Effect of smoking on serum lipid profile amongst stroke patients: A descriptive study from Dhaka, Bangladesh

Habib N1*, Rashid M2, Afzal F3, Roy B4, Tahmina A5

ABSTRACT

Background
Stroke causes death and disability, has an emotional and economic impact on patients, families, and society. The present study was undertaken to compare the serum lipids levels in adult male smokers and nonsmoker stroke patients.

Material and methods
The participants were selected from indoor medicine units of Dhaka Medical College and Hospital, Dhaka, Bangladesh. A total number of 105 stroke patients age >20 years were selected, of whom, 30 were non-smokers and 75 were smokers.

Results
TC, TG, LDL-C is significantly higher in the smoker stroke patients comparing non-smokers. Serum HDL is significantly higher in non-smokers.

Conclusion
Serum lipid profile is altered in smokers, which increases the risk of stroke and other cardiovascular disorders, so intense awareness program about adverse health events of smoking should be considered by all means including the social media campaign and implementation of its importance to the curriculum.

Keywords
Dhaka, patients, serum lipid, smoker, stroke
Introduction
Stroke causes death and disability, has an emotional and economic impact on patients, families, and society. The present study was undertaken to compare the serum lipids levels in adult male smokers and nonsmoker stroke patients. It is the major cause of hospitalization; prolong disability and mortality in many populations. It is estimated that stroke affects 33 million individuals worldwide each year and developing countries are the hotspot; comprising two-thirds of it. [1] Smoking is a leading cause of coronary heart disorders, atherosclerosis, and stroke. Smoking changes rate pressure product (RPP), heart rate and alters lipid profile. [2, 3] Beedis are especially popular amongst rural and lower income group. In June 2005, the anti-smoking law was launched in Bangladesh. In spite of that, smoking is a common problem and a major health problem associated with morbidity and mortality. Plasma lipoprotein metabolism is strongly influenced by cigarette smoking. [4] Smoking increases serum cholesterol, triglycerides (TG), very low density lipoprotein cholesterol (VLDL), and low density lipoprotein cholesterol (LDL-C) and lower serum concentrations of high density lipoprotein cholesterol (HDL-C) and apolipoprotein AI as compared to nonsmokers. Increased serum cholesterol in smokers increases the risk by 9%. Furthermore, the dose-response effect of smoking on serum cholesterol concentration suggests a gradient of increased absolute risk of coronary artery disease between light and heavy smokers. [5] Smoking causes oxidation of LDL particles, increases triglycerides and a decrease of HDL-C, mostly due to HDL, subfraction diminution. [6] Cigarette smoking also causes reduced circulation by narrowing the blood vessels and development of a peripheral vascular disease.

The present study was undertaken to compare the serum lipids levels in adult male smokers and nonsmoker stroke patients in a tertiary care hospital in Bangladesh.

Material and methods
Study Period
The present study was undertaken in the Dhaka Medical College and Hospital, Dhaka, Bangladesh, during the period of 2012 – 2014.

Study design and the participants
Patients from indoor medicine units of Dhaka Medical College and Hospital, Dhaka, Bangladesh were selected for this study. A total number of 105 stroke patients age >20 years were divided into two groups; group A consisting of 30 non-smokers and group B, 75 smokers (smoking>5 years). Smoking history was recorded on a data collection sheet. Prior to the experiment, the aims and objectives were explained to the subjects. Written consent was taken from each of the participants. A detailed history of each subject including smoking history was obtained by using a pretested questionnaire.

Outcome variable
Outcome variables were serum lipid profile parameters - total cholesterol, triglyceride LDL-C, and HDL-C.

Response Rate
Out of 120 participants, 105 were selected by interview and filled the questionnaire correctly giving an overall response rate of 87.5%

Explanatory variables
The demographic factors were defined at the individual level. Factors at individual level were age, gender etc.
Ethical committee approval
The present study was approved by the Institutional ethical committee. Informed consent was obtained from the participants. This research is performed in accordance with the latest version of the Declaration of Helsinki.

