



**EPIDEMIOLOGY OF SMOKELESS TOBACCO
CONSUMPTION AMONG SOUTH ASIAN PEOPLE IN
AUSTRALIA AND RURAL WOMEN IN BANGLADESH**

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BSS (Hons), MSS (Sociology)

A thesis submitted for the degree of Doctor of Philosophy
at the University of Newcastle, Newcastle
Australia

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Dedicated with love, to Anila Parveen

DECLARATION

Thesis presented for the Degree of Doctor of Philosophy

I, Mohammad Shakhawat Hossain, Australia, solemnly and sincerely declare, in relation to the thesis entitled Epidemiology of Smokeless Tobacco Consumption Among South Asian People in Australia and Rural Women in Bangladesh, that:

- This thesis has not been accepted in whole or in part for any other degree or diploma
- This work has been accomplished with the help of the following people:
 - I. Senior Lecturer Dr Abul Hasnat Milton, Professor Kypros Kypri, and Senior Lecturer Dr Bayzidur Rahman, who helped plan and design the study and provided overall supervision
 - II. Professor Iqbal Arslan and Dr Shahnaz Akhter who provided their assistance in field work, data collection, and data entry.

The work for this thesis was carried out over the period 2009 to 2014. My involvement in this work included:

- 2009: planning of the study, preparation of ethics applications
- 2010: preparation of questionnaire, conducting mail survey in Sydney, data collection and data entry
- 2011: planning of the case-control study in Bangladesh, preparation of ethics applications, preparation of study questionnaire for baseline survey and case-control study, information statement, consent form, data collection

- 2012: management of data processing, analysis of data, preparation of manuscripts for publication
- 2013: analysis of data, preparation of manuscripts for publication
- 2014: preparation of manuscripts for publication and manuscript of thesis.

I give consent to the final version of my thesis being made available worldwide when deposited in the University's Digital Repository, subject to the provisions of the Copyright Act 1968.

Mohammad Shakhawat Hossain

Date:

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2. Hossain, M. S., Kypri, K., Rahman, B., Arslan, I., Akter, S. & Milton, A. H. 2014. Prevalence and correlates of smokeless tobacco consumption among married women in rural Bangladesh. *PLoS One*, 9, e84470. A copy of the published paper is presented in Appendix B.

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1. Hossain, M. S., Kypri, K., Rahman, B., Akter, S. & Milton, A. H. Health knowledge and smokeless tobacco quit attempts and intentions among married women in rural Bangladesh.' This paper has been submitted to *Addiction*.
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Statement of Contribution of Authors

We the undersigned co-authors attest that the research higher degree candidate **Mohammad Shakhawat Hossain** contributed to develop the proposal and questionnaire, supervised data collection, developed data field for data entry, analysed and interpreted data, wrote both published and unpublished papers attached in this 'thesis by publication'.

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Data collection	CHAD	LK, MMRH
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Statement of Authorship (thesis by publication)

I hereby certify that this thesis is in the form of a series of published papers of which I am a joint author. I have included as part of the thesis a written statement from each co-author, endorsed by the Faculty Assistant Dean (Research Training), attesting to my contribution to the joint publications.

Mohammad Shakhawat Hossain

Date:

Glossary

AIDS	Acquired Immune Deficiency Syndrome
aOR	Adjusted Odds Ratio
ANC	Antenatal Care
AUD	Australian Dollar
BMI	Body Mass Index
BMRC	Bangladesh Medical Research Council
CI	Confidence Interval
HIV	Human Immune Virus
LGA	Local Government Area
STC	Smokeless tobacco consumption
SD	Standard Deviation
TX	Texas
UK	United Kingdom
USA	United States of America
VIF	Variance Inflation Factor
WHO	World Health Organization
NNK	Nicotine-derived nitrosamine ketone

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ABSTRACT

This thesis by publication is composed of a rationale, objectives, brief literature review, four papers, and a final chapter providing a conclusion and recommendations. At the time of submission, two papers have been published and a further two have been submitted to peer reviewed journals.

