Research Theme
Metabolic Disorders

Research Project Title
Metabolic Disease in Taxi Drivers

Principal Investigator
Associate Professor Fabian Chin Leong Lim, LKCMedicine

Co-supervisor
To be confirmed.

Project Description
Background
The clustering of poor glucose regulation, obesity, dyslipidemia, and hypertension is classified as metabolic syndrome (MS), which not only increases all-cause morbidity and mortality, but also the risks of cardiovascular disease (CVD) and diabetes mellitus (DM) by two- to five-fold. Ageing is the primary independent risk factor for metabolic disease, and the disease is projected to increase exponentially in the 2 – 3 decade. The burden of metabolic disease in the world is also projected to shift to the Asian continent, especially in developed countries with an ageing population, such as Singapore.

Investigations on metabolic disease are mostly done using a general population approach, which has the advantage of a large population base. However, the diversity of individual lifestyle, living and work environments, and risk factors within a population limits the strength of the data in identifying the etiologies with sufficient clarity for designing effective countermeasures against metabolic disease. These limitations of using a general population approach pose a barrier to the translation of research data to lifestyle and clinical interventions to improve the patient care – the ultimate aim of investments in research.

The limitations of the general population model can be addressed by taking an occupational approach in studying metabolic disease, especially in high-risk occupation populations. Since we spend most of our wakeful hours in the work environment, studying the disease within a vocation provides a much higher degree of uniformity in terms of lifestyle and environmental factors that promote or inhibit metabolic disease. This advantage of the occupational model is not only useful for establishing the relationship between lifestyle, environment with the etiology of the disease, but also in designing interventions that are suitable for the specific population. In this sense, the occupational model for disease management is a macrocosmic version of stratified medicine, where disease management is tailored to the unique causes and treatment-responsiveness of the sub-population. Such an approach can better promote the translation of research data to intervention strategies, and increase the efficiency of healthcare resources spent on cardio-metabolic disease management.
Aim of Study
This study investigates the association between the taxi driver vocation and the risks / prevalence of metabolic disease. The association between occupational profile and the status of metabolic disease e.g., driving habits, work duration, shift patterns, and duration in the vocation will be investigated alongside demographic and individual factors, such as age, financial burden, family history and household composition. We chose to study the taxi driver vocation because of the long hours they spend in their vocation daily (10 – 14/d) for almost all days of the week, the highly sedentary and stressful work conditions, and the limited dietary choices, which are key factors that promote metabolic disease. The specific environment of the taxi itself also provides a clearly defined space for designing evidence-based interventions in the future. This study will be done over two phases.

Phase I involves an occupational; and lifestyle survey of > 1000 taxi drivers to establish the relationships between demographics, personal, family and occupational factors and the status of metabolic disease indicators. Besides the survey, the biomarkers of metabolic disease will be directly measured in all the survey participants i.e., central and brachial blood pressures, non-fasted blood glucose and lipids (total cholesterol, HDL, LDL and triglycerides), body composition, and arterial stiffness. The combination of > 1000 survey data with experimental data greatly enhances the robustness of the study design and is a unique strength of this study.

Phase II involves comparison of metabolic disease indicators between n=>50 taxi drivers with n=>50 office-hour deskbound workers, after matching for age, sex, marital status, smoking habits and duration in the vocation. The parameters to be measured includes glucose tolerance, insulin sensitivity, body mass index and composition, arterial stiffness and endothelial functions, central and brachial blood pressures, fasted blood lipids, and cardiorespiratory response during a 3-stage submaximal exercise test.

This project is designed to be broad in scope, which provides the PhD candidate with sufficient intellectual space to carve out the hypotheses and focus of the thesis with occupation, lifestyle and personal factors and metabolic health as the underlying themes. Students may also propose to add to the study design to strengthen the scientific rigor of thesis, if additional resources are available to support the additional studies e.g. nutrition or exercise interventions or to focus on a sub-population.

Contact Us
If you have questions regarding this project, please email the Principal Investigator.

Associate Professor Fabian Chin Leong Lim
fabianlim@ntu.edu.sg