

# A Study to Assess the Stroke Risk Factors Among Middle-Aged Adults in Selected Rural Communities of Rohtas District, Bihar

Dr. K. Latha<sup>1</sup>, Ms. Mamta Kumari<sup>2</sup>, Mr. Hariom Patel<sup>3</sup>, Mr. Abhishek Kumar<sup>4</sup>, Mr. Ravi Ranjan Kumar<sup>5</sup>,  
Ms. Sweta Kumari<sup>6</sup>, Ms. Richa Kumari<sup>7</sup>, Ms. Alisha Kumari<sup>8</sup>

<sup>1</sup>*Dean cum Principal, Narayan Nursing College, Gopal Narayan Singh University*

<sup>2</sup>*Lecturer, Department of Medical Surgical Nursing, Narayan Nursing College, Gopal Narayan Singh University*

<sup>3,4,5,6,7,8</sup> *Bachelor of Science in Nursing, Narayan Nursing College, Gopal Narayan Singh University*  
doi.org/10.64643/IJIRTV12I12-202189-459

**Abstract—Background:** Stroke is a leading cause of mortality and disability worldwide and has become a major public health challenge in rural India. Modifiable risk factors such as hypertension, diabetes mellitus, obesity, tobacco use, alcohol consumption, physical inactivity, and unhealthy dietary practices contribute significantly to the increasing burden of stroke. Middle-aged adults residing in rural communities are particularly vulnerable due to poor awareness, inadequate screening facilities, and limited access to preventive healthcare services. Therefore, the present study was undertaken to assess stroke risk factors among middle-aged adults in selected rural communities of Rohtas district, Bihar.

**Objectives:** -To assess the stroke risk factors among middle-aged adults in selected rural communities of Rohtas district, Bihar.

1. To find the association between stroke risk factors and selected demographic variables among middle-aged adults.

**Methods:** -A quantitative research approach with descriptive survey design was adopted for the study. The study was conducted in selected rural communities under PHC jurisdiction in Rohtas district, Bihar. Multi-stage non-probability sampling technique was used to select 30 middle-aged adults aged 35–60 years. Data were collected using a structured interviewer-administered questionnaire consisting of demographic variables and stroke risk factor assessment. Blood pressure, height, weight, and anthropometric measurements were recorded using standardized procedures. Data were analyzed using descriptive and inferential statistics including frequency, percentage, mean, standard deviation, and chi-square test.

**Results:** - The study findings revealed that 70% of participants had high stroke risk. Hypertension (73.3%),

tobacco use (63.3%), poor dietary habits (66.7%), physical inactivity (56.7%), and obesity (50%) were the most prevalent risk factors. Significant associations were found between stroke risk factors and selected demographic variables such as age, gender, educational status, occupation, and monthly income at  $p < 0.05$  level of significance.

**Conclusion:** -The study concluded that middle-aged adults in selected rural communities of Rohtas district had a high prevalence of modifiable stroke risk factors. Early screening, health education, lifestyle modification, and nurse-led community interventions are essential to reduce the burden of stroke and improve health outcomes among rural populations.

**Index Terms—**Stroke, Risk Factors, Middle-Aged Adults, Rural Communities, Hypertension, Tobacco Use.

## I. INTRODUCTION

Stroke is a neurological emergency that occurs when the blood supply to a part of the brain is interrupted or reduced, preventing brain tissue from receiving oxygen and nutrients. Within minutes, brain cells begin to die, resulting in neurological deficits, disability, or death. Stroke is recognized as one of the leading causes of mortality and long-term disability worldwide. In developing countries such as India, the burden of stroke has increased significantly due to epidemiological transition, urbanization, lifestyle modifications, and increasing prevalence of non-communicable diseases.<sup>1</sup>

Globally, stroke contributes substantially to morbidity, mortality, and economic burden. According to the

World Health Organization, approximately 15 million people suffer from stroke each year worldwide, among whom nearly 5 million die and another 5 million remain permanently disabled. In India, stroke incidence has risen steadily over recent decades, affecting not only older adults but also middle-aged populations. The increasing prevalence of modifiable risk factors such as hypertension, diabetes mellitus, obesity, smoking, alcohol use, dyslipidemia, and physical inactivity has accelerated the burden of cerebrovascular diseases.<sup>2</sup>

