

広島統計談話会
Hiroshima Statistics Study Group

第 255 回談話会を下記のように開催致しますので
御参集下さいますようご案内申し上げます。

You are cordially invited to the 255th meeting as scheduled below.

日 時 : 2010 年 4 月 23 日 (金) 15:00 –
Date : April 23, 2010 (Fri) 15:00 –
場 所 : 放射線影響研究所 講堂
Place : RERF Auditorium
演 者 : 石田 紀子 (長崎大学生産科学研究科 博士研究員)
Speaker : Noriko Ishida
Graduate School of Science and Technology, Nagasaki University
演 題 : 「測定誤差による偏りを修正した移設推定値によるリスク評価」
Title : “Risk Assessment Using Transported Estimates Correcting for Measurement Errors”

要 約 :

Abstract:

Carroll *et al* (1995) emphasize potential dangers in using estimated parameter values in an independent study for analysis of the primary study and introduce the concept of “transportability”. Transportability means “not only the model but also the relevant parameter estimates can be transported without bias”. As far as we know, however, a mathematical definition and statistical considerations of the transportability have not been fully developed yet. We formally define the transportability of a regression model, propose a sufficient condition for it, and confirm the feasibility of the condition with real data. The motivation of the study comes from the fact that we have to wait for the results of an over ten-year cohort study to know the epidemiological significance of the waist circumference (WC), which is necessary for the diagnosis of the metabolic syndrome (MS), because WC was not measured in periodic health examinations until recently.

We considered it would be possible to estimate the risk associated with WC if an unbiased estimate of WC for each subject ten years earlier would be obtained based on the transportability arguments. Since the transported estimates are inevitably subject to measurement errors, this study develops a method for correcting for the measurement errors to obtain asymptotically unbiased estimates of relative risks for death associated with WC.

The method is applied to a cohort sample administered by the Radiation Effect Research Foundation. A total of 667 men who were younger than 75 years old in 1994-96 were analyzed in the present study. In Japan, MS is defined, among men with a WC in excess of 85 cm and women

with a WC in excess of 90 cm, and having 2 or more components from among the following;

- 1) Dyslipidemia: triglycerides ≥ 150 mg/dl and/or HDL cholesterol < 40 mg/dl
- 2) Hypertension: blood pressure $\geq 130/85$ mmHg
- 3) Impaired glucose tolerance: fasting plasma glucose ≥ 110 mg/dl

Those with at least two among the three components are termed as semiMS in this study. SemiMS subjects with WC greater than the specific value are diagnosed as MS.

As for the risk for MS-related death for semiMS subjects, our results (Figure 1) indicate that the larger the WC, the smaller the risk. The resulting corrected estimates for the risk of MS-related death is about 30% larger than the naïve estimates without the corrections. On the other hand, the risk of cancer death increases as WC increases beyond 90 ($=\ln 4.5$) cm irrespective of semiMS or not (Figure 2).

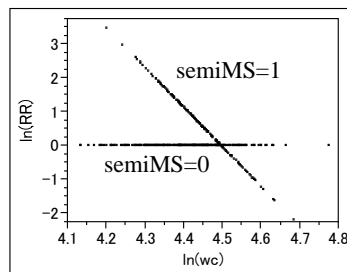


Figure 1. MS-related deaths

(Number of the endpoint observed is 37)

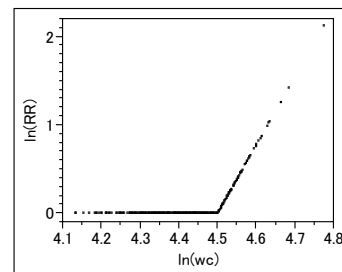


Figure 2. Cancer deaths

(Number of the endpoint observed is 72)

References:

Carroll, R.J., Ruppert, D., and Stefanski, L.A. (1995). *Measurement Error in Nonlinear Models*. London: Chapman and Hall