UNIVERSITI PUTRA MALAYSIA

KNOWLEDGE, ATTITUDE AND PREVENTIVE PRACTICE TOWARDS LEPTOSPIROSIS AND SEROPREVALENCE OF LEPTOSPIRA ANTIBODIES AMONG MARKET WORKERS IN SELANGOR, MALAYSIA

SUHAILAH BINTI SAMSUDIN

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By

SUHAILAH BINTI SAMSUDIN

Thesis Submitted to the School of Graduate Studies, Universiti Putra Malaysia, in Fulfilment of the Requirements for the degree of Master of Science

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Abstract of thesis presented to the Senate of Universiti Putra Malaysia in fulfillment of the requirement for the degree of Master of Science

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SUHAILAH BINTI SAMSUDIN

March 2017

Chairman : Associate Professor Malina Binti Osman, MD
Faculty : Medicine and Health Sciences

Objective: The aim of this thesis is to identify and investigate the knowledge, attitude and practices towards leptospirosis prevention along with seroprevalence of leptospira antibodies. **Methodology:** A cross sectional study was conducted among 120 market workers in four urban markets in Selangor. Questionnaire surveyed and blood sampled were two important methods used in the study. A questionnaire consists of respondent's background, risk factors, knowledge, attitude and practice questions related with leptospirosis. The blood sample was collected from market workers with consent in purpose of seroprevalence study. The sera were obtained and Microscopic Agglutination Test (MAT) was used to determine seropositivity of leptospira antibodies among market workers. Validation and reliability of the questionnaire were carried out and proper procedure in the laboratory was done according to standard protocol. **Result:** The result showed majority of respondents have poor knowledge (91.7%), have unacceptable attitude (60.8%) and have unacceptable practice (72.5%). This study has found that there are 44.2% serum samples positive of leptospiral antibodies. Regression analysis was conducted and the result showed that the respondents who were Malaysian and undertook gardening activity have more likely to have good knowledge. Furthermore, this study showed that respondents who have formal education, undertook cleaning outside house, have exposed to contaminated water having more likely to have good attitude. An adjusted odd ratio shows that respondents who were female, undertook gardening activity, went for travelling, undertook cleaning of business premises and have unacceptable practice score have more likely of having seropositive of leptospiral antibodies. **Conclusion:** The evidence from this study suggests that comprehensive health education should be conducted among market workers regarding leptospirosis and its prevention as majority of them scored poor knowledge, unacceptable attitude and unacceptable practice.

Keywords : seroprevalence, leptospirosis, knowledge, attitude, practice, market

Abstrak tesis yang dikemukakan kepada Senat Universiti Putra Malaysia sebagai memenuhi keperluan untuk ijazah Sarjana Sains

PENGETAHUAN, SIKAP DAN AMALAN PENCEGAHAN TERHADAP PENYAKIT KENCING TIKUS DAN SEROPREVALEN ANTIBODI LEPTOSPIRA DI KALANGAN PEKERJA PASAR DI SELANGOR, MALAYSIA

Oleh

SUHAILAH BINTI SAMSUDIN

Mac 2017

Pengerusi : Profesor Madya Malina Binti Osman, MD
Fakulti : Perubatan dan Sains Kesihatan

