



**UNIVERSITI PUTRA MALAYSIA**

***SEROPREVALENCE AND FACTORS ASSOCIATED WITH  
Chlamydia trachomatis INFECTION AMONG SUBFERTILE  
COUPLES ATTENDING LOCAL PUBLIC SUBFERTILITY CLINIC***

**NILY WAHEEDA BINTI NEKMAT**

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By

**NILY WAHEEDA BINTI NEKMAT**

**Thesis Submitted to the School of Graduate Studies, Universiti Putra  
Malaysia, in fulfilment of the Requirements for the Degree of Master of  
Science**

**August 2020**

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

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**Chairman : Syafinaz Amin Nordin, MBChB, MPath  
Faculty : Medicine and Health Sciences**

*Chlamydia trachomatis* is one of the agents that cause the sexually transmitted infections called chlamydia. People practicing risky sexual behaviours such as having multiple sex partners, exercising sexual intercourse at an early age, and undergoing unprotected sexual intercourse (without condom) with casual partners, are at risk of getting *Chlamydia trachomatis* infection. One of the significant, long term implications of risky sexual behaviours and sexually transmitted infection is infertility problems.

The objectives of this study are to determine the seroprevalence of *Chlamydia trachomatis* (CT) among subfertile couples (husband and wife) of The Lembaga Penduduk dan Pembangunan Keluarga Negara (LPPKN) Subfertility Clinic and the factors associated with it (i.e. socio-demographic, duration of marriage, infertility factor, knowledge, attitude, practice of risky sexual behaviour (RSB) and predictors of *Chlamydia trachomatis* infection).

The study is a cross-sectional study involving 112 infertile couples who underwent fertility treatment at LPPKN Subfertility Clinic from February 2018 until February 2019. Socio-demographic factors, duration of marriage, infertility factor, knowledge, attitude and practice (KAP) of risky sexual behavior (RSB) variables were determined via self-administered questionnaire that includes close ended questions. Meanwhile, *Chlamydia trachomatis* antigen and antibody (CT IgG) were determined via Enzyme-Linked Immunosorbent Assay (ELISA) and rapid visual immunoassay test kit. This approach is selected to detect past and current infections of *Chlamydia trachomatis* through antibody and antigen detection in the blood serum, endocervical swab and urine samples.

The response rate of this study was 97.39%. Majority of the respondents were aged between 25–34 years old and dominated by Malay ethnicity. Half of the respondents were among those with tertiary level of education and working in the private sector. In term of duration of marriage, half of the samples were couples who have been married for 3–7 years with majority of them had primary infertility. The female factor was reported to be the most dominant, followed by the unexplained factor and male factor. The seroprevalence of *Chlamydia trachomatis* among subfertile couples was 22.1% with 14.7% in husbands and 17.9%, was reported among wives. In terms of knowledge, the results showed that most couples had high level of knowledge about risky sexual behaviours with a score of more than the mean (> 6) for both husbands and wives. Meanwhile, each husband and wife group had positive attitude towards risky sexual behavior. Approximately, 35.7% of husbands and 12.5% of wives were engaged with risky sexual behavior while a higher percentage of premarital sex was reported among the husbands compared to the wives. The chi-square results showed no association between CT status and socio –demographic factors, marital status and knowledge of RSB among subfertile couples. A significant association was recorded between CT and practices of RSB among couples ( $p < 0.05$ ) particularly among those with multiple sex partners and husbands who had premarital sex ( $p < 0.05$ ). However, the Binary Logistic Regression analysis showed that none of the selected variables were significant predictors of CT status among the couples ( $p > 0.05$ ).

This study has determined that the seroprevalence of *Chlamydia trachomatis* (22.1%) and practices of risky sexual behavior among subfertile couples were high. Even though the results have shown no association between the dependent and independent variables, our finding has given an evidence-based detection of past infection of *Chlamydia trachomatis* among subfertile couples. The practice of RSB has interrelated risk of getting CT and its long-term consequences particularly on women reproductive system. Since the awareness on CT among public is considered low, it is crucial to sensitize them about it to ensure early detection and prevention. Therefore, CT screening is strongly recommended to be integrated in fertility work up treatment and be promoted among sexually active adolescents and those young in age.

