Study Of Public Knowledge About Stroke & Prevalence Of its Risk Factors In Adult Indian Population

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Abstract

Background: Cerebro-vascular Stroke is one of the leading causes of mortality and morbidity worldwide with developing countries accounting for 85% of global deaths from stroke. However, public knowledge and awareness of cerebro-vascular stroke is deficient in developing countries.

Aim of the study: To evaluate the prevalence of risk factors & public knowledge of cerebro-vascular stroke among people living in India.

Methods: An extensive anonymous survey of a large sample of 718 people was conducted, among which 51.9% were males and 48.1% were females. The survey tool was a 17-item questionnaire, designed to evaluate the prevalence of risk factors & public knowledge of cerebro-vascular stroke.

Results: A vast majority of the population (60%) did not recognize the brain as the organ affected by stroke. Only <2% could identify all the 5 warning symptoms of stroke correctly. Hypertension, tobacco and alcohol consumption were statistically significant prevalent risk factors of stroke among the surveyed population. 77.43% respondents were aware that stroke can be prevented whereas 22.57% felt that it was not preventable. Only, a minority of 14% felt confident about their knowledge about stroke whereas a vast majority desired more information.

Conclusion: We concluded that public awareness regarding stroke in India is bare minimum. Our study also revealed increased prevalence of stroke risk factors, & lack of regular exercise habit patterns in the general population. A comprehensive multidisciplinary strategy is strongly advocated to improve public awareness about stroke.

Keywords: Cerebro-vascular stroke, Public knowledge, Risk factors, Warning symptoms

Introduction

Cerebro-vascular Stroke is one of the leading causes of mortality and morbidity worldwide [1-6] with developing countries accounting for 85% of global deaths from stroke. [3-5]The WHO estimates that by the year 2030, 80% of all strokes will occur in low and middle income countries [7] which are still battling with the scourge of communicable diseases like HIV/AIDS, malaria and tuberculosis. Cerebro-vascular stroke is a medical emergency which can cause permanent neurological damage, complications and death. [8] Nonetheless, it is a preventable public health problem and public awareness can facilitate a faster realization of stroke and immediate activation of pre-hospital emergency mechanism.[9, 10]However, knowledge and awareness of its warning symptoms and risk factors is deficient among the general population in

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developing countries. Stroke is poorly understood by the public and has been associated with numerous misconceptions. [11]Many factors contribute to the delay in seeking appropriate treatment. The principal factor is the lack of public knowledge regarding stroke symptoms and the need for a rapid response [12, 13] Lack of knowledge about stroke symptoms and delayed hospitalization, contribute to high mortality and morbidity in stroke. [14]There is also a lack of knowledge and concern about the treatment of the risk factors and appropriate lifestyle changes, which can decrease the incidence of stroke and morbidity among stroke survivors. [15]The success of primary preventive measures and timely medical attention immediately following a stroke is influenced by the public's knowledge and perception of stroke and its risk factors. [16-19]Our findings will serve as a basis for the health education of those at risk, the public, the healthcare providers and the policy makers in the country.

Materials And Methods

The cross-sectional comparative study was conducted, among 718 people, across major Indian cities. A pre-validated 17-item questionnaire translated in English and Hindi Via Google form was uploaded. Only those who agreed to take part in the study were considered. The questionnaire, contained questions pertaining to demographics, lifestyle; co morbidities; tobacco and alcohol consumption; exercise patterns, organ affected in stroke; warning symptoms of stroke & stroke prevention. Knowledge of warning symptoms of stroke was assessed using questionnaires established by the American Stroke Association[20]and the National Institute of Neurological Disorder and Stroke.[21]The warning symptoms of stroke include:(i) a sudden numbness,

