Review of a Large National Thai Cohort Study of Health-Risk Transition based on Sukhothai Thammathirat Open University Students

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The Thai Cohort Study Team*

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Abstract

Thailand’s dynamic economic development has been accompanied by great changes in cultural, social, environmental and other forces that operate at different levels to shape population health. To study Thailand’s health-risk transition, we began by reviewing data documenting trends in social demography, economics and population health over the past 100 years. Multiple transitions have occurred or are still underway. Most notable is the demographic transition to low fertility, low mortality and high life expectancy, all achieved by the year 2000. The epidemiological transition from infectious to chronic degenerative diseases is also well advanced as is the nutritional transition to high fat, calorie dense animal foods supplied through modern retail supermarkets.

To follow changing health outcomes in work and home environments, socio-demographics and health behavior, we began a longitudinal study of a large cohort of students aged 15-87 years enrolled at Sukhothai Thammathirat Open University (STOU). These are an accessible group of transitional Thais residing all over the country, not affluent yet aspiring to modernize. Our Thai Cohort Study (TCS) started in 2005 with extensive baseline data collected for 87,134 cohort members, of whom over 60,000 were successfully followed up in 2009. The next follow-up is scheduled for 2013. The Thai population, the STOU student body and the TCS cohort members are comparable in social geography and socio-economic status.

The study has enabled research training for master’s degrees (six Thais) and PhDs (four Thais and three Australians). In addition, the research project has already produced nearly 50 published peer-reviewed papers as well as three books and several book chapters. These results are summarised in this report. Such productivity and capacity building should ensure that the project has substantial long-term impacts on regional population health, enabling Thailand and similar middle-income countries to understand and mitigate emerging disease trends.

Background

Thailand is undergoing a health-risk transition, with changing risks and outcomes as well as changing attitudes and understandings of health. The Thai health-risk transition has many components, notably a demographic transition (from high to low birth and death rates), a nutritional transition (from low to high intakes of fat, refined carbohydrate, and animal protein), an environmental transition (from rural agricultural to urban industrial and service work), an epidemiological transition (from epidemic infections to non-communicable chronic diseases) and a health-service transition (from traditional illness management to science-based health service interventions). Some components of the health-risk transition are beneficial, such as falling mortality associated with reproduction and infection; other transition components are not so welcome, including chronic and degenerative diseases that were rare before but are now increasingly prevalent. Some key indicators of Thailand’s transitions include a remarkable increase in life expectancy at birth since World War II (40 to 67 for males and 40 to 73 for females) (Carmichael, 2011) with parallel dramatic falls in infant mortality and fertility; 40% of GDP is now derived from manufacturing, while only 10% comes from agriculture (National Statistical Office of Thailand, 2003). The twin epidemics of obesity and Type II diabetes loom; and injury kills 64 per 100,000 per year, with rates among males (103) about 4 times those for females (Wilbulpolprasert, 2005). Rapid changes in lifestyle are evident with adoption of fast
food and high fat diets and high exposure to traffic injury risks travelling by motorcycle or car without helmets or seat belts.

This Thai health-risk transition has created a set of emerging health problems centred around chronic degenerative disease and injury and arising with socio-economic development. In Thailand, the driver is several decades of high economic growth with limited societal capacity to detect and contain unfamiliar health-endangering environmental and socioeconomic changes. Countries that are undergoing such substantial transitions need to analyse the progress and determinants of changing health risks as well as their multi-level drivers in order to optimise population health outcomes. Our research attempts to map these transitions. We are observing how changes in the risk distribution influence changes in health outcomes, and this information will help Thailand devise appropriate national health policies and health programs.

**Methods**

One of our first aims was to obtain detailed historical data on the last 50 years (and longer for some analyses) of health-risk, economic, and demographic trends in Thailand. This was important as it allowed us to properly understand the context in which the present Thai Cohort Study is situated.