Objektif: Tujuan tesis ini adalah untuk mengenal pasti dan menyiasat pengetahuan, sikap dan amalan ke arah pencegahan leptospirosis bersama-sama dengan seroprevalen antibodi *Leptospira*. **Metodologi:** Kajian irisan lintang telah dijalankan di kalangan 120 pekerja pasar di empat buah pasar di kawasan bandar di Selangor. Borang soal selidik dan pengambilan darah adalah dua kaedah penting yang digunakan dalam kajian ini. Soal selidik mengandungi informasi latar belakang, faktor-faktor risiko, pengetahuan, sikap dan amalan responden berkaitan dengan leptospirosis. Sampel darah untuk tujuan kajian seroprevalen telah berjaya dikumpul dengan kebenaran pekerja-pekerja pasar.Ujian mikroskopik agglutinasi (MAT) telah dijalankan ke atas sera yang telah diperolehi bagi menentukan seropositif antibodi leptospira di kalangan pekerja pasar. Validasi dan kebolehpercayaan soal selidik telah dijalankan dan prosedur di dalam makmal mengikut protokol yang ditetapkan. **Keputusan:** Hasil kajian menunjukkan majoriti responden mempunyai pengetahuan yang lemah (91.7%), sikap yang kurang baik (60.8%) dan mempunyai amalan yang kurang baik (72.5%).Kajian ini telah mendapati bahawa terdapat 44.2% sampel serum positif antibodi *Leptospira*. Analisis regresi telah dijalankan dan hasilnya menunjukkan bahawa responden yang berwarganegara Malaysia dan menjalankan aktiviti berkebun adalah lebih cenderung untuk mempunyai pengetahuan yang baik. Tambahan pula, kajian ini menunjukkan bahawa responden yang mempunyai pendidikan formal, menjalankan pembersihan di luar rumah, terdedah kepada air tercemar mempunyai kecenderungan yang lebih untuk mempunyai sikap yang baik. Nisbah odds menunjukkan bahawa responden wanita, menjalankan aktiviti berkebun, pergi melancong, melaksanakan pembersihan premis perniagaan dan mempunyai skor amalan yang kurang baik mempunyai lebih kecenderungan dalam mempunyai seropositif antibodi *Leptospira*. **Kesimpulan:** Bukti-bukti daripada kajian ini menunjukkan bahawa pendidikan kesihatan yang komprehensif hendaklah dilaksanakan di kalangan pekerja pasar mengenai leptospirosis dan pencegahannya.

Kata kunci: seroprevalen, kencing tikus, pengetahuan, sikap, amalan, pasar

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I certify that a Thesis Examination Committee has met on 20 March 2017 to conduct the final examination of Suhailah binti Samsudin on her thesis entitled "Knowledge, Attitude and Preventive Practice Towards Leptospirosis and Seroprevalence of Leptospira Antibodies among Market Workers in Selangor, Malaysia" in accordance with the Universities and University Colleges Act 1971 and the Constitution of the Universiti Putra Malaysia [P.U.(A) 106] 15 March 1998. The Committee recommends that the student be awarded the Master of Science.

Members of the Thesis Examination Committee were as follows:

Nor Afiah binti Mohd Zulkefli, MD
Associate Professor
Faculty of Medicine and Health Science
Universiti Putra Malaysia
(Chairman)

Hayati binti Kadir @ Shahar, MD
Senior Lecturer
Faculty of Medicine and Health Science
Universiti Putra Malaysia
(Internal Examiner)

Zeehaida Mohamed, PhD
Professor
Universiti Sains Malaysia
Malaysia
(External Examiner)

NOR AINI AB. SHUKOR, PhD
Professor and Deputy Dean
School of Graduate Studies
Universiti Putra Malaysia

Date: 2 June 2017

This thesis was submitted to the Senate of Universiti Putra Malaysia and has been accepted as fulfilment of the requirement for the Master of Science. The members of the Supervisory Committee were as follows:

Malina Osman, MD
Associate Professor
Faculty of Medicine and Health Sciences
Universiti Putra Malaysia
(Chairman)

Siti Norbaya Masri, MD
Senior Lecturer
Faculty of Medicine and Health Sciences
Universiti Putra Malaysia
(Member)

_____
ROBIAH BINTI YUNUS, PhD
Professor and Deputy Dean
School of Graduate Studies
Universiti Putra Malaysia

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Declaration by Members of Supervisory Committee

This is to confirm that:

- the research conducted and the writing of this thesis was under our supervision;
- supervision responsibilities as stated in the Universiti Putra Malaysia (Graduate Studies) Rules 2003 (Revision 2012-2013) are adhered to.

Signature: _____

Name of Chairman of Supervisory Committee: _____

Signature: _____

Name of Member of Supervisory Committee: _____

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

LIST OF ABBREVIATIONS

CDC	Communicable Disease Control
CSF	Cerebral Spinal Fluid
ELISA	Enzyme-linked Immunosorbent Assay
g	gram
IMR	Institute of Medical Research
kg	kilogram
MAT	Microscopic Agglutination Test
mg	milligram
ml	milliliter
PCR	Polymerase Chain Reaction
PPE	Personal Protective Equipment
RM	Ringgit Malaysia
SPFL	Severe Pulmonary Hemorrhagic Form Leptospirosis
UPM	Universiti Putra Malaysia
WHO	World Health Organization