weakness or heaviness of the face, arms and legs, especially on one side of the body; (ii) sudden confusion or difficulty in speaking or understanding speech; (iii) sudden trouble in seeing in one or both eyes; (iv) sudden trouble in walking or dizziness or loss of balance or coordination; and (v) sudden severe headache with no known cause. SPSS version 22.0 was used (SPSS Inc., Chicago, IL) for data analysis. Results on categorical measurements are presented in number (%). Distribution of demographic variables in terms of tables and graphs for all participants has been carried out in descriptive analysis.
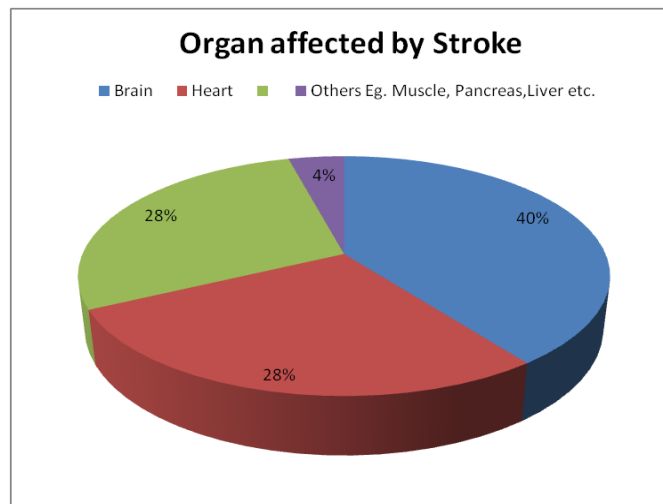
Results
Socio-demographic factors.

Table 1 shows the basic socio-demographic pattern of the whole sample. Out of 718 participants, there were 345 females (48.1%) and 373 males (51.9 %).The mean age of participants was 27.63 ± 11.43 years. Majority (81.1%) of the people in our study were young adults from the age group of 18-30 yrs. Maximum participants (60.2%) had 11-15 years of education. 60% of the surveyed population were graduates and 30% of them were post graduates.

Organ Affected by Stroke.

In our research, a vast majority of the population (60%) did not recognize the brain as the organ affected by stroke. Substantial proportions of participants also believed the heart

($N = 200$; 27.85%) to be the predominant focus of strokes. 4 % of the sample chose other organs such as lungs, liver, pancreas, muscles and kidneys as the body part affected during stroke. [Fig 1]

Figure 1.

Warning Symptoms of Stroke

Responses to questions regarding the warning symptoms of stroke are summarized in Table 1.All the results were statistically significant (p=<0.001) in the surveyed population.

Only a handful of the participants (<2%) could identify all the 5 warning symptoms correctly from the list.

**First step in Stroke management**

Our study revealed that 46.1% of the public had no idea what to do in case they encountered someone with a stroke. Out of those who responded to the first step in stroke management, Calling an ambulance (p=0.013) emerged as the statistically significant parameter among others like basic life support and calling a doctor. [Table 1]

Risk Factors for Stroke.

In our study, the majority of the participants (58.4%) led a sedentary lifestyle.[Fig 2]

Figure 2
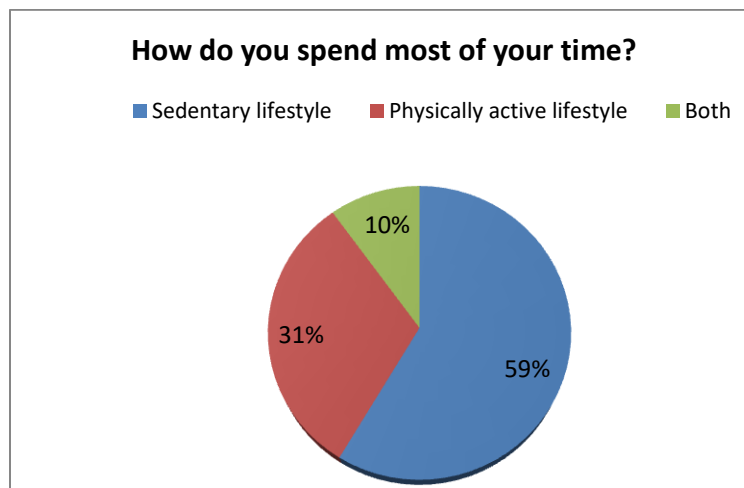
Out of the risk factors of stroke as mentioned in Table 1, hypertension (p=0.021), tobacco and alcohol consumption were statistically significant prevalent risk factors among the surveyed population. (Tobacco consumption p=<0.001; Alcohol consumption p=<0.001).