Our prospective research includes longitudinal study of a very large cohort of Sukhothai Thammathirat Open University (STOU) students, chosen because they are embedded in the general Thai population, live and work all over Thailand, are young enough to follow for many years, and embrace the socio-economic changes underway. The cohort was recruited in 2005 when a 20-page questionnaire was mailed to all 200,000 STOU students. By early 2006 87,134 had responded, initiating the Thai Cohort Study. A four-year follow-up was conducted in 2009. For details on how the cohort follow-up studies were carried out see Seubsman et al. (2011). This is the first prospective cohort study addressing the health-risk transition and is a landmark in the development of epidemiology in the region.

The 2005 baseline questionnaire obtained data on socioeconomic and demographic circumstances, environment now and when respondents were 10-12 years old, work and its social, psychological and physical environment, social capital, self-reported health (SF8) and doctor-diagnosed disease, psychological state, happiness and well-being, height, weight, birth weight, breast feeding as an infant, current diet, food sources and preferences, exercise, health service use, injury, transport risks, alcohol and tobacco use, health events for parents, allergy and asthma among children, and home pets. When possible we used standardised questions validated in other populations. To develop the questionnaire the research team worked in bicultural groups over six months and questions went through many iterations in English before being tested, amended and improved through many further iterations in Thai. Back translation ensured meanings were retained, and all questions were piloted among STOU students.
Overall the cohort represents the geo-demographic, ethnic, occupational and socioeconomic status of the adult Thai population: 45% were male, the median age was 29 years, 31% were married at enrolment, and 95% were Buddhist (Sleigh et al., 2008). Most STOU students are not-yet-affluent, upwardly-mobile working Thais—an important group for the country’s socio-economic future. Their age distribution (mostly 20-40 years), countrywide residence and socio-economic profile match our central purpose – to measure risk and health transitions in a broad stratum of Thai society that is likely to change material and technological circumstances, ways-of-life and health behaviours.

Ethics approvals and acknowledgements
This project is supported by the Wellcome Trust (UK) and the National Health and Medical Research Council (Australia). Ethics approval was obtained from Sukhothai Thammathirat Open University Research and Development Institute (protocol 0522/10) and the Australian National University Human Research Ethics Committee (protocol 2004344). Informed written consent was obtained from all participants.

Results
1. Overview
Our initial retrospective studies adopted a multi-level perspective (Figure 1) of social, economic, and other factors leading to health outcomes in the whole population over the last 50 years (Seubsman et al, 2007).

We began by documenting the demographic aspects of the transition process underway in Thailand (Figure 2), which exposed many sequential transitions. The peaceful abolition of corvee labour in the 19th century had increased conjugal stability and the birth rate, leading to population growth evident by 1920 (Carmichael, 2008). After World War II mortality fell greatly most likely due to public health campaigns (e.g. malaria, TB, yaws and smallpox), the spread of modern ideas, the development of provincial medical care and nationwide family planning; average life expectancy increased by about 30 years over just 4 decades. Now, work in Thailand is rapidly formalizing, creating new opportunities for occupational health (Kelly, Strazdins et al., 2010). Recently, universal coverage for health service finance has improved equity of health care (Yiengprugsawan, Kelly et al., 2010).
Our Thai Cohort Study members reported their height, and together with a separate analysis of height for 34,000 military recruits over a 30 year period, this provided biological proof of a sustained positive interaction between the childhood environment, nutrition and health. Conditions improved in the post-war period, leading to a steady height gain faster than those noted 100 years before in Europe. The effect was equal for males and females, and slower for persons in rural areas. This height gain is a major factor in the health-risk transition, and when compared with European trends, Thais appear to be halfway through their health and nutrition transition (Seubsman & Sleigh, 2008; Jordan et al., 2010).
2. **Urbanization**

Negative health-risk behaviours and associated health outcomes corresponded to urbanisation, with junk food, smoking and drinking increasing and physical activity decreasing. Urbanites had higher incomes and higher levels of obesity and worse overall health than residents of rural areas (Lim et al., 2009; Yiengprugsawan, Seubsman, Lim et al., 2009; Yiengprugsawan, Carmichael et al., 2010).

