

Smokeless tobacco and coronary heart disease: risks among non-smokers in Bangladesh

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TABLE OF CONTENTS

| | |
|---|----|
| LIST OF TABLES..... | 11 |
| LIST OF FIGURES..... | 14 |
| THESIS ABSTRACT | 15 |
| DECLARATION..... | 19 |
| LIST OF PUBLICATIONS CONTRIBUTING TO THIS THESIS | 21 |
| LIST OF CONFERENCE PRESENTATIONS ARISING FROM THIS THESIS | 23 |
| LIST OF AWARDS/SCHOLARSHIPS RECEIVED..... | 25 |
| ACKNOWLEDGEMENTS | 27 |
| ABBREVIATIONS | 30 |
| CHAPTER 1 | 32 |
| <i>Background</i> | 32 |
| Chapter outline | 33 |
| 1.1. Introduction..... | 33 |
| 1.1.1. Smokeless tobacco..... | 33 |
| 1.1.2. Coronary heart disease..... | 34 |
| 1.1.3. Smokeless tobacco and coronary heart disease..... | 34 |
| 1.1.4. Bangladesh context..... | 35 |
| 1.1.5. Scope of further study | 36 |
| 1.2. Research questions and objectives | 37 |
| 1.2.1. Research questions | 37 |
| 1.2.2. Research Objectives | 37 |
| 1.3. Justification for the study | 38 |

| | |
|--|-----------|
| 1.3.1. Rationale for studying SLT | 38 |
| 1.3.2. Rationale for studying SLT and CHD | 42 |
| 1.3.3. Rationale for a study in Bangladesh..... | 43 |
| 1.3.4. Methodological constraints of earlier studies | 46 |
| 1.4. Thesis outline | 48 |
| CHAPTER 2 | 52 |
| <i>A systematic review of epidemiological studies on the association between smokeless tobacco use and coronary heart disease.....</i> | <i>52</i> |
| Chapter outline | 53 |
| Rationale for developing this manuscript | 53 |
| Rationale for choosing <i>Journal of Public Health and Epidemiology</i> | 54 |
| Authors' contributions | 54 |
| Statement of authorship | 55 |
| Abstract | 58 |
| Introduction..... | 59 |
| Methods..... | 61 |
| Results..... | 65 |
| Characteristics of the included studies..... | 65 |
| Analysis of the Western studies | 68 |
| Analysis of the South Asian studies | 69 |
| Analysis of the Global study..... | 70 |
| Quality level of the selected studies..... | 70 |
| Discussion | 79 |
| Conclusion..... | 82 |
| CHAPTER 3..... | 83 |

| | |
|---|-----|
| <i>Is there any association between use of smokeless tobacco products and coronary heart disease in Bangladesh?</i> | 83 |
| Chapter outline | 84 |
| Rationale for developing this manuscript | 85 |
| Rationale for choosing <i>PLoS One</i> | 85 |
| Authors' contributions | 85 |
| Statement of authorship | 86 |
| Abstract | 89 |
| Introduction..... | 91 |
| Methods..... | 93 |
| Ethics statement | 93 |
| Study design and study sites | 93 |
| Study population | 94 |
| CHD cases..... | 94 |
| Community controls | 94 |
| Hospital controls | 95 |
| Cases and controls re-classified by the Rose Angina Questionnaire (RAQ).. | 96 |
| Sample size | 96 |
| Study tool..... | 96 |
| Data collection | 97 |
| Laboratory analysis..... | 99 |
| Data analysis | 99 |
| Results..... | 100 |
| Study participants | 100 |
| Risk factors for CHD | 101 |
| Nicotine content of the SLT products | 101 |

| | |
|---|-----|
| Use of SLT products | 103 |
| Association between SLT use and CHD | 103 |
| Discussion | 105 |
| CHAPTER 4..... | 115 |
| <i>Why do Bangladeshi people use smokeless tobacco products?</i> | 115 |
| Chapter outline | 116 |
| Rationale for developing this manuscript | 116 |
| Rationale for choosing <i>Asia Pacific Journal of Public Health</i> | 117 |
| Authors' contributions | 117 |
| Statement of authorship | 118 |
| Abstract | 121 |
| Introduction..... | 122 |
| Methods..... | 123 |
| Study design and study sites | 123 |
| Study population | 124 |
| Sample size | 124 |
| Data collection | 124 |
| Socio-demographic variables..... | 124 |
| Use of SLT products | 125 |
| Perceptions of SLT use..... | 125 |
| Data analysis | 126 |
| Results..... | 126 |
| Study participants | 126 |
| Use of SLT products | 128 |
| Comparing socio-demographic variables between SLT users and SLT non- users | 129 |