Keywords: Chlamydia, *Chlamydia trachomatis*, infertility, subfertile couples, seroprevalence, risky sexual behavior

Abstrak tesis ini telah dikemukakan kepada Senat Universiti Putra Malaysia sebagai memenuhi keperluan Ijazah Master Sains

**SEROPREVALEN DAN FAKTOR-FAKTOR YANG BERKAITAN  
KEBOLEHJANGKITAN *Chlamydia trachomatis* DALAM KALANGAN  
PASANGAN YANG MENDAPATKAN RAWATAN DI KLINIK  
SUBFERTILITI AWAM**

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*Chlamydia trachomatis* (CT) merupakan salah satu agen yang menyebabkan jangkitan seksual dinamakan sebagai chlamydia. Individu yang mengamalkan tingkahlaku seksual berisiko seperti mempunyai ramai pasangan seks, mengadakan hubungan seks pada usia muda dan hubungan seks tanpa perlindungan (kondom) dengan pasangan kasual adalah berisiko mendapat jangkitan *Chlamydia trachomatis*. Implikasi jangka panjang akibat tingkahlaku seksual berisiko dan jangkitan seksual akan lebih signifikan apabila individu mengalami masalah subfertiliti.

Untuk menentukan seroprevalen jangkitan *Chlamydia trachomatis* (CT) dan faktor-faktor berkaitan dengannya (sosiodemografi, tempoh lama berkahwin, faktor infertiliti, pengetahuan, sikap, dan praktis (KAP) terhadap tingkahlaku seksual berisiko serta faktor peramal kepada jangkitan *Chlamydia trachomatis* dalam kalangan pasangan subfertiliti (suami dan isteri) di Klinik Subfertiliti, Lembaga Penduduk dan Pembangunan Keluarga Negara (LPPKN).

Kajian secara keratan rentas telah dijalankan ke atas seramai 112 pasangan yang mengalami masalah subfertiliti dan mendapatkan rawatan Klinik Subfertiliti LPPKN mulai Februari 2018 sehingga Februari 2019. Variabel bagi sosiodemografi, tempoh lama berkahwin, faktor infertiliti, pengetahuan, sikap, dan amalan (KAP) terhadap tingkahlaku seksual berisiko (RSB) diperolehi daripada borang soal selidik (tadbir sendiri) yang merangkumi soalan-soalan tertutup.

Sementara itu, antibodi (CT IgG) dan antigen *Chlamydia trachomatis* ditentukan dengan teknik 'Enzyme-Linked Immunosorbent Assay (ELISA)' dan kit ujian visual pantas 'immunoassay'. Kaedah ini telah dipilih untuk mengesan jangkitan *Chlamydia trachomatis* (CT) yang lama dan jangkitan semasa melalui pengesanan antibodi dan antigen dalam serum darah, calitan endoservik dan air kencing.

Kadar respons oleh responden adalah 97.4%. Majoriti responden berumur di antara 25–34 tahun dan didominasi oleh etnik Melayu. Hampir setengah daripada responden adalah dalam kalangan mereka yang mempunyai tahap pendidikan tertiary dan bekerja di sektor swasta. Dari segi tempoh perkahwinan, setengah daripada responden adalah pasangan yang telah berkahwin di antara 3-7 tahun dengan majoritinya mengalami infertiliti tahap satu. Faktor wanita telah dilaporkan sebagai paling dominan, diikuti oleh faktor yang tidak diketahui dan faktor lelaki. Seroprevalen jangkitan *Chlamydia trachomatis* dalam kalangan pasangan subfertiliti adalah 22.1% dengan sebanyak 14.7% pada para suami manakala 17.9% telah dilaporkan dalam kalangan para isteri. Dari sudut pengetahuan, keputusan telah menunjukkan bahawa kebanyakan pasangan mempunyai tahap pengetahuan yang tinggi terhadap tingkahlaku seksual berisiko dengan skor melebihi min ( $> 6$ ) bagi kedua-dua para suami dan para isteri. Sementara itu, setiap kumpulan suami dan isteri mempunyai sikap yang positif dengan persetujuan sebanyak ( $>80\%$ ) pada kenyataan 'kepentingan mengetahui sejarah tingkahlaku seksual berisiko dan jangkitan seksual pasangan', ujian darah sebelum berkahwin, tingkahlaku seksual berisiko boleh menyebabkan jangkitan seksual dan tahap keseriusan isu tingkahlaku seksual berisiko dalam kalangan pasangan berkahwin. Kira-kira 35.7% daripada para suami dan 12.5% daripada para isteri telah mengamalkan tingkahlaku seksual berisiko dengan peratusan tertinggi dilaporkan pada seks sebelum berkahwin dalam kalangan para suami berbanding para isteri sebanyak. Keputusan ujian chi-square telah menunjukkan tidak terdapat perkaitan di antara status CT dan sosiodemografi, status perkahwinan dan tahap pengetahuan terhadap tingkahlaku seksual berisiko dalam kalangan pasangan subfertiliti. Perkaitan yang signifikan telah direkodkan di antara CT dan amalan terhadap tingkahlaku seksual berisiko dalam kalangan pasangan ( $p < 0.05$ ) terutamanya pada ramai pasangan seks dan seks sebelum berkahwin dalam kalangan para suami ( $p < 0.05$ ). Walaubagaimanapun, analisis *Binary Logistic Regression* telah menunjukkan bahawa tiada variabel yang telah dipilih adalah peramal yang signifikan kepada status CT dalam kalangan pasangan ( $p > 0.05$ ).