Exercise Pattern.

The study revealed that the maximum no. of participants (40.66%) rarely or never indulged in any form of physical exercise and only 31.8 % exercised regularly. Majority (46.1 %) of the participants had never performed any breathing exercise and only a meager 9.33% performed breathing exercises on a daily basis.

Preventive Measures

In the present study, 556 (77.43%) respondents were aware that stroke can be prevented whereas 162 (22.57%) felt that it was not preventable.
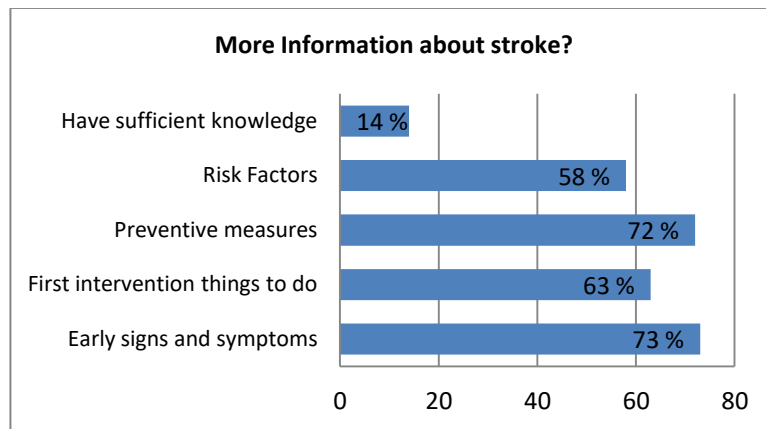
Regular Exercise (p=0.002), diet (p=0.016), smoking cessation (p=0.003) and alcohol cessation (p=0.035) were the statistically significant preventive measures suggested by the public. Other preventive measures included yoga, stress control and adequate management of Diabetes and Hypertension.

Further information about Stroke

Only, a minority of 14% felt confident about their knowledge about stroke. Majority (73%, 72%) of the population expressed the desire to know more about the early signs and symptoms of stroke & its preventive measures respectively. The participants (58%, 63%) also wanted further information on other areas like risk factors of stroke & the first intervention things to do respectively. [Figure 3]

Figure 3

More Information about stroke?
- Have sufficient knowledge — 14 %
- Risk Factors — 58 %
- Preventive measures — 72 %
- First intervention things to do — 63 %
- Early signs and symptoms — 73 %

Table 1.

Demographic		Data
	Total (n=718)	Percentage (%)
Age		
18-20	207	28.8
21-30	376	52.3
31-40	41	5.7
41-50	40	5.5
51-60	34	4.7
More than 60	20	2.7
Gender		

Female	345	48.05	
Male	373	51.95	
Years of education			
11 to 15	432	60.16	
16 to 20	232	32.31	
21 to 25	12	1.67	
up to 10	42	5.84	
Stroke Awareness			
	No.	**%**	**p value**
Warning Symptoms			
1. Difficulty in walking, loss of balance or coordination	239	33.28	**<0.001***
2. Slurred speech or inability to talk	241	33.5	**<0.001***
3. Sudden dimness or visual loss	185	25.76	**<0.001***
4. Sudden numbness, weakness or paralysis of face, arms or legs	297	41.36	**<0.001***
5. Sudden severe headache with an unknown cause	200	27.85	**<0.001***
First Step to take in Stroke			
Call Ambulance	430	59.88	**0.010***
Medical help by Doctor/Medication	371	51.67	0.906
Basic Life Support	340	47.35	0.519
Don't Know	331	46.1	0.093
Risk Factors Prevalence			
1. Obesity	126	17.54	0.098
2. Asthma	20	2.78	0.782
3. HTN	**42**	**5.85**	**0.021***
4. DM	17	2.37	0.283
5. FH OF HTN	150	20.89	0.366
6. FH OF DM	194	27.02	0.192
7. FH OF STROKE	44	6.13	0.194
8. Alcohol	**255**	**35.51**	**0.001***