| | |
|--|-----|
| Perceptions of SLT use..... | 129 |
| Discussion | 135 |
| Conclusions | 139 |
| CHAPTER 5..... | 140 |
| <i>Hospital controls vs. community controls: choice for a case-control study in Bangladesh</i> | 140 |
| Chapter outline | 141 |
| Rationale for developing this manuscript | 141 |
| Rationale for choosing <i>Epidemiologic Perspectives and Innovations</i> journal | 142 |
| Authors' contributions | 142 |
| Statement of authorship | 143 |
| Abstract | 146 |
| Introduction..... | 148 |
| Methods..... | 150 |
| Study settings | 150 |
| Study population | 151 |
| Data collection | 152 |
| Sample size | 154 |
| Data analysis | 154 |
| Ethics | 155 |
| Results..... | 155 |
| Study participants | 155 |
| Socio-demographic variables..... | 155 |
| Risk factors for CHD | 156 |
| Use of SLT products | 156 |

| | |
|---|-----|
| Discussion | 161 |
| Conclusions | 164 |
| CHAPTER 6 | 166 |
| <i>Rose Angina Questionnaire: validation with cardiologists' diagnoses to detect coronary heart disease in Bangladesh</i> | 166 |
| Chapter outline | 167 |
| Rationale for developing this manuscript | 167 |
| Rationale for choosing <i>The Southeast Asian Journal of Tropical Medicine and Public Health</i> | 168 |
| Authors' contributions | 168 |
| Statement of authorship | 169 |
| Abstract | 172 |
| Introduction | 173 |
| Methods | 175 |
| Study settings | 175 |
| Study participants | 176 |
| CHD positive [cardiologists] individuals | 176 |
| CHD negative [cardiologists] individuals | 176 |
| CHD positive [RAQ] and CHD negative [RAQ] individuals | 177 |
| Data collection | 177 |
| Data analysis | 180 |
| Ethics statement | 180 |
| Results | 181 |
| Study participants | 181 |
| Utility of the RAQ to detect CHD | 185 |
| Discussion | 188 |

| | |
|---|-----|
| CHAPTER 7 | 195 |
| <i>Additional information: Methods</i> | 195 |
| Chapter outline | 196 |
| 7.1. Selection of study sites | 197 |
| 7.1.1. Health care context of Bangladesh | 197 |
| 7.1.2. Hospitals | 197 |
| 7.1.3. Communities | 200 |
| 7.1.4. Collaboration | 200 |
| 7.2. Selection of study participants | 201 |
| 7.2.1. Identifying CHD cases..... | 201 |
| 7.2.2. Identifying community controls..... | 202 |
| 7.2.3. Identifying hospital controls..... | 203 |
| 7.2.4. Interviewing cases and controls | 204 |
| 7.2.5. Exclusion criteria | 204 |
| 7.3. Study period | 205 |
| 7.4. Study questionnaire | 205 |
| 7.4.1. Screening questionnaire | 205 |
| 7.4.2. Socio-demographic questionnaire..... | 207 |
| 7.4.3. Questionnaire on risk factors for CHD..... | 208 |
| 7.4.4. Questionnaire on SLT use | 210 |
| 7.4.5. Questionnaire on perceptions of SLT use | 212 |
| 7.4.6. Rose Angina Questionnaire (RAQ) | 212 |
| 7.4.7. Translation of the questionnaire | 214 |
| 7.5. Selection and training of data collectors | 215 |
| 7.6. Pilot study and finalising the study questionnaire | 217 |
| 7.7. Quality control..... | 217 |