LIST OF APPENDICES

CHAPTER 1

INTRODUCTION

1.1 Background of study

Leptospirosis is an infectious disease caused by pathogenic organisms belonging to the genus *Leptospira*, which are transmitted directly or indirectly from animals to humans. Leptospirosis is a major direct zoonosis (World Health Organization, 2003).Genus of *Leptospira* can be classified into two which are *Leptospira interrogans* (pathogenic leptospires) *and Leptospira biflexa* (saprophytic leptospire). Pathogenic *Leptospira* have a potential to cause disease whilst saprophytic *Leptospira* are free-living bacteria and do not cause disease (WHO, 2003).

Pathogenic leptospires are survived in the renal tubules and genital tracts of certain animals which are rodents, cattle, dogs, and pigs appear to be the predominant animal hosts in many countries (WHO, 2003). In the Asia-Pacific region, countries with high incidence rates (> 10 per 100,000 populations) are Bangladesh, Cambodia, Fiji, French Polynesia, the Andaman, and Nicobar Islands in India, Laos, Nepal, New Caledonia, Sri Lanka, Thailand and Vietnam. Countries like China, mainland India, Malaysia, New Zealand, the Philippines and Mongolia have moderately high incidence rates (1 – 10 per 100,000 population) while low incidence rates (< 1 per 100,000 population) are seen in countries like Australia, Hong Kong, Japan, South Korea and Taiwan (Victoriano, A., Smythe, L., Gloriani-Barzaga, N., Cavinta, L., Kasai, T., Limpakarnjanarat, K.,…Adler, B., 2009). In the developing countries of the Asia Pacific region, leptospirosis is largely a water-borne disease and climate change may further aggravate the extent of the problem (Lim, J. K., Murugaiyah, V. A., Ramli, A., Abdul Rahman, H., Mohamed, N. & Shamsudin, N., 2011).

Leptospirosis occurs in many countries but the incidence varies considerably and marked underreporting is common. Generally, there is a higher incidence in tropical countries (Sarkar, Chopra, Katageri, Raj, & Goel, 2012). Persons of all ages and sexes are susceptible to infection. Besides, it is also considered to be an occupational disease of individuals, who come in direct contact with infected animals, such as farmers, veterinarians, and abattoirs workers, and may also affect persons who have contact with the urine of animals having the disease for example sewer workers and sugarcane field workers. Occupational exposure towards leptospirosis probably accounts for 30-50% of human cases (Sapian, M., Khairi, M. T., How, S. H., Rajalingam, R., Sahhir, K., Norazah, A.,…Jamaludin, A. R., 2012). The main occupational groups at risk include farm workers, veterinarians, pet shop owners, field agricultural workers, abattoir workers, plumbers, meat handlers, coal miners, and workers in the fishing industry, military troops, and sewer workers (Sapian et al., 2012).

1.2 Problem statements

Market or *pasar* in Malaysia serves an important role in the modern urban environment and recreating industry, and has become one of important tourism resources. Night markets are popular destinations among locals where it can be found easily in almost every small town and city in every state including Selangor (Aziz, K. A. & Yeng, L. W., 2011). Other than night market, Malaysia also has a wet market which also known as a fresh food market. The market is the place which provides a variety of food although their cleanliness status is well known uncertain. According to a study by Subramaniam (2011) on rodents and human health risks at the wet market shows the majority of food workers and hawkers had symptom on health related problem. Furthermore, the outcome of the study shows about 72% rodent infestation and rodent species which had been identified exist in the study environment (Subramaniam, Abdul Hafiz, & Chandrakant, 2011). Wet market workers might pose a risk to acquire leptospirosis through exposure to *Leptospira* contaminating watery environment of the market. Furthermore, the risk not limited to leptospirosis, the previous study showed that 60 respondents had symptoms of health related problems are reported (Subramaniam et al., 2011).

Besides in Kuala Lumpur, Selangor also was known has the high-density population, especially in Klang Valley. Rampant urbanization of cities has been known can lead to improper garbage management system in urban areas, probably created favourable conditions for animal carriers (Benacer, D., Woh, P.Y., Mohd Zain, S.N., Amran, F. & Thong, K.L., 2013).Perhaps the most important animals associated with human leptospirosis are peridomestic rodents which are rats and mice (Mohan, A. & Chadee, D., 2011; World Health Organization, 2003). This may pose a health risk for leptospirosis as infected animals and carriers might contaminate environmental waters and soils via their excreta and urine (Doudi Benacer et al., 2013).