9. Cigarette Smoking	**117**	**16.29**	**0.001***
Stroke Preventive Measures suggested			
Exercise	148	20.61	**0.002***
Diet	149	12.25	**0.016***
Yoga	15	2.08	0.914
Stress control	88	1.01	0.375
Smoking cessation	30	4.16	**0.003***
Alcohol cessation	24	3.33	**0.035***
BP Control	21	2.91	0.059
Diabetes Control	14	1.9	0.052
More Information On Stroke			
Early signs and symptoms	522	72.7	**0.041***
First intervention things to do	454	63.2	**0.009***
Preventive measures	514	71.58	**0.012***
Risk Factors	420	58.49	**0.031***
Have sufficient knowledge	99	13.78	**<0.001***

*= significant

95% CI= 95% confidence interval of the difference

**HTN= Hypertension, DM = Diabetes mellitus, FH= Family history

Discussion

The present study showed that the general population in India has inadequate knowledge & awareness about stroke. There is a lack of awareness about stroke among the public even in developed countries like the United States [10] and Australia.[13]A vast majority of the subjects (60%) in our study could not identify the brain as the organ affected in stroke. Substantial proportions of participants also believed the heart (27.85%) to be the predominant focus of strokes. This indicates a high level of ignorance and inadequate information about this medical condition, which has preventable risk factors even among the educated public. Likewise, almost three quarters of participants wrongly identified the heart as the organ affected in stroke in Uganda.[22]Maximum participants 41.36 correctly identified weakness on one side of the body as warning symptoms for stroke. This is consistent with other studies. [9,10,16,17]The

least identified warning signs were a sudden visual problem (26%). This was in alignment with a previous study.[23]In our study, the most frequent actions to be taken when seeing a patient with stroke were calling for an ambulance 60 %, followed by going to a doctor in 52 %.These results agreed with Spain [24]study as 45% call emergency and 41% call GP; in Australia [13] 67% call emergency and 23% go to hospital; and in Pakistan [25] the response was to take individual to emergency department/ hospital in 26.16% of participants. Physicians and family doctors need to be educated about referring patients to stroke centers within the window period of intervention. This is true for developing countries, where the number of neurologists available to any population is proportionately much less than that in developed countries.

Non-communicable diseases are fast becoming a serious public health concern in developing countries [3-5] such as India. In our study, the majority of the participants led a sedentary lifestyle and rarely or never indulged in any form of physical exercise. This is a matter of concern because physical inactivity is associated with many poor health effects, including stroke. The relationship between physical activity and stroke may be due to the associated decrease in blood pressure, reduction in diabetes, and reduction in excess body weight.[26]It is concluded that moderate and high levels of physical activity are associated with reduced risk of total, ischemic, and hemorrhagic strokes and stroke mortality.[27, 28]Research has also identified that sedentary lifestyle has been a major contributory factor in post stroke patients for recurrence of stroke[29]& exercise has both positive physical and psychosocial effects for post-stroke patients. [30]A useful recommendation for primary stroke prevention, which can be tailored to an individual's lifestyle needs and preference, is the AHA/ACC CVD prevention guideline of at least 40 minutes per day of moderate to vigorous intensity exercise, 3 to 4 days per week.[31,32]

Ischemic stroke incidence has increased lately in young adult population, who largely remain unaware of risk factors & presenting symptoms, which deters the early diagnosis and treatment thereby worsening prognosis.[33] Based on Thai national data, the most common risk factors identified in stroke patients are hypertension (57%), smoking (27%), and diabetes (24%) [34] In the present study we found that Hypertension, alcohol and tobacco smoking were statistically significant risk factors of stroke prevalent in the surveyed population. High blood pressure is the most important risk factor for stroke, contributing to over 50% of all strokes in the UK. Regular alcohol ingestion is associated with hypertension, fatal and nonfatal intracranial hemorrhage, cerebral infarction, and increased risk of death from stroke. [35] A meta-analysis reported that there was a 41% reduction in stroke for every blood pressure reduction of 10 mmHg systolic or 5 mmHg diastolic.[36] Other studies reported that there is a strong relationship between excessive smoking and risk of ischemic & hemorrhagic stroke. [37, 38]This fact is important because if patients are aware of the risk factors; they are more likely to modify their lifestyle.[39]Health professionals should consider risk factor education as a tool to improve medical adherence and lifestyle modification for secondary prevention strategies.