| | |
|--|-----|
| 7.8. Data management | 218 |
| 7.9. Laboratory analysis of SLT products | 219 |
| 7.9.1. SLT market survey | 219 |
| 7.9.2. Nicotine analysis of selected SLT products..... | 220 |
| 7.10. Data analysis | 221 |
| 7.11. Ethical issues..... | 223 |
| 7.11.1. Consent for the interviews..... | 223 |
| 7.11.2. Confidentiality and privacy | 223 |
| 7.11.3. Other issues..... | 224 |
| CHAPTER 8..... | 225 |
| <i>Additional information: Results</i> | 225 |
| Chapter outline | 226 |
| 8.1. Non-response | 226 |
| 8.2. Dose-response relationship between SLT use and CHD..... | 226 |
| 8.2.1. Frequency and duration of each SLT used | 226 |
| 8.2.2. Dose-response relationship between SLT use and CHD..... | 228 |
| CHAPTER 9..... | 235 |
| <i>Conclusions</i> | 235 |
| Chapter outline | 236 |
| 9.1. Summary of the study findings | 236 |
| 9.2. Strengths of the study..... | 238 |
| 9.3. Limitations of the study | 241 |
| 9.4. Implications and recommendations | 243 |
| REFERENCES..... | 249 |
| APPENDICES | 268 |
| Appendix I: Study questionnaire in English | 269 |

| | |
|--|-----|
| Appendix II: Study questionnaire in Bengali | 282 |
| Appendix III: Ethics approval from Australia | 297 |
| Appendix IV: Ethics approval from Bangladesh..... | 299 |
| Appendix V: Signed statement of authorship..... | 300 |
| Appendix VI: Updated list of publications | 306 |

LIST OF TABLES

| | |
|---|-----|
| Table 1: Summary of the Western studies exploring the association between coronary heart disease (CHD) and smokeless tobacco (SLT) use..... | 72 |
| Table 2: Summary of the studies using South Asian smokeless tobacco (SLT) products to explore the association between coronary heart disease (CHD) and smokeless tobacco (SLT) use | 77 |
| Table 3: Socio-demographic and risk factor variables for coronary heart disease (CHD) among the study participants | 102 |
| Table 4: Univariate and multivariate matched analysis showing the association between coronary heart disease and use of smokeless tobacco (by smoking status of the participants)..... | 108 |
| Table 5: Univariate and multivariate unmatched analysis showing the association between coronary heart disease and use of smokeless tobacco among the re-classified cases and controls by the Rose Angina Questionnaire (RAQ) | 109 |
| Table 6: Univariate and multivariate matched analysis showing the association between coronary heart disease and current use of different types of Bangladeshi smokeless tobacco (SLT) products (by smoking status of the participants) | 110 |
| Table 7: Socio-demographic characteristics of the study participants..... | 127 |
| Table 8: Status of smokeless tobacco (SLT) use among the study participants . | 128 |
| Table 9: Perceptions of smokeless tobacco (SLT) use among the study participants..... | 132 |
| Table 10: Experience of smokeless tobacco (SLT) users | 134 |

| | |
|---|-----|
| Table 11: Socio-demographic and risk factor variables for coronary heart disease (CHD) among the study participants | 158 |
| Table 12: Status of smokeless tobacco (SLT) use according to smoking exposure among the study participants | 159 |
| Table 13: Univariate and multivariate matched analysis showing association between coronary heart disease and use of smokeless tobacco, as well as association between smokeless tobacco use and choice of controls (by smoking status of the participants) | 160 |
| Table 14: Distribution of socio-demographic variables and risk factors for coronary heart disease (CHD) among the study participants..... | 183 |
| Table 15: Comparing coronary heart disease detection by the Rose Angina Questionnaire with diagnoses done by hospital cardiologists, Dhaka, Bangladesh | 185 |
| Table 16: Validation of the Rose Angina Questionnaire (RAQ) compared with cardiologist-diagnosis, according to types of cases, gender, age-groups and socio-economic status of the study population in Dhaka, Bangladesh | 187 |
| Table 17: Selection of the study participants..... | 229 |
| Table 18: Frequency and duration of each SLT product used by the study participants (exclusive users)..... | 230 |
| Table 19: Univariate and multivariate matched analysis showing the association between cumulative exposure (frequency and duration combined) of each smokeless tobacco (SLT) and coronary heart disease (cases vs. community controls) | 232 |
| Table 20: Univariate and multivariate matched analysis showing the association between cumulative exposure (frequency and duration combined) of each | |

smokeless tobacco (SLT) and coronary heart disease (cases vs. hospital controls)
.....233

