RISK MANAGEMENT FOR TYPE 2 DIABETES IN
COMMUNITY PHARMACY PRACTICE

THITAPORN THOOPPUTRA
RISK MANAGEMENT FOR TYPE 2 DIABETES IN COMMUNITY PHARMACY PRACTICE

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SCHOOL OF BIOMEDICAL SCIENCES AND PHARMACY
THE UNIVERSITY OF NEWCASTLE
AUGUST 2013
STATEMENT OF ORIGINALITY

This thesis contains no material which has been accepted for the award of any other degree or diploma in any university or other tertiary institution and, to the best of my knowledge and belief, contains no material previously published or written by another person, except where due reference has been made in the text. I give consent to this copy of my thesis, when deposited in the University Library, being made available for loan and photocopying subject to the provisions of the Copyright Act 1968.

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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.

THITAPORN THOOPPUTRA
ACKNOWLEDGEMENTS

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PUBLICATIONS INCLUDED AS PART OF THIS THESIS

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CHAPTER 3

Thitaporn Thoopputra, David Newby, Jennifer Schneider, Shu Chuen Li. Role of community pharmacist in chronic disease management: a literature review. Submitted.

CHAPTER 4


CHAPTER 5


CHAPTER 6


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<tr>
<th>Abbreviation</th>
<th>Full Form</th>
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<tbody>
<tr>
<td>ABS</td>
<td>Australian Bureau of Statistics</td>
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<tr>
<td>ADA</td>
<td>American Diabetes Association</td>
</tr>
<tr>
<td>ANOVA</td>
<td>Analysis of Variance</td>
</tr>
<tr>
<td>AUC</td>
<td>Area under curve</td>
</tr>
<tr>
<td>AusDiab</td>
<td>Australian Diabetes, Obesity and Lifestyles study</td>
</tr>
<tr>
<td>AUSDRISK</td>
<td>Australian Diabetes Risk assessment tool</td>
</tr>
<tr>
<td>BMI</td>
<td>Body Mass Index</td>
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<tr>
<td>BP</td>
<td>Blood pressure</td>
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<tr>
<td>CVD</td>
<td>Cardiovascular disease</td>
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<tr>
<td>DM</td>
<td>Diabetes</td>
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<tr>
<td>DPP</td>
<td>Diabetes Prevention Program</td>
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<tr>
<td>EQ-5D</td>
<td>The EQ-5D self-reported questionnaire</td>
</tr>
<tr>
<td>ERSD</td>
<td>End-stage renal disease</td>
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<tr>
<td>FBG</td>
<td>Fasting Blood Glucose</td>
</tr>
<tr>
<td>FSG</td>
<td>Fasting Serum Glucose</td>
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<tr>
<td>HBM</td>
<td>Health Believe Model</td>
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<tr>
<td>HDL</td>
<td>High density lipoprotein</td>
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<tr>
<td>HRQoL</td>
<td>Health related Quality of Life</td>
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<tr>
<td>HT</td>
<td>Hypertension</td>
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<tr>
<td>IDF</td>
<td>International Diabetes Federation</td>
</tr>
<tr>
<td>IFG</td>
<td>Impaired Fasting Glucose</td>
</tr>
<tr>
<td>IGT</td>
<td>Impaired Glucose Tolerance</td>
</tr>
<tr>
<td>IMC</td>
<td>Interactive multimedia computer-based</td>
</tr>
<tr>
<td>IPA</td>
<td>International Pharmaceutical Abstracts</td>
</tr>
<tr>
<td>MTM</td>
<td>Medication Therapy Management</td>
</tr>
<tr>
<td>NPV</td>
<td>Negative predictive value</td>
</tr>
<tr>
<td>OGGT</td>
<td>Oral Glucose Tolerance Test</td>
</tr>
<tr>
<td>PBC</td>
<td>Perceive Behavioral Control</td>
</tr>
<tr>
<td>PCU</td>
<td>Primary Care Unit</td>
</tr>
<tr>
<td>PPI</td>
<td>Pharmacy Practice Incentives</td>
</tr>
<tr>
<td>PPV</td>
<td>Positive predictive value</td>
</tr>
<tr>
<td>QoL</td>
<td>Quality of Life</td>
</tr>
<tr>
<td>ROC</td>
<td>Receiver operating characteristic curve</td>
</tr>
<tr>
<td>SD</td>
<td>Standard deviation</td>
</tr>
<tr>
<td>SF-36</td>
<td>The Short Form 36 Health Survey</td>
</tr>
<tr>
<td>T2DM</td>
<td>Type 2 Diabetes</td>
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<tr>
<td>TDRS</td>
<td>Thai Diabetes Risk Scores</td>
</tr>
<tr>
<td>TG</td>
<td>Triglyceride</td>
</tr>
<tr>
<td>TPB</td>
<td>Theory Planned Behaviour</td>
</tr>
<tr>
<td>UK</td>
<td>United Kingdom</td>
</tr>
<tr>
<td>Abbreviation</td>
<td>Full Form</td>
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<tr>
<td>UKPDS</td>
<td>United Kingdom Prospective Diabetes Study</td>
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<tr>
<td>US</td>
<td>United States</td>
</tr>
<tr>
<td>VAS</td>
<td>Visual Analog Scale</td>
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<tr>
<td>VIF</td>
<td>Variance Inflation Factor</td>
</tr>
<tr>
<td>WHO</td>
<td>World Health Organization</td>
</tr>
<tr>
<td>WTP</td>
<td>Willingness to Pay</td>
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EXECUTIVE SUMMARY