Kajian ini telah menentukan seroprevalen *Chlamydia trachomatis* (22.1%) dan amalan terhadap tingkahlaku seksual berisiko adalah tinggi dalam kalangan pasangan subfertiliti. Walaupun keputusan menunjukkan tiada perkaitan di antara variabel bersandar dan variabel-variabel tidak bersandar, kajian ini telah membuat penemuan berdasarkan bukti jangkitan terdahulu *Chlamydia trachomatis* telah dikesan dalam kalangan pasangan subfertiliti.

Amalan tingkahlaku seksual berisiko mempunyai hubungkait dengan risiko mendapat CT dan kesan jangkamasa panjang jangkitan ini terutamanya kepada sistem reproduksi wanita. Memandangkan tahap kesedaran orang ramai terhadap CT masih rendah, adalah penting untuk merangsang sensitisasi mereka demi memastikan pengesanan awal dan pencegahan dapat diambil. Oleh yang demikian, ujian saringan amat disyorkan untuk diintegrasikan di dalam rawatan kesuburan dan juga untuk dipromosikan dalam kalangan remaja dan anak muda yang aktif secara seksual.

Kata Kunci: Chlamydia, *Chlamydia trachomatis*, infertiliti, pasangan subfertiliti, seroprevalen, tingkahlaku seksual berisiko





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## LIST OF ABBREVIATIONS

AIDS	Autoimmune Deficiency Syndrome
CT	<i>Chlamydia trachomatis</i>
°C	Degree Celsius
DOM	Duration of Marriage
EB	Elementary body
g	Gram
hrs	Hours
HFEA	Human Fertilisation and Embryology Authority
HIV	Human Immunodeficiency Virus
IF	Infertility Factor
IgG	Immunoglobulin G Antibody
KAP	Knowledge, Attitude and Practice
Min	Minute
ml	Millilitre
nm	Nanometer
PCOS	Polycystic Ovarian Stimulation
PID	Pelvic Inflammatory Disease
RB	Reticulate body
RPM	Revolutions Per Minute
RSB	Risky Sexual Behaviour
SDB	Social Desirability Bias
STI	Sexual Transmitted Infection
SPSS	Statistical Package for the Social Sciences
TFI	Tubal Factor Infertility
µg	Microgram
µL	Microliter
%	Percentage

# CHAPTER 1

## INTRODUCTION

### 1.1 Overview

*Chlamydia trachomatis* is the bacterial agents that caused chlamydia. Chlamydia is a Sexual Transmitted Infection (STI) probably common in some western countries, but not in Malaysia (Awang, Wong, Jani, & Low, 2014; Folasayo et al., 2017). World Health Organization (WHO) has reported 100.4 million individuals were found being infected by chlamydia worldwide, while 8 million infections has been recorded in South and Southeast Asia in 2008 (World Health Organisation (WHO), 2012). Unlike other STI, chlamydia is preventable and easily treated. Therefore, it can be controlled accordingly as a primary prevention. Nevertheless, the concern is the long term effects of chlamydia infection. (Tsevat, Wiesenfeld, Parks, & Peipert, 2017) reported, several studies indicate that long-term effects of past history of chlamydia infections have caused significant risks of tubal infertility and clinical symptoms in women.

People practicing risky sexual behaviour such as having multiple sex partners, sexual intercourse at early age and unprotected sexual intercourse with casual partners, are at risk of getting *Chlamydia trachomatis* infection. Long-term implications of risky sexual behaviour and sexually transmitted infection apparently will be more significant when individuals suffer from infertility problems. Recently, Ministry of Health Malaysia has released in the latest 2019 HIV/AIDS country report documenting that the spread of HIV/AIDS has shifted from infecting drug to sexual transmission by heterosexuals and homosexuals activities. This situation triggers a question mark because the same route could also transmit *Chlamydia trachomatis* and cause chlamydia.

