

Vita

Candidate's name: Md. Ashiqul Haque

Universities
Attended: Shahjalal University (2016)
Bachelors of Science

University of New Brunswick (2020)
Masters of Science

Presentations/Conferences/Publications:

Nonlinear Joint Models for Longitudinal Data. Jointly with T. Hasan & R. Ma; at the 2020 online Canadian Statistics Student Conference., May 30, 2020.

The case of Middle Eastern and North African immigrant women in Canada: A longitudinal study. Jointly with F. Solati & M. Chowdhury; for presentation at Metropolis Canada Conference: Renewing Canada's Commitment to Immigration, March 19-21, 2020, Winnipeg, Manitoba.

Factors associated with availability of selected essential medicines for diabetes and cardiovascular diseases in health facilities of Bangladesh. Jointly with S. Hakim, M. Chowdhury & M. J. Uddin. Presented by M. J. Uddin at International Conference on Data Science and SDGs: Challenges, Opportunities and Realities, December 18-19, 2019, University of Rajshahi, Rajshahi, Bangladesh.

Extent of HIV/AIDS awareness among married women in Bangladesh: A statistical analysis. Jointly with M. Hossain, M. Chowdhury and M. J. Uddin), Presented at 16th National Statistical Conference, July 28-29, 2017, Dhaka, Bangladesh.

Joint Generalized Nonlinear Mixed Models for Longitudinal Data

UNIVERSITY OF NEW BRUNSWICK

THESIS DEFENCE AND EXAMINATION

in Partial Fulfillment

of the Requirement for the Degree of
Master of Science

by

Md. Ashiqul Haque

in the Department of Mathematics & Statistics

U.N.B., Fredericton, N.B.

**Tuesday, August 25th, 2020
1:00 p.m.**

Via MS TEAMS

Examining Committee

Dr. Tariq Hasan & Renjun Ma
Dr. Jeff Picka
Dr. Murshed Chowdhury
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Co-Supervisors
Internal Examiner
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Chair of Oral Examination

UNNB

Abstract

Joint modelling of multiple longitudinal responses enables us to account for the association between them and is thus more efficient than separate analyses. Most existing techniques to handle this problem are based on the assumptions of normality of the responses and linearity of the mean functions. However, nonnormality of responses and non-linear shape of their mean functions often arise from medical and population growth studies. For example, it is desirable to investigate the nonlinear mean structures in the analysis of the effect of different drug formulations while accounting for their association in Pharmacodynamics (the study of what the drug does to the body). We propose to model data of mixed types jointly by incorporating both subject-specific and time-specific random effects into Tweedie nonlinear models. An optimal estimation of our model has been developed using the orthodox best linear unbiased predictors of the random effects. This approach allows

us to model multiple non-normal longitudinal responses with interpretable parameters.