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EFFECT OF SOCIOECONOMIC FACTORS ON RISK OF STROKE

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ABSTRACT

Objectives: To studythe effects of socioeconomic status on risk of stroke in patients admitted to tertiary care hospitals.

Methodology: This was a case control study done in tertiary care hospitals of Peshawar. We recruited 100 cases and 200 controls - two controls for every case. Cases were patients of any age and both sexes admitted with first ever stroke and controls were selected from hospital and community. We conducted a face to face interview using a structured questionnaire. Demographics features included age, gender, socioeconomic status were recorded. Anthropometric measurements were noted.

Results:Mean age of cases was 66.9±3.5 years and controls 65.1±14.5 years. Advanced age was found to be significantly associated with risk of stroke ($p \leq 0.01$). Males were 70 % in cases and 56% in control groups ($p \leq .019$). Being a male was significantly associated with risk of stroke. Socioeconomic status was divided into three groups.In the lowest income group (Rs.1000- 20,000) 83% were cases and 68% were the control. Low Socioeconomic status was significantly associated with risk of stroke ($p \leq 0.02$). Education was categorized into three groups. The group with lowest level of education(0-5 grade) had 72% cases and 58%controls. Education was significantly associated with risk of stroke ($p \leq 0.010$). Among cases 66% belonged to rural areas and among controls 56% in controls. However this was not significantly associated with risk of stroke ($p \leq 0.096$) CI 95%.

Conclusion: This case control study shows that advanced age, male gender, low socioeconomic status and low education level are significantly associated with risk of stroke.

Key Words: Stroke, Risk factors, Socioeconomic status, Education, Male

INTRODUCTION

Stroke is the second leading cause of death worldwide. It is the leading cause of acquired disability in adult population. More than 16 million people suffer from acute stroke every year.[1] Over 80% survive the acute insult but most victims unfortunately are left with long term neurological deficit making stroke an important cause of morbidity.[1]

The incidence of stroke is declining in the West, perhaps due to better understanding and awareness of its risk factors. However it is on the rise in most of the Asian countries especially South Asia.[2] Countries of low and middle income have the largest burden of stroke, accounting for more than 85% of stroke mortality in the world. However few reliable data are available to identify risk factors for stroke in most of this region.[3]

The emergence of vascular diseases in developing countries has been attributed to changes in the demographic structure of the population as well as to epidemiological transitions.[4] The important issue with these transitions in developing countries is that the decline in infectious diseases is far outweighed by the rapid increase in chronic diseases.[5] Therefore, these countries are experiencing high rates of both infectious and chronic diseases[5].

According to World Health Organization (WHO) in Pakistan, total mortality due to stroke in 2002 was 78,512.[6] By 2020, stroke mortality will have almost doubled mainly as a result of increase in the proportion of older people and the future affects of current smoking patterns in developing countries.[6] Stroke is a huge burden on economy in terms of expenditure and treatment as well as disability associated with it, which translates into waste of precious man-hours, especially for developing countries[6].

In most of the urban cities the risk factors for stroke are similar to those experienced in the western countries. Nevertheless the risk factors may be quite different among the poverty stricken and uneducated population of the developing countries. So besides conventional risk factors for stroke, other factors like poor socioeconomic status and illiteracy need to be identified and studied in details.[7]

The public sector hospitals of Peshawar cater to health needs of patients not only from KPK but also neighboring Afghanistan and Northern Punjab. Patients admitted usually belong to poor or middle income segments of the society. As a few studies on risk factors of stroke have been done in this part of the country and inadequate reliable data is available. The aim of the study is to determine the effects of socioeconomic status on the risk of stroke in patients admitted to tertiary care hospitals in Peshawar. Besides looking at the conventional risk factors we aimed to see the affects of socioeconomic status and education on risk of stroke.

METHODOLOGY

This Case-Control study was conducted in Lady Reading Hospital, Khyber Teaching Hospital, Hayatabad Medical Complex Peshawar - Pakistan from October to December 2011. Sample size was calculated according to WHO formula for this type of study. Sampling technique adopted was convenience sampling. We recruited 100 cases and 200 controls for this study - two controls for every case.We selected patients as cases presenting with stroke admitted to neurology and medical units of these hospitals. Cases were patients of any age and both sexes admitted with first ever stroke and controls were selected from hospital and community. Cases were admitted to hospital with stroke, characterized by rapidly developing clinical symptoms and/or signs lasting for 24 hours. For patients unable to communicate sufficiently to complete the study questionnaire, proxy respondents were used. We defined a valid proxy respondent as a spouse or first-degree relative who is living in the same home or was aware of the participant's previous medical history and present treatments. Controls were based in hospital or the community, and with no history of stroke. Those selected from the community were relatives or attendants of the patient. Hospital based controls were patients selected from units with disease unrelated to stroke and its risk factors.

The study was approved by the ethical committee of Postgraduate Medical Institute, Lady Reading Hospital, Peshawar.