Chapter 1 provides an overview of adverse pregnancy outcomes, stillbirth and smokeless tobacco consumption (STC), a brief literature review of the prevalence of STC, forms of smokeless tobacco products, reasons for STC, and health consequences of STC. It also describes the rationale for studying STC and stillbirth and for conducting this study in Australia and Bangladesh; and presents research questions, objectives, and a statement regarding ethical approval.

Chapter 2 (Paper 1), reports an analytic cross-sectional study conducted among the South Asian ethnic population in Sydney, Australia. The title of the paper is "Smokeless tobacco consumption in the South Asian population of Sydney, Australia: prevalence, correlates and availability", published in the *Drug and Alcohol Review*. The study showed that prevalence of ever consumption, more than 100 times consumption and current consumption were 72.1%, 65.9% and 17.1%. Over 96% of consumers reported buying smokeless tobacco products from ethnic shops in Sydney. Current consumption of smokeless tobacco products was associated with country of birth: Indians (odds ratio 5.7, 95% confidence interval 2.3-14.5) and Pakistanis (odds ratio 3.1, 95% confidence interval 1.5-6.5) were more likely to be current consumers than Bangladeshis after adjusting for socio-demographic variables.

Chapter 3 (Paper 2), reports a large population-based analytic cross-sectional study conducted among married women in Madaripur, Bangladesh. The title of the paper is “Prevalence and Correlates of Smokeless Tobacco Consumption among Married Women in Rural Bangladesh”, published in *PLoS ONE*. The study showed that 31% of the cohort had never consumed smokeless tobacco, 44% were ever consumers but not current consumers, 25% were current consumers, and the mean age at first use was 31.5 years. After adjustment for demographic variables, current consumption was associated with being over 25 years of age (aOR=3.08, 95% CI: 2.26–4.20), being unemployed (aOR=7.00, 95% CI: 5.45–8.98), being Muslim, and being divorced or widowed (aOR=1.81, 95% CI: 1.42–2.29).

Chapter 4 (Paper 3), “Health knowledge and smokeless tobacco quit attempts and intentions among married women in rural Bangladesh” has been submitted to *Addiction*. It reports that 45% of current consumers thought STC was good for their health and many ascribed medicinal values to it, e.g., 25% thought STC helped reduce stomach ache. Only 10% intended to quit while a quarter had previously tried to quit. Inaccurate knowledge of STC health consequences was associated with being older (aOR=2.65, 95% CI: 1.99–3.50), being less educated (aOR=2.04, 95% CI: 1.56–2.66), being Muslim (aOR=5.59, CI: 3.60–8.68), being unemployed (aOR=31.9, CI: 26.9–37.8), and being an income earner (aOR= 4.22, CI: 2.90–6.14). Having less education (aOR=2.52, CI: 0.98–6.45) and being unemployed (aOR=1.52, CI: 1.03–2.23) were associated with quitting intentions.

Chapter 5 (Paper 4), reports a case-control study: “Smokeless tobacco consumption and stillbirth: Case-control study in Bangladesh”, finding an association between STC and

stillbirth among married women in Madaripur, Bangladesh. This paper has been submitted to the *British Journal of Obstetrics & Gynaecology*. A 3.6 fold (95% CI: 1.90–6.90) increase in the odds of stillbirth was observed in women who consumed smokeless tobacco during their first pregnancy. Heavier users (>5 times daily) were at higher risk of having a stillbirth (aOR = 5.15, 95% CI: 1.67–15.8) than were less heavy users (1–5 times per day, aOR 1.67, CI: 0.67–4.17).

Chapter 6 provides a conclusion and recommendations. The research reveals a high prevalence of STC in the South Asian population of Sydney and among women in rural Bangladesh. The case-control study revealed a dose-effect relationship between STC and stillbirth. The knowledge of women regarding the health risks of STC is poor and there are many myths circulating about supposed health benefits of STC.

In Bangladesh, health awareness campaigns in mass media and school education should be used to improve knowledge of the harm of STC. Routine screening and cessation advice should be provided in primary healthcare settings, and consideration should be given to methods of regulating the smokeless tobacco market. In Australia, where mechanisms exist to control the supply of smokeless tobacco, enforcement of existing laws should be the priority.