Table 21: Univariate and multivariate matched analysis showing the association
between cumulative exposure (frequency and duration combined) of each
smokeless tobacco (SLT) and coronary heart disease (cases vs. both controls) 234

LIST OF FIGURES

| | |
|---|-----|
| Figure 1: Search strategy for selection of epidemiological studies exploring the association between coronary heart disease and smokeless tobacco use | 63 |
| Figure 2: Characteristics of the selected epidemiological studies exploring the association between coronary heart disease and smokeless tobacco use | 67 |
| Figure 3: Re-classification and analyses of cases and controls using the Rose Angina Questionnaire (RAQ)..... | 98 |
| Figure 4: Reclassification of cases and controls by the Rose Angina Questionnaire (RAQ)..... | 178 |

THESIS ABSTRACT

Background

Most epidemiological studies exploring the association between smokeless tobacco (SLT) use and coronary heart disease (CHD) have been in Western populations and have focused on the SLT products used in those countries. Studies from South Asia are limited and the results have been inconsistent. There is widespread use of SLT products in Bangladesh particularly associated with betel chewing, with a prevalence of 27% among the Bangladeshi adult population including urban and rural.

Objectives

- To determine whether there is an association between SLT use and CHD among non-smoking adults in Bangladesh.
- To explore the perceptions of Bangladeshi adults regarding health effects of SLT use.
- To assess whether hospital controls can be used in case-control studies with minimal bias, where resource constraints limit recruitment of community controls.
- To determine the utility of the Rose Angina Questionnaire (RAQ) for detecting CHD among Bangladeshi adults.

Methods

A case-control study of non-smoking adults aged 40-75 years, residing within Dhaka City Corporation areas, was conducted in 2010. Cases of CHD were selected from two cardiac hospitals. Controls were selected from both hospital and community settings. Cases were classified as incident cases (diagnosed within last one-year) of CHD if diagnosed as such by the hospital cardiologists.

Neighbourhood residents of the CHD cases, not known to have any cardiac disease, were selected as community controls. Hospital controls were those patients who attended cardiac outpatient departments, but on clinical examination were considered not to have CHD by attending cardiologists. Four community controls were matched to each case on age (± 5 years), gender, residential area and socioeconomic status. One hospital control was matched to each case on age and gender. A structured questionnaire was used for the case-control study and a semi-structured questionnaire was used to explore perceptions of SLT use. The RAQ was also used to re-classify cases and controls, and to validate its utility in Bangladesh.

Results

The study enrolled 302 cases, 1208 community controls, and 302 hospital controls (male: female 50:50; mean age 53 ± 8.5 years). Current (during the last one year) use of SLT was higher among community controls (38%) compared to cases (33%) and hospital controls (32%). Current use of SLT was not associated with an increased risk of CHD when community controls were used (adjusted OR 0.87, 95% CI 0.63-1.19, $p > 0.05$), when hospital controls were used (adjusted OR 1.00, 95% CI 0.63-1.60, $p > 0.05$), or when both controls were combined (adjusted OR 1.00, 95% CI 0.74-1.34, $p > 0.05$). All analyses were adjusted for potential confounders. Risk of CHD did not increase with use of individual types except *gul*, frequency, duration, past use of SLT products, or using the RAQ re-classification of cases and controls. There was a significant association between *gul* use and CHD when both controls were combined (adjusted OR 2.93, 95% CI 1.28-6.70). Study participants believed that Bangladeshi people used SLT products primarily due to addiction (52%) and habituation to SLT products (23%). The influence of

family members was the main reason given for initiating SLT use. Almost all respondents (97%) considered SLT products to be harmful, and cited heart disease, cancer and tuberculosis as the major SLT-related diseases. There were significant differences found between hospital controls and community controls in terms of confounding variables, but not for SLT use. The RAQ had a sensitivity of 53%, specificity of 89% and a positive likelihood ratio of 4.8 in detecting CHD among Bangladeshi adults compared with diagnoses done by cardiologists.