The demographic variables included were age, gender, place of residence, education, family history of stroke and socioeconomic status. A detailed neurological and physical examination was done on cases and controls. Anthropometric measurements were recorded. Statistical analysis was done with SPSS version 16.

Sample Size estimation: Sample size was calculated using WHO formula Confidence level (1%) $1-\alpha = 95\ \%$

Relative precision = 0.30

Anticipated probability of exposure given disease = P_1 0.35

Anticipated probability of exposure given no disease = P_2 0.30

Anticipated Odds ratio = 1.25

Sample size n = 277

$$n = \frac{z^2 1-\alpha/2}{\log_e (1-\alpha)^2 P_1 (1-P_1)} \left(\frac{1+1}{P_2 (1-P_2)} \right)$$

Data was entered by two independent individuals and checked twice before analysis. Descriptive statistics was computed for all variables, including frequencies and percentages.Level of significance was ≤0.05 with 95% confidence interval.A study size of 300 respondents with 100 case and 200 controls was analyzed. Mean, median were calculated to summarize continuous variables and standard deviation were done for each. The continuous variables were compared with *t* test and chi square test was used for categorical data for comparison of two independent proportions.

RESULTS

For cases and controls the mean age was 57.11 with SD±14.48years.The mean age for cases 66.9±13.5 SD years. Age of controls was 55 18±14.5 SD years. Advanced age was found to be significantly associated with risk of stroke at (p≺0.01) at 95% CI. There were 60.7% males and 39.3% females among the respondents. Cases were 70% males and controls were 56% males. Male gender was significantly associated with risk of stroke (p≺.019) CI 95% (Figure 1). There were 66% cases and 56% controls belonging torural areas. The rest of 34% cases and 44% controls resided in urban areas. However this was not significantly associated with risk of stroke (p≤0.096) CI 95%. The lowest income group (less Rs 5000) had the highest percentage of 73% in both cases and controls. The cases had 83% belonging to the lowest strata of SES and there were 68% among the controls. Low Socioeconomic status was significantly associated with risk of stroke (p≤0.022) CI 95%.There were 35.3% respondents with personal income and 64.7% had household income. Cases were 30% in the personal income group and controls were 38% in this group. (p≤0 .17) CI 95% (Figure 2). Education was analyzed as continuous and categorical variable. The group with 0-5 grade was 62.7% among the respondents and 75.5% had below 10th grade of schooling. Among the cases 78% belonged to the group with minimum education and among controls this group was 58%. Education was significantly associated with risk of stroke.(p≺0.010) at 95% CI (Figure 3). Family history of stroke was found in 16.7% of the respondents. Among cases 18% had a family history and among the controls 16% had appositive family history. This was however not significantly associated with risk of stroke (p >0 .66) CI 95%.

