Original Article

Feasibility and acceptability study of risk reduction approach for stroke prevention in primary care in Western India

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ABSTRACT

Objectives: Stroke is among the leading cause of morbidity and mortality and prevention is the need of the hour. Risk assessment of stroke could be done at primary care. A study was hence planned to assess if an information, education, and communication (IEC) intervention module could be used to address risk factors of stroke among attendees of primary care in Western India.

Materials and Methods: Patients (>30 years) attending primary care center were enrolled ($n = 215$). Knowledge, attitude, and practice (KAP) questionnaire was administered at baseline and end line, and detailed diagnosis (hypertension and/diabetes, stroke, coronary artery disease, etc.) was noted from written records. A predesigned IEC module was administered about stroke, risk factors, and their prevention. Body mass index (BMI) and waist-to-hip ratio were taken before and after 16 weeks.

Results: A total of 215 participants (M: F = 85:130; mean age = 51.66 ± 13.32 years) had risk factors such as hypertension (26.7%), diabetes (32.5%), history of stroke ($n = 3$; = 1.39%), and 7.4% (16/215) had coronary artery disease. Before and after comparison of KAP scores indicated significant difference (62.23 ± 19.73 vs. 75.32 ± 13.03); $P \leq 0.0001$). Change of waist-to-hip ratio occurred from baseline 0.91–0.9 ($P \leq 0.001$). Comparison of the proportion of patients taking antihypertensives before and after IEC intervention was statistically significant ($P < 0.05$), indicating improvement in drug compliance. BMI comparison changed marginally (26.5 ± 4.7 vs. 26.2 ± 4.5) before and after but was not significant ($P \geq 0.05$). The intervention was found to be feasible and acceptable.

Conclusion: IEC intervention appears to be a low-cost, feasible, and acceptable implementation model for addressing risk factors for stroke in primary care.

Keywords: Stroke, Primary prevention, Information, Education and communication

INTRODUCTION

Stroke is among the leading cause of death and disability-adjusted life years (DALY).[1] In fact, the past two decades have shown an increase in the risk factors for stroke amenable to primary prevention, for example, hypertension, diabetes, obesity, smoking, and alcohol drinking.

At present, third-fourth of all stroke-related morbidity and mortalities occur in developing countries. This is assumed to be due to aging, changing pattern of lifestyle, and socioeconomic factors. In short, stroke is emerging as a major public health issue in developing nations.[2] Controlling blood pressure alone can have a significant risk reduction of both hemorrhagic and ischemic stroke.[3]

The rising burden of stroke,[3] especially in low-income and middle-income countries, is a cause for concern.[1,2] Cost-effective interventions at the primary care level that have the potential to reduce cardiovascular risk in the population, for example, information, education, and communication (IEC) can have a substantial impact on stroke burden. Hence, a need was felt to have a novel, low-cost, comprehensive, workable, and feasible model for stroke prevention in primary care which could be implemented. A study was planned to assess if IEC intervention could be used to address risk factors for stroke among attendees of primary care in Western India.

MATERIALS AND METHODS

Study design and setting

This is a cross-sectional study of the patients coming to primary care for general medical (e.g., B.P./Sugar) check-up under the National Programme for Prevention and Control of Cancer, Diabetes, Cardiovascular Diseases, and Stroke Program ($n = 325$) in Western India ($n = 215$).

For the purpose of the study, initial interaction was done with 325 patients, of which 215 patients agreed to be part of the study.

Questionnaire

Semi-structured knowledge, attitude, and practice (KAP) questionnaire was administered to all participants, and baseline and end-line details of patients, namely, demographic information, diagnosis of hypertension and diabetes, stroke, and coronary artery disease were noted from written medical records. A questionnaire (Hindi) was constructed and consisted of 20 questions (Knowledge = 7; Attitude = 5; and Practice = 8) related to basic information related to stroke, its risk factors, and prevention.

Assessment

Body mass index (BMI), waist-to-hip ratio was taken before and after the completion of the study which lasted for 16 weeks (October–January 2022).

IEC module

Predesigned IEC intervention module was administered to all participants before and after the study about stroke, risk factors, and its prevention.