It is a norm to observe abundant of semi-solid and solid waste left at the site of the market after their operation ended during that specific day. Variety types of wastes such as solid, food and sometimes watery waste can be found in market areas when their closed. This will create favour environment to animal carriers such as rats and mice. The study shows solid waste accumulations become an important factor for urban rodent feeding and sheltering strategies. A study from Barcellos and Sabroza in 2011 shows densely populated urban areas displayed an excess of leptospirosis cases around waste accumulation sites (Barcellos, C. & Sabroza, P. 2001).

Previous study among local market seller towards leptospirosis showed that majority of them had moderate knowledge (51.4%), unsatisfactory attitude (90.0%) and satisfactory practice (64.3%). Thus, it is showed that the sufficient information on leptospirosis was not made available to the community especially among market workers (Ismail, Ahmad, Sarker, Lim, Ishak, Husin & Johari, 2016). Furthermore, previous study only focused on local market seller while recently lots of foreign were hired to become a worker in the market. This study included both Malaysian and immigrant workers who involved in this type of occupation.

1.3 Research Justification

Based on statistic cases reported by Jabatan Kesihatan Negeri Selangor (JKNS) showed there are two districts of Selangor which have a high number of cases in 2015 were Hulu Langat and Petaling. Both districts are located in urban areas of Selangor. High rodent infestation in urban Selangor causes a high risk of having leptospirosis among the population. A variety of occupations may easily expose towards leptospirosis in order to fulfill their job, they need to have contact with the environment.

Leptospirosis not only infects population who working with infected animals. It also gives risk to the population who has contact with the urine of animals having the disease (Shafei, MN., Mohd Rahim, S., Azwany, Y.N., Habsah, H., Zahiruddin, W.M., Aziah, B.D.,…Rusli,M.,2012). In an example, markets and hawker centres would attract rats if the waste is not disposed of properly (Henry, 2013). Thus, working as market workers and food handlers may pose a risk to have leptospirosis from the environment.

Market workers have a proneness to have leptospirosis if the location of the market had precarious sanitation conditions which attract infestation of rats and vulnerable to flood. Besides, a serious menace at wet markets and food courts was proved as rats are not just damaging electrical wires and food items but also transmitting dangerous diseases like leptospirosis (Henry, 2013). Hence, it is importance to have knowledge in leptospirosis especially on a transmission of the disease, the prevention and also treatment which can be implemented among market workers to avoid any cases occurs among them. In order to address this issue, the study of knowledge, attitude and preventive practice towards leptospirosis and seroprevalence of *Leptospira* antibodies among market workers in Selangor is important to be done. Furthermore, the data from this study will be a good baseline for market workers population to determine the seroprevalence among them and their level of knowledge, attitude and practices regarding leptospirosis since there is no study had been done.

1.4 Research Objective

1.4.1 General Objective

To study knowledge, attitude and preventive practice towards leptospirosis along with seroprevalence of *Leptospira* antibodies and associations between variables among market workers.

1.4.2 Specific Objectives

1. To determine demographic (age, gender, race, nationality) and socioeconomic indicators (education level, monthly income), risk factors, knowledge, attitude and preventive practices distribution towards leptospirosis among market workers.

2. To determine seropositivity of *Leptospira* antibodies and distribution of serovars among market workers.

3. To determine associated factors (demographic and socioeconomic indicators) to the level of knowledge, attitude and preventive practices towards leptospirosis among market workers.

4. To determine associated factors (demographic and socioeconomic indicators, risk factors, knowledge, attitude, and practice) to seropositivity of *Leptospira* antibodies among market workers.

5. To determine predictors influencing knowledge, attitude, practice and seropositivity of leptospirosis among market workers.

1.5 Research Hypothesis

1. There is a significant association between associated factors (demographic and socioeconomic indicators) with the level of knowledge, attitude and preventive practice towards leptospirosis among market workers.