Conclusions

In this study, there was no statistically significant association between SLT use in general and CHD. Public health campaigns should focus on other detrimental health effects of SLT use. Tobacco control activities should consider addressing the role of the family in SLT initiation and use. The study also suggests that in resource constrained settings, carefully selected hospital controls may be an alternative to community controls if confounders are measured and are adjusted for. Finally, the RAQ may be a useful tool in large scale epidemiological research in Bangladesh.

DECLARATION

I, Muhammad Aziz Rahman, certify that this work contains no material which has been accepted for the award of any other degree or diploma in any university or other tertiary institution and, to the best of my knowledge and belief, contains no material previously published or written by another person, except where due reference has been made in the text.

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Signed:

(Dr. Muhammad Aziz Rahman)

Date:

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4. Rahman MA, Spurrier N, Mahmood MA, Rahman M, Choudhury SR, Leeder S. Hospital controls vs. community controls: choice for a case-control study in Bangladesh. Submitted to: Epidemiologic Perspectives and Innovations; Submitted on: Oct 2011.
5. Rahman MA, Spurrier N, Mahmood MA, Rahman M, Choudhury SR, Leeder S. Rose Angina Questionnaire: validation with cardiologists' diagnoses to detect coronary heart disease in Bangladesh. Submitted to: The Southeast Asian Journal of Tropical Medicine and Public Health; Submitted on: Nov 2011.

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2. Rahman MA, Spurrier N, Mahmood MA, Rahman M, Choudhury SR, Leeder S. Community controls vs. hospital controls: choice for a case-control study in Bangladesh. *Abstract book of Public Health Association of Australia (PHAA) Annual Conference 2011 Sep*; 48; Brisbane, Australia.
3. Rahman MA, Spurrier N, Mahmood MA, Rahman M, Choudhury SR, Leeder S. Rose Angina Questionnaire: accuracy for diagnosing coronary heart disease in Bangladesh. *Abstract book of Public Health Association of Australia (PHAA) Annual Conference 2011 Sep*; 48; Brisbane, Australia.
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8. Rahman MA, Spurrier N, Mahmood MA, Rahman M, Choudhury SR, Leeder S. Smokeless tobacco and coronary heart disease: risks among non-smokers in Bangladesh. *Abstract book of European Conference Tobacco or Health 2011*; 74.
9. Choudhury SR, Tabassum F, Rahman MA. Smokeless tobacco and coronary heart disease. *Abstract book of Conference on Cardiovascular Diseases, National Heart Foundation of Bangladesh December 2010*; 53; Dhaka, Bangladesh.

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1. June 2011 *The Konrad Jamrozik Student Scholarship 2011*
Public Health Association of Australia (PHAA) SA Branch,
AUSTRALIA

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Institute for Global Tobacco Control,
Bloomberg School of Public Health,
Johns Hopkins University,
USA

3. Mar 2011 *Postgraduate Travelling Fellowship*
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ABBREVIATIONS

| | |
|---------|--|
| BCSIR | Bangladesh Council of Scientific and Industrial Research |
| BDT | Bangladesh Taka |
| BMI | Body Mass Index |
| CAG | Coronary Artery Angiogram |
| CCU | Coronary Care Unit |
| CHD | Coronary heart disease |
| CI | Confidence Intervals |
| CVD | Cardiovascular diseases |
| DCC | Dhaka City Corporation |
| ECG | Electrocardiogram |
| ETT | Exercise Tolerance Test |
| FCTC | Framework Convention on Tobacco Control |
| IEDCR | Institute of Epidemiology, Disease Control & Research |
| IFST | Institute of Food Science and Technology |
| IPDs | Inpatient departments |
| MI | Myocardial infarction |
| NICVD | National Institute of Cardiovascular Diseases |
| NHFH&RI | National Heart Foundation Hospital & Research Institute |
| OPDs | Outpatient departments |
| ORs | Odds Ratios |
| PCCU | Post Coronary Care Unit |
| RAQ | Rose Angina Questionnaire |
| SES | Socio-economic status |
| SLT | Smokeless tobacco |
| WHO | World Health Organization |