However, data on *Chlamydia trachomatis* incidence in Malaysia is limited. In addition, information on the prevalence of *Chlamydia trachomatis* infection among subfertile couples is inadequate. Firstly, this could be related to the difficulties in conducting study in fertility centre and secondly the information can only be obtained if the individuals come forward and seek treatment. Although subfertility is not a life-threatening, it plays an important role in ensuring a psychological-emotional harmony in a marriage.

A family is the foundation of a community and nations. While individual happiness is the most important indicator towards the success of a country. Nowadays, many developed countries are facing a reduction of fertility rates among young couples. Malaysia has experienced a decline in total fertility

rate from 3.3 in 1995 to 2.1 in 2012, it is also projected to decline to 1.97 in 2015 and further to 1.79 in 2030 (Tey & Ng, 2012). Centre of Disease Control and Prevention (CDC) has stated that infertility could be caused by various factors such as genetic abnormalities, infectious agents and environmental factors (National Public Health Action Plan, 2014). In the literature, a few researchers have explored knowledge, attitude and practice (KAP) but mostly focused on sexual transmitted disease among adolescent (Folasayo *et al.*, 2017, Osuafor & Ayiga, 2016, Awang *et al.*, 2014). Currently there is limited information on KAP of risky sexual behaviour among subfertile couples in Malaysia.

## 1.2 Problem Statement

Risky sexual behaviour may increase the risk of *Chlamydia trachomatis* (CT) infection among intimate relationship network. Intimate relationship network is a particularly close interpersonal relationship which involves two or more individuals. It could be defined by the characteristics of intimate relationship with people that we are attracted to, people that we like and love, and having romantic and sexual relationship. Long term implications of risky sexual behaviour and sexual transmitted infection apparently will be more significant when individuals suffer from infertility problems. However, information about prevalence of *Chlamydia trachomatis* infection among sub-fertile couples in Malaysia is limited. Currently there is also limited information on knowledge, attitude and practice (KAP) of risky sexual behaviour among subfertile couples in Malaysia.

## 1.3 Research Question

The study was designed to answer the research questions which are:

1. What are the sociodemographic (SD), Duration of Marriage (DOM) and Infertility Factor (IF) of subfertile couples of LPPKN Subfertility Clinic?
2. What is the seroprevalence of *Chlamydia trachomatis* (CT) among subfertile couples attending LPPKN Subfertility Clinic?
3. What are the Knowledge, Attitude and Practice (KAP) of Risky Sexual Behaviour (RSB) subfertile couples of LPPKN Subfertility Clinic?
4. What are the associations between *Chlamydia trachomatis* (CT) and:
  - Socio Demographic (SD)
  - Duration of Marriage (DOM)
  - Infertility Factor (IF)
  - Knowledge, Attitude and Practice (KAP) of Risky Sexual Behavior (RSB)
5. What are the predictors of *Chlamydia trachomatis* (CT) among subfertile couples attending LPPKN Subfertility Clinic.

## **1.4 Research Objectives**

### **1.4.1 General Objective:**

To determine the seroprevalence of *Chlamydia trachomatis* (CT) among subfertile couples attending LPPKN Subfertility Clinic and its associated factors.

### **1.4.2 Specific Objectives:**

1. To determine the socio-demographic (SD), duration of marriage (DOM) and infertility factor of subfertile couples.
2. To determine the seroprevalence of *Chlamydia trachomatis* (CT) among subfertile couples.
3. To determine the Knowledge, Attitude and Practice (KAP) of Risky Sexual Behaviour (RSB) among sub-fertile couples.
4. To determine the association between *Chlamydia trachomatis* (CT) and:
  - Socio Demographic (SD)
  - Duration of Marriage (DOM)
  - Infertility Factor (IF)
  - Knowledge, Attitude and Practice (KAP) of Risky Sexual Behaviour (RSB) among subfertile couples attending LPPKN Subfertility Clinic.
5. To determine the predictors of *Chlamydia trachomatis* (CT) among subfertile couples attending LPPKN Subfertility Clinic.

## **1.5 Hypotheses**

The hypothesis of the study is 'there are associations between *Chlamydia trachomatis* (CT) and Risky Sexual Behaviour (RSB) among subfertile couples'.

## 1.6 Significance of Study

Data and findings on the prevalence of *Chlamydia trachomatis* (CT) infection and factors associated with it among subfertile couples are expected to be an 'evidenced – based recommendation' to improve fertility cases management and to upgrade the quality of service, effective as well as 'patient- friendly' services.

The fertility treatment also could be a platform to educate patients particularly on the importance of risky sexual behavior, its impact on sexual transmitted disease and its association with infertility problems.





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