Rural populations are particularly vulnerable to stroke because of poor healthcare access, low literacy rates, lack of awareness regarding non-communicable diseases, and delayed diagnosis of chronic conditions. In many rural communities, individuals are unaware of the importance of regular blood pressure and blood sugar monitoring. Harmful practices such as tobacco chewing, smoking, excessive salt intake, and alcohol consumption are common and contribute significantly to cardiovascular and cerebrovascular disorders. Moreover, limited awareness regarding early warning signs of stroke often results in delayed healthcare seeking, thereby increasing mortality and disability.<sup>3</sup> Middle-aged adults constitute an important segment of the population because they are economically productive and socially responsible for family welfare. This age group is also the period during which multiple cardiovascular risk factors begin to develop and progress silently. Early identification and modification of these risk factors can significantly reduce the future burden of stroke. Unfortunately, many middle-aged adults fail to undergo regular health screening and continue unhealthy lifestyle practices due to lack of awareness or limited healthcare access.<sup>4</sup>

In rural areas of Bihar, especially in Rohtas district, socio-economic challenges, illiteracy, poverty, poor health infrastructure, and dependence on agricultural labour increase vulnerability to non-communicable diseases. Healthcare facilities are often inadequate, and preventive health services remain underutilized. Community-based studies assessing stroke risk factors among middle-aged adults are limited in this region, making it difficult for healthcare authorities to plan effective preventive strategies.<sup>5</sup>

Nurses play a crucial role in the prevention and control of stroke through community health education, risk factor screening, counselling, and early referral. Community health nurses can identify high-risk

individuals, educate families regarding healthy lifestyles, and encourage early recognition of stroke warning signs. Understanding the prevalence of stroke risk factors among middle-aged adults in rural communities is therefore essential for planning targeted interventions and strengthening preventive healthcare services.<sup>6</sup>

The present study entitled “A Study to Assess the Stroke Risk Factors Among Middle-Aged Adults in Selected Rural Communities of Rohtas District, Bihar” was undertaken to identify the prevalence of modifiable stroke risk factors and determine their association with selected demographic variables. The findings of the study are expected to provide baseline information for developing nurse-led community-based interventions aimed at reducing the burden of stroke in rural populations.<sup>7</sup>

## II. METHODS

### Research Approach

A quantitative research approach was adopted for the present study. Quantitative approach was considered appropriate because the study aimed to assess stroke risk factors and determine their association with selected demographic variables using measurable data.

### Research Design

A descriptive survey design was used for the study to assess the prevalence of stroke risk factors among middle-aged adults residing in selected rural communities.

### Research Setting

The study was conducted in selected rural communities under Primary Health Centre jurisdiction in Rohtas district, Bihar. Two villages were purposively selected based on accessibility, population size, and availability of healthcare services.

### Population

The target population consisted of middle-aged adults aged 35–60 years residing in selected rural communities of Rohtas district.

### Sample Size

The sample size consisted of 30 middle-aged adults. Fifteen participants were selected from each village.

#### Sampling Technique

Multi-stage non-probability sampling technique was used. Initially, rural communities were selected purposively, followed by convenience sampling for selection of participants.

#### Inclusion Criteria

- Middle-aged adults aged 35–60 years
- Residents of selected rural communities for at least six months
- Individuals willing to participate
- Participants available during the period of data collection

#### Exclusion Criteria

- Individuals diagnosed with stroke
- Participants with acute illness
- Individuals with cognitive impairment affecting communication

#### Description of Tool

The tool used for data collection consisted of two sections:

##### Section A: Demographic Variables

Included age, gender, education, occupation, monthly income, religion, dietary pattern, and family history.

##### Section B: Stroke Risk Factor Assessment

Included assessment of:

- Hypertension
- Diabetes mellitus
- Tobacco use
- Alcohol consumption
- Physical inactivity
- Obesity
- Poor dietary habits
- Family history of stroke
- Stress and lifestyle factors

#### Validity of Tool

The tool was validated by five experts including neurologists, nursing faculty members, and a biostatistician. The Content Validity Index (CVI) was found to be 0.99, indicating high validity.

