ*2010; 341 :c4974doi: 10.1136/bmj.c4974
17. Jamison J, Graffy J, Mullis R, Mant J, Sutton S. Barriers to medication adherence for the secondary prevention of stroke: a qualitative interview study in primary care. The British Journal of General Practice. 2016;66(649):e568-e576. doi:10.3399/bjgp16X685609.

Conflict of Interest: **None**
Source of funding support: Nil

How to cite this article: AmitaMukhopadhyay, Daksha Pandit, Uma Sundar, SikandarAdwani. Stroke among slum dwellers: Risk factors and health-seeking behavior in elderly residents of Dharavi, Mumbai. Nat J Res Community Med 2018;7(1):26-31.

NJRCM: www.commedjournal.in