3. **Nutrition transition and diets**

Overall, around 30% of our cohort was overweight or obese at baseline, and obesity was associated with being male and with increasing age. Among cohort women the association of obesity with socio-economic status (SES) has inverted, now showing the developed country pattern (high SES associated with less obesity) (Banwell et al., 2009; Seubsman et al., 2010).

4. **Cancer**

Cancer is an emerging problem in Thailand and has already affected the cohort. We conducted a case-control analysis of breast cancer among cohort females. The study identified 43 female cases and 860 age-matched controls selected from the remaining 47,271 female cohort participants. Breast cancer was found to be associated with increasing height, type-2 diabetes and being firstborn among siblings. All of these risk factors will increase in the future as families get smaller and diabetes and height increase (Jordan et al., 2009).

5. **Injuries**

Our research has revealed very high injury rates among Thai adults with nearly 22% of our cohort reporting at least one injury during the previous 12 months. Males, those with lower income and the less-educated had higher injury rates, particularly sport, road and workplace injuries. The most worrying result is the number of young males experiencing serious motorcycle accidents and the proportion of these young males who report driving after consuming alcohol. Another concern is the low levels of motorcycle helmet use among females (Stephan, Kelly et al., 2010; Stephan, McClure et al., 2010).

6. **Sexuality and reproductive health**

Urbanisation and modern life are changing sexuality in Thailand and particularly the sexual behaviour of Thai youth. While traditional mores valuing virginity until marriage, particularly for females, are still powerful in Thai society, the younger generation is increasingly sexually active. Thailand has a very strong record in family planning and providing reproductive health services but these services are still primarily aimed at married couples. Unmarried youth are increasingly exposed to risky sexual behaviour, yet face an array of obstacles in acquiring appropriate information and services (Tangmunkongvorakul, et al., 2010a; Tangmunkongvorakul et al. 2010b; Tangmunkongvorakul et al., 2010c).
7. Social wellbeing, development and disability

Our cohort of Thai adults allows us to measure the wellbeing and quality of life of Thais coping with the rapid transition to a modern and urban lifestyle. We have found that personal wellbeing in Thailand is comparable to that found in western countries and increases with age and socio-economic status. Rural dwellers however have higher levels of wellbeing (Yiengprugsawan, Seubsman, Khamman et al., 2009; Yiengprugsawan, Seubsman et al., 2010).

Another key indicator we have used to measure wellbeing in the Thai population is social capital as social support and networks have been found to be important contributors to overall health and wellbeing. We found that those in rural areas and those with low incomes often had the highest levels of social interaction and trust. Indeed we have shown that economic stress associated with low income tends to co-occur with high social interaction and family support. This observation should be reassuring to policymakers aiming to preserve and promote social capital as Thailand continues to urbanize and modernize (Yiengprugsawan, Seubsman et al., 2011; Yiengprugsawan, Khamman et al., 2011).

Another interesting finding relates to the positive role of spirituality and personal wellbeing. This finding crosses social groups within Thailand and was detectable in both prisoners and monks within our cohort. It would be of practical significance to support spiritual sentiments among prisoners because we also have found they have low levels of social trust and community support (Yiengprugsawan, Seubsman et al., 2010).

Conclusion

Our studies shed light on an emerging public health issue in the Asia-Pacific region—transition, from traditional patterns of risk, infection and maternal child health problems to chronic disease and injury with concomitant implications for prevention and health services. Our study of the health-risk transition process is pioneering work likely to benefit Thailand as well as other countries going through similar transitions. The policy focus of our work will be key aspects of the health-risk transition: urban health and social capital; traffic injury; sexual health services for adolescents; occupational health; stress and psychological health; and diet and physical activity. We are also aware that our study is helping to build capacity for health research in Thailand as well as enhancing regional partnership with Australia. Until now we have been very productive for new knowledge (nearly 50 peer-reviewed journal articles, three books and several book chapters published) as well as directly training young researchers for local master’s degrees (six Thais) and for international PhDs (four Thais and three Australians).
References