The preventive measures for stroke suggested by the public included regular exercise, yoga, alcohol & smoking cessation, healthy diet, stress control and adequate management of Diabetes and hypertension. Yoga may be effective for ameliorating some of the long-term consequences of stroke. [40,41]A Cochrane review in 2013 suggested that adherence to a healthy diet can decrease lifetime risk of stroke by nearly 20%. [42]In our survey we found that a vast majority of the population were keen on more information regarding stroke. 73%, 72% of the population expressed the desire to know more about the early signs and symptoms of stroke & its preventive measures respectively. The participants also wanted further information on other areas like risk factors of stroke & the first intervention things to do respectively. This is a promising fact for the need to create awareness. While the knowledge gap is daunting; it also illuminates multiple potential opportunities. Increasing stroke knowledge will result in earlier arrival in the emergency department because of early stroke recognition and help individuals in the future both reduce stroke risk and its complications.

Conclusion

In our study we concluded that, despite the fact that stroke is one of the most important causes of mortality and morbidity throughout the world, public awareness regarding stroke in India is bare minimum. Furthermore, our study revealed increased prevalence of stroke risk factors and lack of regular exercise habit patterns in the general population. Awareness of stroke symptoms and risk factors are essential for the public to address stroke in a timely manner. There is a need for mass awareness campaigns, public health policies and regular surveillance to make people aware about stroke, its risk factors and immediate steps to take. There is also a need to promote physically active lifestyles. The Fit India Movement started by the Government of India, is a right step towards this direction. The study suggests that a comprehensive multidisciplinary strategy with multifaceted programs regarding stroke, including printed information, audio-visual programs and stroke service programs are strongly advocated to

improve public awareness about stroke treatment and prevention.

References

1. D. Mozaffarian, E. J. Benjamin, A. S. Go et al., "Heart disease and stroke statistics—2016 update: a report from the American Heart Association," 2016, 133 (4) : 38–360.

2. H. D. Wang,M.Naghavi, C. Allen et al., "Global, regional, and national life expectancy, all-cause mortality, and cause-specific mortality for 249 causes of death, 1980-2015: a systematic analysis for the Global Burden of Disease Study," *Lancet*, 2016, 388 (4) : 1459–1544.

3. V.L.Feigin,C.M.M.Lawes,D.A.Bennett,andC.S. Anderson, "Stroke epidemiology: a review of population-based studies of incidence,prevalence,and case-fatality athlete 20th century," Lancet Neurology, 2003, 2 (1) : 43–53.

4. P.M.Dalal,S.Malik,M.Bhattacharjeeetal.,"Popula tion-based stroke survey in Mumbai, India: incidence and 28-day case fatality,"Neuroepidemiology,2008, 31 (4) : 254–261.

5. P. M. Dalal and M. Bhattacharjee, "Stroke epidemic in India: hypertension-stroke control programme is urgently needed," Journal of Association of Physicians of India,2007, 55: 689–691.

6. V.L.Feigin,M.H.Forouzanfar,R.Krishnamurthieta l.,"Global and regional burden of stroke during 1990–2010:findings from the Global Burden of Disease Study 2010," TheLancet, 2014, 383 (9913) : 245-255.

7. Mathers CD, Loncar D: Updated projections of global mortality and burden of disease, 2002–2030: data sources, methods and results. Evidence and Information for Policy Working Paper. Geneva: World Health Organization.

8. WHO MONICA Project Investigators. The World Health Organization MONICA Project (Monitoring trends and determinants in cardiovascular disease). J Clin Epidemiol.1988,41:105–14.

9. Evci ED, Memis S, Ergin F, BeserE.A population-based study on awareness of stroke in Turkey.Eur J Neurol 2007,14:517-22.