The profession of Pharmacy presently has transformed practice emphasis from a product-oriented to a patient-oriented approach. Many pharmacists in various countries are now providing a range of cognitive services or pharmaceutical care services including disease management. This change in approach is a response to the rapidly increasing prevalence of many chronic diseases globally. For example, the prevalence of type 2 diabetes is rapidly increasing worldwide and is a national health priority in many countries. To address this health problem, early screening to identify people at risk of diabetes is an important strategy to prevent or delay the disease. However, there is a paucity of research to assess community pharmacists’ involvement in diabetes risk screening and the impact of different health systems on the practice outcomes. Based on the organisation theory, the components of the organisation composed of four major elements; participants, technology, social structure and goals. Each component affects and is affected by each other. In this thesis, we considered the practice of diabetes risk screening at community pharmacy from an organisational perspective. Understanding dynamic of interactions among the elements is important to provide an enhanced sustainable practical implementation of cognitive services at community pharmacy.

This thesis was therefore conducted to explore an alternative approach in diabetes prevention, focusing on identifying people at risk of developing type 2 diabetes at the community pharmacy setting. Integration of theories including organisational theory, theory of planned behaviour, and health believe model was employed to evaluate the interaction of the elements in implementing diabetes risk assessment intervention.

First, we attempted to identify and determine the performance of existing non-invasive diabetes risk assessment tools internationally through a systemic review. Second, we evaluated the current status of disease management interventions to find a gap to enhance the role of community pharmacists in disease management through another systemic review. Third, we applied the theory of planned behaviour to evaluate the impact of pharmacists’ intervention on the risk perception and intention to change lifestyle behaviours of clients by utilising non-invasive risk assessment tools using Australia as the example. Fourth, we determine the impact of technology-enhanced tool on risk awareness by comparing an interactive multimedia computer-based diabetes risk assessment tool and paper-based diabetes risk assessment tool. Fifth, the risk assessment intervention were performed and compared in two different countries with different
health systems, to explore the influence of social structures on the facilitators and barriers in providing the intervention. We also determine the perceived value by assessing the willingness to pay for the risk assessment intervention and the impact of its intervention on HRQoL.

From all the aforementioned attempts, we obtained several interesting findings. First, our systemic reviews showed limited application of non-invasive risk assessment tools in community pharmacy practice, a lack of universal standard tool that can be used internationally and limited proactive pharmaceutical care services targeting healthy population and at risk population. Second, we proved the hypothesis that intention to engage in healthy lifestyles could be positively affected by individuals’ level of risk awareness and by health professional interventions based on the theory of planned behaviour. Level of risk awareness and intervention by pharmacists also increased perceived value in terms of willingness to pay for the service. Third, we found risk assessment intervention has minimal negative effect on clients’ quality of life at least in the short term, and this would contribute to a better adherence to intervention or education provided by the community pharmacists. Fourth, the technology-enhanced tool increased individuals’ level of risk awareness and enhanced individuals’ healthy lifestyles seeking behaviour. Fifth, the difference in healthcare systems and pharmacy practice pattern could affect the willingness to pay for the service from individuals’ perspectives and influence the facilitators and barriers in providing cognitive services.

In conclusion, the employment of organisational theory, health believed model and the theory of planned behaviour to develop quantitative and qualitative studies included in this thesis have contributed interesting and important information to community pharmacy practice. We used risk assessment (type 2 diabetes in this case) as part of health prevention program as an example. The results showed the interaction among the elements of the organisation (healthcare system in this case), and enhanced understanding of these factors would be important in the development of models for establishing sustainable provision of cognitive services in community pharmacy.