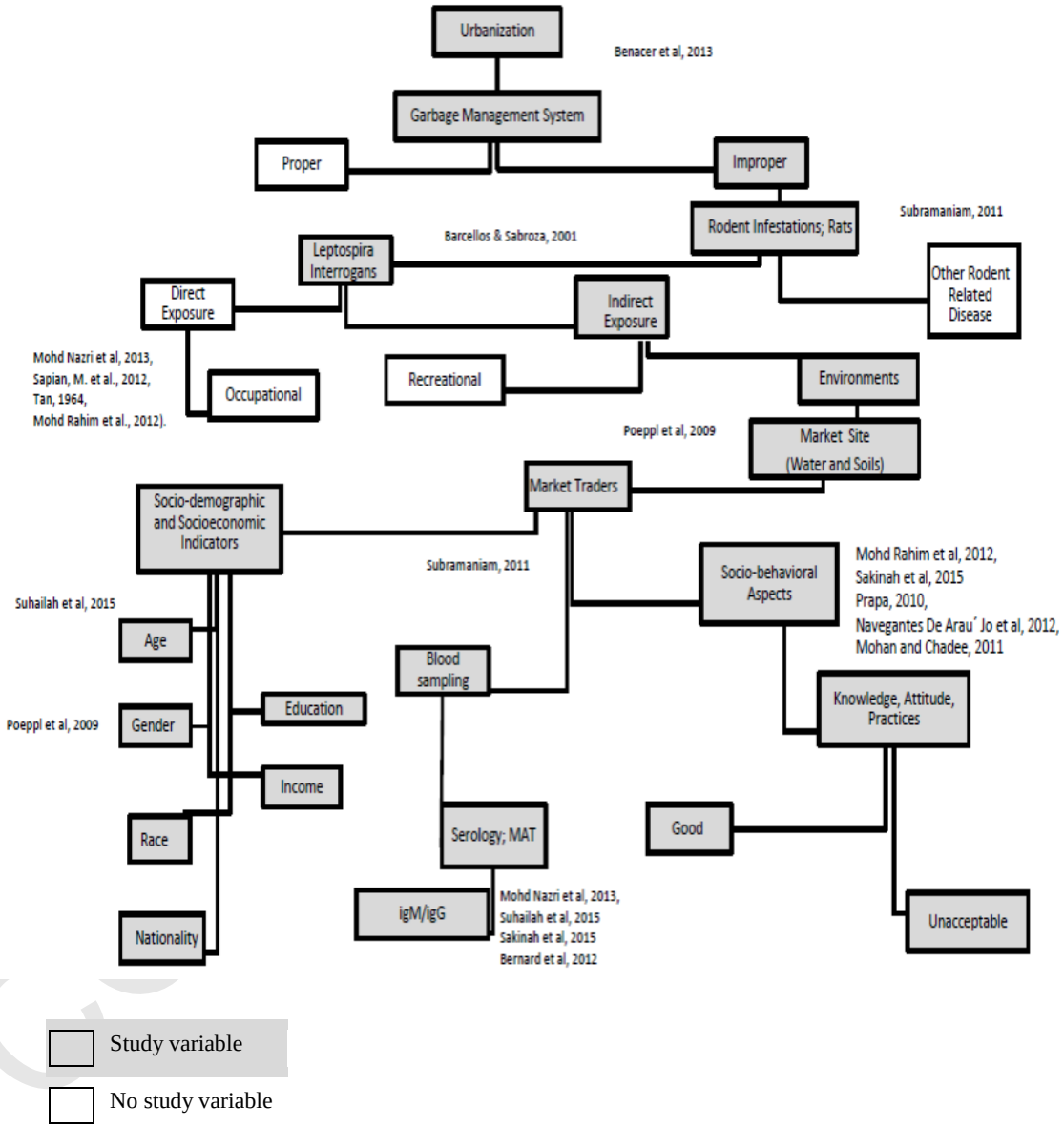
2. There is a significant association between associated factors (demographic and socioeconomic indicators, risk factors, knowledge, attitude and preventive practice) with seropositivity of *Leptospira* antibodies among market workers.

3. There is a probability of a predictors is associated with the knowledge, attitude, practice and seropositivity of leptospirosis among market workers.

1.6 Definition of variables

The conceptual definition of variables and operational definition of variables are in **Appendix A.**

1.7 Conceptual Framework



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