Figure 1: Gender

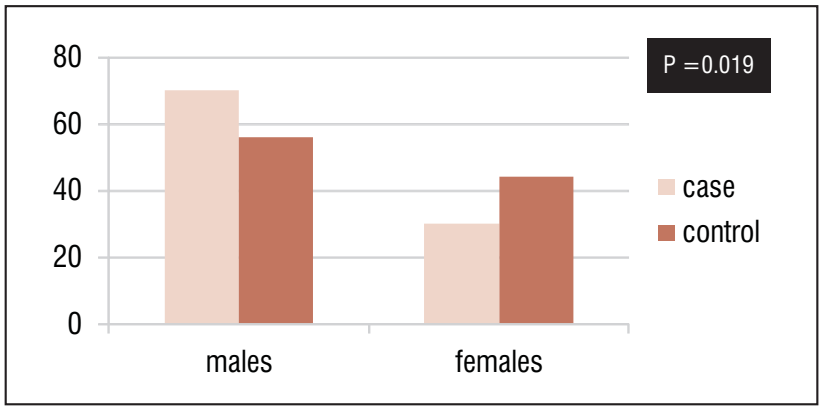


Figure 2: Socioeconomic Status

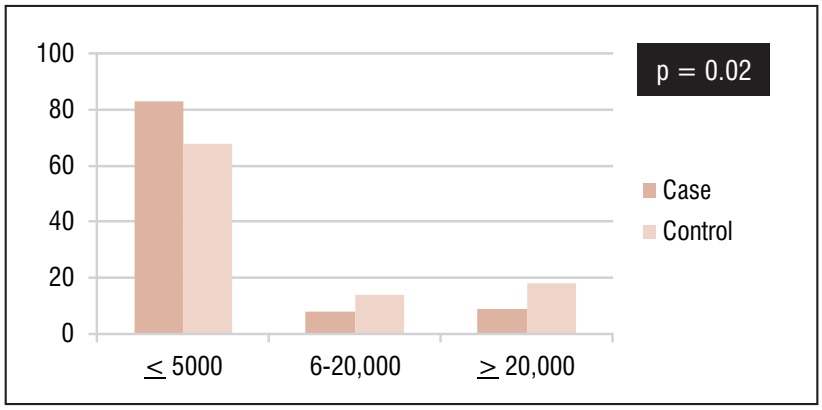
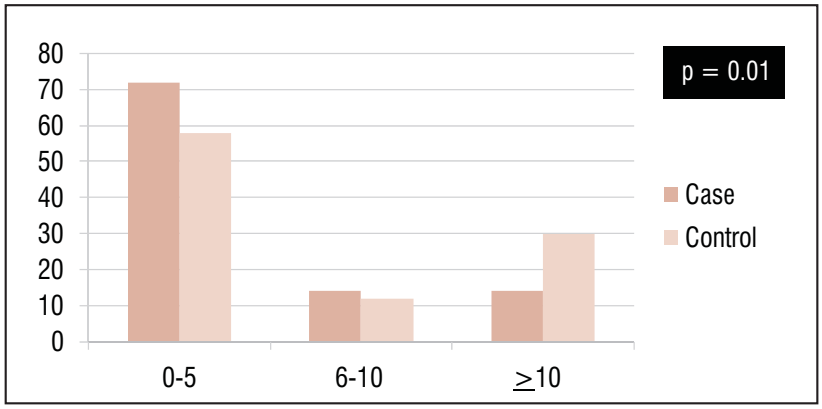


Figure 3: Education



DISCUSSION

This study is one of the few analytical case control studies on risk factors for stroke in the province of KPK. Stroke is a leading cause of mortality and morbidity in the developing countries. Countries of low and middle income have the largest burden of stroke, accounting for more than 85% of stroke mortality worldwide4. In Pakistan data on stroke prevalence and its risk factors is limited.

The relationship of Poverty and stroke was studied in India by Jeyaraj D et al.[7] In developed countries, the predominant health problems are those lifestyle-related illnesses associated with increased wealth. In contrast, diseases occurring in developing countries can largely be attributed to poverty, poor healthcare infrastructure, and limited access to care. However, many developing countries have undergone economic and demographic growth in recent years resulting in a transition from diseases caused by poverty toward chronic, non-communicable, lifestyle-related diseases. Despite this recent rapid economic growth, a large proportion of the population lives in poverty. Although risk factors for stroke in urban populations are similar to developed nations, it is likely that they may be quite different among those afflicted by poverty.[7]

Data on prevalence of vascular risk factors in poor population (living ⩽1$/ day) of Pakistan is not adequate. It is possible that pattern of risk factors in poor strata of the society is different from what is observed in more rich and urbanized population.

There is evidence that fetal and early postnatal nutrition are associated with increase in CHD, stroke, and type 2 diabetes[8]. All of these have been shown to be increased in low birth weight babies. Low Socioeconomic status is related with carotid intima media thickness as well as many risk factors for stroke including diabetes, smoking, lack of physical activity, hypertension, and diet[9-10]. A hospital based study among young stroke patients(45years) in South India showed that high prevalence of systolic hypertension, smoking, high fasting glucose levels, and lower HDL levels[11]. Presence of metabolic syndrome was associated with increased risk of stroke when compared to both community and hospital based controls[11].

In another hospital based case control study in Nagpur, India showed high prevalence of hypertension, high cholesterol level, use of anticoagulants/anti platelets use and history of TIA's to be associated with increased risk of stroke[12]A population based study of middle aged men and women in Sweden showed that low SES was associated with increased incidence of stroke.[13]

Another study reviewed the current evidence of association SES and incidence of stroke, survival, mortality and other outcomes. The evidence is strongest for mortality and incidence of stroke, with high rates of stroke in low socioeconomic groups being a consistent finding. Low socioeconomic groups also have lower survival and greater stroke severity than high socioeconomic groups, although there is less evidence for this association. The mechanisms through which socioeconomic status affects stroke risk and outcomes are unclear but some studies report that differences in risk-factor prevalence could account for some of the variation.[14]

A study done in Pakistan shows high prevalence of risk factors in the population.Most of them belonged to low socioeconomic status and almost 50% were having family history of stroke. Most of the patients had multiple risk factors which included: hypertension (65%), smoking (32%), diabetes mellitus (36.3%), dyslipidemia (32.7%), coronary artery disease (9%), obesity (18%), epilepsy (16.3%) and left ventricular hypertrophy (3.6%).[15]

Our study results are consistent with those done elsewhere in the world. It is important to know that in underdeveloped countries like Pakistan, the risk factors for stroke in urban population might be similar to the developed nations. However in poor population living mostly in rural area, the

risk factors might be high rates of infections like tuberculosis and cerebral malaria[16].There is evidence that fetal and early postnatal undernutrition may be associated with health outcomes such as coronary heart disease, stroke, type 2 diabetes, and the metabolic syndrome, all of which have been shown to be increased in low-birth-weight babies.[16]

In present study the effects of poor socioeconomic status were similar to what has been shown in other studies done in the under developed world. The effect of poor SES however needs to be researched and explored further.

CONCLUSION

This case control study shows that advanced age, male gender, low socioeconomic status, lack of education are significantly associated with risk of stroke.

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