Data management and statistical analysis
Collected data were checked, verified, for consistency to reduce error. Data were analyzed by Statistical Package for the Social Sciences (SPSS) for Windows Version 17.0 (SPSS Inc; Chicago, IL, USA). Student’s t-test was performed to examine the association between different variables. P < 0.05 is considered as statistically significant.

Results
In the present study, most of the subjects smoked the cigarette (97.3%) followed by Beedi (2.7%). Mean duration of smoking was 13.01± 6.52 years. Mean per day smoked was 14.59± 6.87 SD sticks.

The age of smoker stroke patient was 62.61±15.803 years (mean±SD). According to the residence, urban (53.3%), rural (20.0%) and slum (26.7%). The level of education was primary (28.0%), secondary (40.0%), higher education (20.0%), illiterate (5.3%), others (6.7%). The major occupations were business (12.0%), labour (12.0%), farmer (53.3%), housewife (1.3%) and service (21.3%). Amongst the smokers, 97.3% consumed cigarette, remaining 2.7% consumed beedi.

Table 1: Serum lipid profile amongst smoker and non smoker stroke patients (mean±SD)

<table>
<thead>
<tr>
<th></th>
<th>Total cholesterol</th>
<th>Triglyceride</th>
<th>LDL-C</th>
<th>HDL-C</th>
</tr>
</thead>
<tbody>
<tr>
<td>Group A</td>
<td>5.20±1.02</td>
<td>0.62±0.11</td>
<td>2.41±0.31</td>
<td>0.97±0.11</td>
</tr>
<tr>
<td>(Nonsmoker)</td>
<td>N=30</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Group B</td>
<td>7.21±1.43</td>
<td>3.75±1.35</td>
<td>4.06±0.13</td>
<td>0.70±0.03</td>
</tr>
<tr>
<td>(Smoker)</td>
<td>N=75</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>P Value</td>
<td>0.020*</td>
<td>0.002†</td>
<td>0.001†</td>
<td>0.002†</td>
</tr>
<tr>
<td>P&lt;0.05</td>
<td>P&lt;0.01</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 1 expedites that TC, TG and LDL C is significantly higher in the smoker stroke patients comparing non smokers. Serum HDL is significantly higher in non smokers.

Discussion
Smoking is considered as a major risk factor for SAH (Subarachnoid Hemorrhage) with a relative risk about 3 and for cerebral infarction relative risk about 2.0. Sustained risk of stroke is observed even after quitting smoking habit and passive smokers are worst affected. [11, 12]

Conclusion
Abnormalities in lipid profile are directly correlated with smoking in this study. Further studies are required to establish the comparison of other biochemical parameters. So our research outcome is a clear message for the policymakers to amend a firm law to prohibit smoking in the public places, to reduce the passive smokers in the community. Intense awareness program needs to be implemented through all means including the social media campaign and the implementation of its importance to the curriculum.
Abbreviations
Free fatty acids (FFA), high density lipoprotein cholesterol (HDL-C), low density lipoprotein cholesterol (LDL-C), triglycerides (TG), very low density lipoprotein cholesterol (VLDL)

Acknowledgments
Authors are thankful to the patients for their cooperation and the hospital authority for giving permission to conduct this research.

Authors’ contribution
Conceptualization was done by NH, MR, FA, BR and AT. Data curation was done by NH, MR and AT. NH, MR, FA, BR, AT did the formal analysis. Investigation was done by NH, MR, FA and AT. Project administration by NH, MR, BR, FA and AT. Resources by NH, MR, FA, BR, AT.

Competing interests
The authors declare no conflicts of interest.

Limitations & future scope of the study
The present study was confined to males and they were belonging from same geographical area.

Publisher’s Note
NHRWS remains neutral with regard to jurisdictional claims in published maps and institutional affiliations. The publisher shall not be legally responsible for any types of loss, actions, claims, proceedings, demand or costs or damages whatsoever or howsoever caused arising directly or indirectly in connection with or arising out of the use of this material.

References
10. Sathian B, Sreedharan J, Banerjee I, Roy B. Simple sample size calculator for medical research: a necessary tool for the researchers. Medical Science. 2014; 2(3): 141-44. DOI: https://doi.org/10.29387/ms.2014.2.3.141-144