10. Pancioli AM, Broderick J, Kothari R, Brott T, Tuchfarber A, Miller R, et al.Public perception of stroke warning signs and knowledge of potential risk factors.JAMA 1998,279:1288-92.

11. Donnan GA, Fisher M, Macleod M, Davis SM. Stroke. Lancet. 2008,371:1612–23.

12. Evenson KR, Rosamond WD, Morris DL. Pre-hospital and in-hospital delays in acute stroke care. Neuroepidemiology. 2001,20:65–76.

13. Yoon SS, Heller RF, Levi C, Wiggers J, Fitzgerald PE. Knowledge of stroke risk factors, warning symptoms and treatment among an Australian urban population. Stroke. 2001,32:1926–30.

14. Srivastava AK, Prasad K. A study of factors delaying hospital arrival of patients with acute stroke. Neurol India. 2001,49:272–6.

15. Das S, Banerjee T. Stroke: Indian scenario. Circulation. 2008,118:2719–24.

16. R.O.Akinyemi,O.S.Ogah,R.F.Ogundipe Metal.,"Knowledge and perception of stroke amongst hospital workers in an African community," European Journal of Neurology, 2009, 16(9) : 998-1003.

17. N.Stroebele,F.M¨uller-Riemenschneider,C.H.Nolte,J.M¨ullerNordhorn, A. Bockelbrink, and S. N. Willich, "Knowledge of risk factors, and warning signs of stroke: a systematic review from a gender perspective," International Journal of Stroke,2011,6(1): 60-66.

18. O.Ayanniyi,O.Akande,andA.F.Mustapha,"Know ledge and perception of stroke among adults in Osogbo,Nigeria,"African Journal of Medicine and Medical Sciences, 2006, 35(4): 447-452.

19. S. P. Jones, A. J. Jenkinson, M. J. Leathley, and C. L. Watkins, "Stroke knowledge and awareness:an integrative review of the evidence," Age and Ageing, 2009, 39(1): 11-22.

20. American Stroke Association. Know the warning signs of stroke. Available at http://www.strokeassociation.org/presenter.jhtml ?identifier=1020 [Accessed 11 December 2002].

21. National Institute of Neurological Disorder. Stroke information page. Available at http://www.nin.is.nih.gov/health and medical/disorders/stroke.htm#What is stroke [Accessed 11 December 2002].

22. Jane Nakibuuka, Martha Sajatovic,et al., "Knowledge and Perception of Stroke: A Population-Based Survey in Uganda" Hindawi Publishing Corporation ISRN Stroke Volume

2014, Article ID 309106, http://dx.doi.org/10.1155/2014/309106

23. K. Das, G. P. Mondal, A. K. Dutta, B. Mukherjee, and B. B. Mukherjee, "Awareness of warning symptoms and risk factors of stroke in the general population and in survivors stroke," Journal of Clinical Neuroscience, 2007, 14(1): 12-16

24. Segura T, Vega G, Lopez S, Rubio F and Castillo J : on behalf of the Cerebrovascular Diseases Study Group of the Spanish Society of Neurology. Public perception of stroke in Spain. Cerebrovasc Dis 2003;16:21–26

25. Aly Z, Abbas K, Kazim SF, Taj F, Aziz F, Irfan A, Sheikh R, Shakir M, Javed SM, Fatmi Z. Awareness of stroke risk factors, signs and treatment in a Pakistani population. JPMA. 2009,59:495.

26. Manson JE, Colditz GA, Stampfer MJ, Willett WC, Krolewski AS, Rosner B, et al. A prospective study of maturity-onset diabetes mellitus and risk of coronary heart disease and stroke in women. Arch Intern Med. 1991, 151:1141–1147. [PubMed: 2043016]

27. Zhou ML, Zhu L, Wang J, Hang CH, Shi JX. The inflammation in the gut after experimental subarachnoid hemorrhage. The Journal of surgical research. 2007; 137:103–108. [PubMed: 17069855]

28. Lee CD, Folsom AR, Blair SN. Physical activity and stroke risk: A meta-analysis. Stroke; a journal of cerebral circulation. 2003; 34:2475–2481.