#### Reliability of Tool

Reliability of the tool was established through test-retest method. The reliability coefficient was found to

be  $r=0.88$ , and Cronbach's alpha was 0.82, indicating high reliability.

#### Ethical Considerations

Permission was obtained from concerned authorities before data collection. Informed consent was obtained from participants. Confidentiality and anonymity were maintained throughout the study.

#### Data Collection Procedure.

Data collection was carried out through household visits. Participants were interviewed individually using structured questionnaires. Blood pressure and anthropometric measurements were recorded using standardized procedures.

#### Plan for Data Analysis

Data were analyzed using descriptive and inferential statistics:

- Frequency
- Percentage
- Mean
- Standard deviation
- Chi-square test at  $p<0.05$  level of significance

### III. RESULTS

The analysis and interpretation of data collected from 30 middle-aged adults residing in selected rural communities of Rohtas district, Bihar, are presented under the following sections.

#### Section I: Distribution of Participants According to Demographic Variables

The demographic characteristics of the participants revealed that the majority 16 (53.3%) belonged to the age group of 35–44 years, followed by 9 (30%) in the age group of 45–54 years and 5 (16.7%) in the age group of 55–60 years.

With regard to gender, 20 (66.7%) participants were male and 10 (33.3%) were female.

Regarding educational status, 12 (40%) participants had primary education, 10 (33.3%) were illiterate, 5 (16.7%) had secondary education, and only 3 (10%) had higher secondary or above education.

According to occupation, 14 (46.7%) participants were farmers, 6 (20%) were labourers, 5 (16.7%) were self-employed, and 5 (16.7%) were homemakers.

In relation to monthly family income, the majority 25 (83.3%) had income less than ₹10,000 per month, while only 5 (16.7%) had income above ₹10,000 per month.

With respect to religion, 28 (93.3%) participants were Hindu and 2 (6.7%) were Muslim.

Regarding dietary pattern, 22 (73.3%) participants consumed mixed diet whereas 8 (26.7%) were vegetarian.

Family history of stroke or cardiovascular disease was present among 14 (46.7%) participants and absent among 16 (53.3%) participants.

Demographic Variables	Category	f	%
Age (Years)	35-44	16	53.3
	45-54	10	33.3
	55-60	4	13.3
Mean age ± SD	45.2 ± 7.1 years (range:36-59)		
Gender	Male	20	66.7
	Female	10	33.3
Education	Illiterate	12	40.0
	Primary	10	33.3
	Secondary+	8	26.7
Occupation	Farmer/Laborer	20	66.7
	Business/Housewife/Others	10	33.3
Family Income (₹ /monthly)	≤5,000	12	40.0
	5,001-10,000	13	43.3
	10,001-20,000	4	13.3
	>20,000	1	3.3
Mean income ± SD	₹ 7,833±3,450 (range:₹ 4,000-₹ 22,000)		
Religion	Hindu	28	93.3
	Muslim	2	6.7
Diet	Vegetarian	8	26.7
	Non-vegetarian	22	73.3
Family History of Stroke	Yes	14	46.7
	No	16	53.3

### Section II: Assessment of Stroke Risk Factors Among Middle-Aged Adults

The findings of the study revealed that a considerable proportion of participants had one or more modifiable stroke risk factors.

Among the total participants:

- 22 (73.3%) had hypertension.
- 19 (63.3%) used tobacco products either in smoked or smokeless form.
- 20 (66.7%) had unhealthy dietary habits with excessive intake of salt, oil, or saturated fat.
- 17 (56.7%) participants were physically inactive.
- 15 (50%) participants were obese or overweight according to BMI assessment.
- 10 (33.3%) participants had diabetes mellitus.

- 8 (26.7%) participants consumed alcohol regularly.
- 14 (46.7%) participants reported positive family history of stroke or cardiovascular disease.