1. Health education about the nature of stroke and its risk factors was imparted to study participants, along with counseling related to lifestyle factors linked to stroke. Lifestyle factors, for example, quitting smoking, reducing alcohol intake, and adopting physical activities (e.g., walking/yoga) were suggested *ad libitum*. A minimum period of 30–60 min daily was suggested however
2. Counseling was given to the group of 4–6 subjects, in a single setting, and lasted for about 10 min each session. A reinforcement telephonic call was given to participants at fortnightly intervals
3. If the patient was already on medications, then psychoeducation about the need for taking regular medications was emphasized. The study flow is given in Figure 1.

Ethics

A written and informed consent was taken from all study participants and the study was approved by the Institutional Ethics Committee ICMR-NIIRNCD, Jodhpur (Rajasthan).

Statistics

Comparison of before and after KAP scores, BMI, was done using paired t-test. The chi-square test of proportion was used to compare the compliance before and after the intervention.

RESULTS

A total of 215 participants (M: F = 85:130; mean age = 51.66 ± 13.32 years) were enrolled for a period 16 weeks. Break up of risk factors in the present study is given in Table 1. Main reasons for visiting the primary health care center were for getting blood pressure and sugar checked (84.15%), fever, cough/cold (6%), and miscellaneous (9%). The majority of the patients were educated till the undergraduate level (65%), 25% were illiterate, and 20% consisted of graduates or above. Hypertension and diabetes were major diseases for which consultation was sought at the primary care level (47% and 33%, respectively).

Before and after comparison of means of KAP score in the present study was done and results indicated that there was a statistically significant difference between before and after groups (62.23 ± 19.73 vs. 75.32 ± 13.03; $P \leq 0.0001$). Diabetes and hypertension were the main cardiovascular risk factors in the present study group.

Change in waist-to-hip ratio occurred in the present study from baseline 0.91–0.9 in the present study with statistically
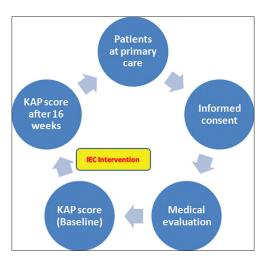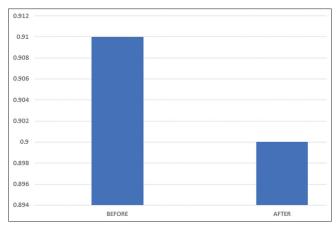

Figure 1: Study flow.

Figure 2: Change in waist-to-hip ratio.

significant results ($P \leq 0.001$; Figure 2). Comparison of the proportion of patients taking antihypertensives before and after the 16 weeks of IEC intervention [Figure 3] had a significant effect ($P \leq 0.05$). BMI comparison changed marginally (26.5 ± 4.7 vs. 26.2 ± 4.5) before and after but was not significant ($P \geq 0.05$). Comparison of the proportion of patients taking antihypertensives before and after IEC intervention was statistically significant ($P < 0.05$). Overall, the intervention was found to be feasible and acceptable by the majority (215/325; 66.15%). Blood sugar (Fasting) showed a decline from 144 ± 73 mg/dL to 124 ± 58 mg/dL ($P = 0.01$). KAP scores improved significantly in before and after groups [Figure 4].

DISCUSSION

The present study reports improvement in KAP scores (before and after comparison) regarding stroke prevention in primary care. Change of waist-to-hip ratio occurred from baseline and comparison of the proportion of patients taking antihypertensives before and after IEC intervention was statistically significant. BMI comparison changed marginally but was not statistically significant.

Rising burden of stroke-related disability

Costs of stroke care are rising providing the impetus to direct our research focus toward effective measures of

stroke prevention in primary care[3] but studies focusing on prevention in primary care are virtually non-existent. Effective tobacco control, lifestyle changes, for example, physical activities, salt reduction, and other dietary interventions (reduced high sugar/fat consumption), and controlling blood pressure and diabetes are effective in the primary prevention of stroke, but the implementation of the same in primary care[4] is challenging.

Stroke prevention[5,6]

Developing cost-effective stroke prevention models for primary care is a priority for stroke prevention. Stroke prevention programs involving community health workers in rural areas in health have the potential to be effective in lower- and middle-income countries like India, particularly for tobacco cessation, blood pressure, and diabetes control.[4]

A study from central India from 24 districts showed critical gaps in key items required for the management of non-communicable diseases in primary care. The increasing burden of non-communicable diseases such as hypertension[5] and diabetes mellitus necessitates public health response through health systems.[6]

Over two decades ago, it was suggested that it is important to prohibit tobacco use and adjust dietary habits to control body