29. Kringle EA, Campbell G, McCue M, Barone Gibbs B, Terhorst L, Skidmore ER. Development and feasibility of a sedentary behavior intervention for stroke: a case series. Top Stroke Rehabil. 2019 Sep;26(6):456-463. doi: 10.1080/10749357.2019.1623437. Epub 2019 Jun 6. PMID: 31170037.

30. Han P, Zhang W, Kang L, Ma Y, Fu L, Jia L, Yu H, Chen X, Hou L, Wang L, Yu X, Kohzuki M, Guo Q. Clinical Evidence of Exercise Benefits for Stroke. Adv Exp Med Biol. 2017;1000:131-151. doi: 10.1007/978-981-10-4304-8_9. PMID: 29098620.

31. Howard VJ, McDonnell MN. Physical activity in primary stroke prevention: Just do it! Stroke; a journal of cerebral circulation. 2015; 46:1735–1739.

32. Eckel RH, Jakicic JM, Ard JD, de Jesus JM, Houston Miller N, Hubbard VS, et al. 2013 aha/acc guideline on lifestyle management to reduce cardiovascular risk: A report of the american college of cardiology/american heart association task force on practice guidelines. Circulation. 2014; 129:S 76–99. [PubMed: 24222015]

33. Singhal AB, Biller J, Elkind MS, et al Recognition and management of stroke in young adults and adolescents. Neurology. 2013,81(12):1089-97. doi: 10.1212/WNL.0b013e3182a4a451. Epub 2013 Aug 14. PMID: 23946297; PMCID: PMC3795593.

34. K. Kongbunkiat, N. Kasemsap, K. Thepsuthammarat, S.Tiamkao, and K. Sawanyawisuth, "National data on stroke outcomes in Thailand," Journal of Clinical Neuroscience, 2015,22(3), 493-497. stroke.org.uk

35. Law MR, Morris JK, Wald NJ. Use of blood pressure lowering drugs in the prevention of cardiovascular disease: meta-analysis of 147 randomised trials in the context of expectations from prospective epidemiological studies. BMJ. 2009 19;338:b1665. doi: 10.1136/bmj.b1665. PMID: 19454737; PMCID: PMC2684577.

36. Markidan J, Cole JW, Cronin CA, Merino JG, Phipps MS, Wozniak MA, Kittner SJ. Smoking and Risk of Ischemic Stroke in Young Men. Stroke. 2018;49(5):1276-1278. doi: 10.1161/STROKEAHA.117.018859. Epub 2018 Apr 19. PMID:29674522; PMCID: PMC5916531.

37. Klimowicz-Młodzik I, Pietrzykowska I, Chodakowska-Zebrowska M, Cegielska J. [Cigarette smoking and alcohol abuse effects on stroke development]. Neurol Neurochir Pol. 1995;29(2):151-8. Polish. PMID: 7651587.

38. C. Ellis, J. Barley, and A. Grubaugh, "Poststroke knowledge and symptom awareness: a global issue for secondary stroke prevention," Cerebrovascular Diseases, 2013,35 (6) 572– 581.

39. Thayabaranathan T, Andrew NE, Immink MA, Hillier S, Stevens P, Stolwyk R, Kilkenny M, Cadilhac DA. Determining the potential benefits

of yoga in chronic stroke care: a systematic review and meta-analysis. Top Stroke Rehabil. 2017;24(4):279-287. doi: 10.1080/10749357.2016.1277481. Epub 2017 Jan 19. PMID: 28100160.

40. Mooventhan A, Nivethitha L. Evidence based effects of yoga in neurological disorders. J ClinNeurosci. 2017;43:61-67. doi: 10.1016/j.jocn.2017.05.012. Epub 2017 Jun 7. PMID: 28599839.

41. Rees K, Dyakova M, Wilson N, Ward K, Thorogood M, Brunner E. Dietary advice for reducing cardiovascular risk. The Cochrane database of systematic reviews. 2013 CD002128.