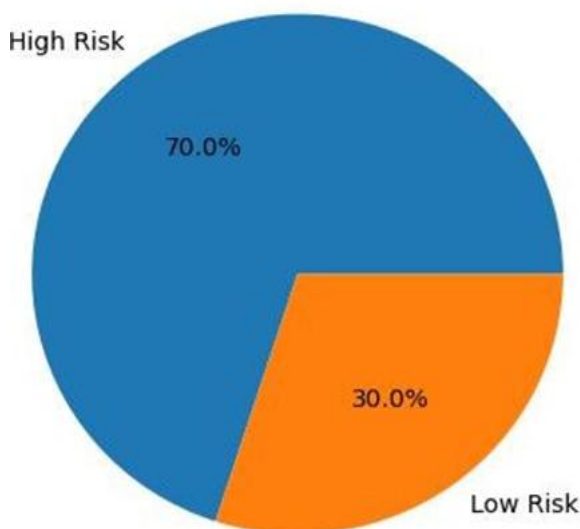
The study findings further showed that multiple risk factor clustering was common among participants. Most individuals had more than one risk factor contributing to increased stroke susceptibility.

### Section III: Distribution of Participants According to Overall Stroke Risk Level

Based on the total stroke risk assessment score, participants were categorized into low-risk and high-risk groups.

Stroke Risk Level	Frequency (f)	Percentage (%)
High Risk	21	70%
Low Risk	9	30%

Figure 4.4: Risk Level Distribution



The findings indicate that the majority of middle-aged adults 21 (70%) were categorized as high risk for developing stroke, whereas only 9 (30%) participants were categorized as low risk.

The mean stroke risk score among participants was 6.4 ± 2.3, indicating a high burden of modifiable stroke risk factors within the study population.

### Section IV: Association Between Stroke Risk Factors and Selected Demographic Variables

Chi-square test was used to determine the association between stroke risk factors and selected demographic variables among middle-aged adults.

The study findings revealed statistically significant association between stroke risk factors and the following demographic variables:

Demographic Variable	$\chi^2$ Value	p-value	Significance
Age	6.45	0.039	Significant
Gender	4.89	0.027	Significant
Educational Status	7.23	0.027	Significant
Monthly Income	5.67	0.017	Significant
Occupation	3.92	0.048	Significant

The findings indicate that stroke risk factors were significantly associated with age, gender, education, income, and occupation at  $p < 0.05$  level of significance.

No statistically significant association was found between stroke risk factors and religion, dietary pattern, or family history.

#### Section V: Interpretation of Major Findings

The present study demonstrated a high prevalence of modifiable stroke risk factors among middle-aged adults residing in selected rural communities of Rohtas district, Bihar.

Hypertension emerged as the most prevalent stroke risk factor followed by unhealthy dietary habits and tobacco use. Most participants belonged to low socio-economic and low educational backgrounds, which may contribute to poor health awareness and unhealthy lifestyle practices.

The findings also revealed that younger middle-aged adults (35–44 years), males, illiterate individuals, labourers, and low-income groups were more vulnerable to high stroke risk.

The study highlights the urgent need for community-based screening programmes, lifestyle modification interventions, and nurse-led health education activities to reduce the future burden of stroke among rural populations.

#### IV. DISCUSSION

The present study assessed stroke risk factors among middle-aged adults residing in selected rural communities of Rohtas district, Bihar. The findings

demonstrated alarmingly high prevalence of modifiable stroke risk factors among participants.

Hypertension emerged as the most common risk factor, affecting 73.3% of participants. This finding is consistent with previous studies conducted in rural India which reported increasing prevalence of hypertension due to unhealthy lifestyles, poor dietary practices, stress, and lack of regular screening. Tobacco use was another major risk factor identified in the present study. Tobacco consumption in the form of smoking and smokeless tobacco remains highly prevalent in rural Bihar and contributes significantly to cardiovascular and cerebrovascular diseases.

Physical inactivity and obesity were also highly prevalent among participants. Mechanization of agricultural work, sedentary lifestyles, and poor dietary habits may contribute to increasing obesity and metabolic disorders among rural populations. Similar findings have been reported in community-based studies conducted in other parts of India.