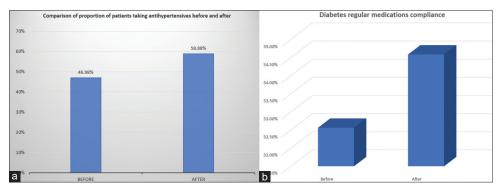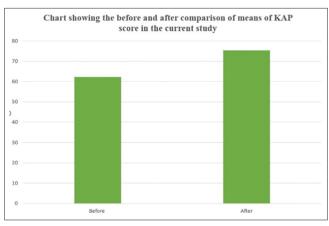| Table 1: Clinical and demographic characteristics of the study subjects.			
Mean age±SD		51.66±13.32 years	
Hypertension		26.7%	
Diabetes		32.5%	
History of stroke		1.39%	
Coronary artery disease		7.4%	
KAP scores	**Before**	**After**	*P-value*
	62.23±19.73	75.32±13.03	≤0.0001 Statistically significant
Waist-to-hip ratio	0.91	0.9	≤0.05 Statistically significant
Body mass index	26.5±4.7	26.2±4.5	≥0.05 Not statistically significant
KAP: Knowledge, attitude, and practice, SD: Standard deviation			

Figure 3: (a and b) Change in compliance to anti-hypertensive (a) and anti-diabetic medications (b) after 16 weeks of intervention.

Figure 4: Change in knowledge, attitude, and practice score in the present study before and after.

weight and associated conditions such as diabetes mellitus for primary prevention of stroke.[7] In a similar study addressing the tobacco cessation, it has been envisioned that about half of the cardiovascular diseases are attributable to smoking. In the present study, primary prevention addressing risk factors, for example, smoking cessation was attempted.[8] In fact, it has been suggested that non-communicable disease clinics could be used for tobacco cessation.[9]

A proposed trial in 20 villages in Tibet and 20 villages in Haryana, India will train community health workers to manage and follow-up high-risk patients on a monthly basis.[10] Similar study involving 120 villages in China[11] and Tanzania is underway.[12]

The highest age-standardized stroke-related mortality and DALY rates were in the low-income group.[13] It has been realized that the stroke burden cannot be effectively halted and reversed without effective and widely implemented primordial and primary stroke prevention measures.[14,15] India is likely to suffer a huge social and economic burden in the rehabilitation of stroke patients due to increased life expectancy and urbanization.[16] A stroke mortality reduction approach is being developed.[16]

Stroke preventive strategies[17,18]

Although the use of educational activities[17] in post-stroke period has been tried;[18] to the best of our knowledge, this is the first study that shows the use of information, education, and awareness activities in improving risk factors and knowledge regarding preventing them in primary care.

For preventing stroke in general, two major strategies have been proposed, that is, high-risk strategy or population-level strategy.[2] In the high-risk strategy, those at higher risk of developing the disease are identified e.g., hypertension and diabetes.[19,20] Individual may not have a specific disease or health condition, for example, hypertension or diabetes but

may have higher risk such as pre-hypertension or smoking.[21] *In population-level strategy*, lifestyle change is suggested. Simple interventions such as reduced salt consumption, increase fruits and vegetable intake, increased physical activity, weight loss, reduced alcohol intake, and managing psychosocial stress could be important in reducing overall cardiovascular risk.[22,23] A recent cluster randomized trial from Nepal showed the feasibility of lifestyle change implemented through community health workers in reducing blood pressure.[24]

Mean age of individuals enrolled in the present study was 51.66 ± 13.32 years; indicating, the right target group to address stroke prevention in the present study. This is because stroke occurs 15 years earlier in lower- and middle-income countries compared to high-income countries.[24]

Policy implications

Current work assumes public health significance due to the rising number of cases of stroke in India, and also in light of the World Stroke Organization international survey which showed that recommended primary prevention activities are being done only in one-third of the 82 countries studied. Furthermore, important is the fact that aspirin, the mainstay for secondary stroke prevention may not be beneficial for primary prevention of stroke.

CONCLUSION

There was a statistically significant difference in the KAP scores regarding risk factors for stroke prevention among those attending Primary Health Center for a general health check-up before and after the study period. There was an increase in the proportion of patients taking anti-hypertensive drugs before and after the intervention. IEC intervention appears to be a low-cost, feasible, and acceptable implementation model for addressing risk factors for stroke in primary care in India.

Declaration of patient consent

The Institutional Review Board (IRB) permission was obtained for the study.

Conflicts of interest

There are no conflicts of interest.

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