The study revealed significant association between stroke risk factors and socio-demographic variables such as age, education, occupation, and income. Illiterate participants and low-income groups demonstrated higher prevalence of risk factors. This finding indicates that low literacy and poor socio-economic conditions negatively affect health awareness, preventive practices, and healthcare utilization.

The findings emphasize the urgent need for community-based screening programmes and health education interventions. Nurses and primary healthcare workers can play a key role in identifying high-risk individuals, conducting awareness campaigns, and promoting healthy lifestyle modifications. Nurse-led interventions such as regular blood pressure screening, tobacco cessation counselling, dietary education, and physical activity promotion can significantly reduce the burden of stroke in rural populations.

The present study also highlights the importance of integrating stroke prevention strategies into existing national programmes such as NPCDCS. Strengthening primary healthcare services and improving accessibility of screening facilities in rural areas are essential for early identification and management of stroke risk factors.

## V. CONCLUSION

The study concluded that middle-aged adults in selected rural communities of Rohtas district, Bihar, had a high prevalence of modifiable stroke risk factors, with hypertension, tobacco use, poor dietary habits, physical inactivity, and obesity being the most common. The findings indicate that a large proportion of rural adults are at high risk for future stroke and related cardiovascular complications.

The study further established significant associations between stroke risk factors and selected demographic variables such as age, gender, education, occupation, and income. Illiteracy, low socio-economic status, and unhealthy lifestyle practices were major contributors to increased stroke risk among rural populations.

The findings emphasize the urgent need for early screening, community-based health education, and nurse-led preventive interventions to reduce the burden of stroke. Regular blood pressure monitoring, lifestyle modification counselling, tobacco cessation programmes, and awareness regarding healthy dietary practices should be strengthened at the community level.

Community health nurses, ASHAs, and primary healthcare workers play an important role in stroke prevention through identification of high-risk individuals, counselling, referral services, and continuous health education. Strengthening rural healthcare infrastructure and integrating stroke prevention strategies within primary healthcare services can improve early detection and management of stroke risk factors.

Overall, the study highlights the importance of targeted preventive strategies and community participation in reducing the burden of stroke and improving health outcomes among middle-aged adults in rural Bihar.

## VI. NURSING IMPLICATIONS

The findings of the present study have important implications for nursing practice, nursing education, nursing administration, and nursing research. Since the study identified a high prevalence of modifiable stroke risk factors among middle-aged adults in rural communities, nurses play a crucial role in prevention, early identification, health promotion, and rehabilitation services related to stroke care.

### Nursing Practice

Community health nurses are the frontline healthcare providers in rural areas and have a significant responsibility in preventing stroke through early detection and management of risk factors. The findings of the study indicate the need for regular community-based screening programmes for hypertension, diabetes mellitus, obesity, and other cardiovascular risk factors among middle-aged adults.

Nurses can:

- Conduct regular blood pressure and blood sugar screening camps in rural communities.
- Identify high-risk individuals and refer them for further medical management.
- Provide counselling regarding tobacco cessation, alcohol reduction, healthy diet, and physical activity.
- Educate community members regarding warning signs and symptoms of stroke such as facial drooping, speech difficulty, and sudden weakness.
- Promote adherence to medication among patients diagnosed with hypertension or diabetes.
- Encourage regular health check-ups and lifestyle modifications to prevent stroke.

Nurses working in Primary Health Centres and community settings can also collaborate with ASHA workers and Anganwadi workers to strengthen awareness regarding stroke prevention in rural populations.

### Nursing Education

The study findings emphasize the importance of incorporating stroke prevention and non-communicable disease management into nursing education programmes. Nursing students should be trained in community-based assessment and screening of stroke risk factors.

Implications for nursing education include:

- Strengthening curriculum content related to stroke prevention and cardiovascular risk assessment.
- Training nursing students in the use of screening tools such as blood pressure apparatus, BMI calculation, and risk assessment questionnaires.
- Providing practical exposure to community-based non-communicable disease prevention programmes.

- Developing communication and counselling skills among nursing students for effective health education.
  - Encouraging student participation in rural health awareness campaigns and outreach programmes.
- Educational institutions can organize workshops and training programmes focused on lifestyle modification counselling and early recognition of stroke symptoms.

#### Nursing Administration

Nursing administrators have an important role in planning and implementing community health programmes for prevention of stroke and other non-communicable diseases. The findings of the study suggest the need for strengthening preventive healthcare services in rural areas.

Nursing administration can:

- Organize regular screening camps for hypertension, diabetes, obesity, and tobacco use.
- Ensure availability of screening equipment such as sphygmomanometers, weighing machines, and glucometers in rural healthcare settings.
- Develop policies and protocols for early detection and referral of high-risk individuals.
- Arrange continuing nursing education programmes on stroke prevention and management.
- Strengthen coordination between hospitals, Primary Health Centres, and community healthcare workers.
- Promote nurse-led clinics for non-communicable disease screening and counselling services.

Nursing administrators should also advocate for inclusion of stroke prevention strategies within rural healthcare policies and public health programmes.

#### Nursing Research

The study findings contribute valuable baseline information regarding stroke risk factors among middle-aged adults in rural Bihar and highlight the need for further research in this area.

Implications for nursing research include:

- Conducting studies with larger sample sizes to improve generalizability of findings.
- Undertaking comparative studies between rural and urban populations.
- Conducting interventional studies to assess the effectiveness of nurse-led educational programmes on stroke prevention.

- Exploring knowledge, attitudes, and practices related to stroke risk factors among community populations.
- Evaluating the effectiveness of lifestyle modification interventions in reducing stroke risk.
- Conducting longitudinal studies to monitor changes in stroke risk factors over time.

Nursing research can help generate evidence-based strategies for reducing the burden of stroke and improving community health outcomes.

#### Overall Implication

The study clearly demonstrates that stroke prevention should become an important priority in rural healthcare services. Nurses, being key healthcare providers, can significantly contribute toward reducing the burden of stroke through early screening, health education, counselling, lifestyle modification programmes, and community participation. Strengthening nurse-led preventive strategies can improve quality of life, reduce disability, and decrease mortality related to stroke among rural populations.

#### REFERENCES

- [1] World Health Organization, "Stroke, cerebrovascular accident," Geneva, Switzerland: WHO, 2024. [Online]. Available: <https://www.who.int>
- [2] K. Park, *Park's Textbook of Preventive and Social Medicine*, 27th ed. Jabalpur, India: Banarsidas Bhanot Publishers, 2023.
- [3] D. F. Polit and C. T. Beck, *Nursing Research: Generating and Assessing Evidence for Nursing Practice*, 12th ed. Philadelphia, PA, USA: Wolters Kluwer, 2021.
- [4] B. T. Basavanthappa, *Nursing Research*, 3rd ed. New Delhi, India: Jaypee Brothers Medical Publishers, 2022.
- [5] B. K. Behera, A. Kumar, and R. Singh, "Burden of stroke in India: Findings from Global Burden of Disease Study 2021," *Indian Journal of Public Health*, vol. 68, no. 2, pp. 115–122, 2024.
- [6] M. Patel, V. Sharma, and R. Gupta, "Prevalence of stroke risk factors among rural adults in India: A systematic review and meta-analysis," *Journal of Stroke and Cerebrovascular Diseases*, vol. 33, no. 1, pp. 102–110, 2024.

- [7] S. Kamalakannan, A. S. V. Gudlavalleti, and V. S. M. Gudlavalleti, “Prevalence of non-communicable disease risk factors among rural middle-aged adults in India,” *BMC Public Health*, vol. 21, no. 1, p. 1542, 2021.
- [8] S. Prabhakar, M. M. Singh, and B. C. Bansal, “Stroke risk factors among rural populations in India: A case-control study,” *Neurology India*, vol. 68, no. 4, pp. 812–818, 2020.
- [9] S. V. Rangamani, P. Kumar, and K. S. Reddy, “Rural stroke incidence and cardiovascular risk factors among adults in India,” *International Journal of Stroke*, vol. 19, no. 3, pp. 210–218, 2024.