UNIVERSITI PUTRA MALAYSIA

EFFECTIVENESS OF HEALTH EDUCATION IN IMPROVING KNOWLEDGE AND ATTITUDE TOWARDS TOXOPLASMOSIS AMONG PREGNANT WOMEN IN AL NAJAF, IRAQ

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By

ATHEER KADHIM IBADI

Thesis Submitted to the School of Graduate Studies, Universiti Putra Malaysia, in Fulfilment of the Requirements for the Degree of Doctor of Philosophy

October 2016

DEDICATION

TO

Dedicated especially to my parents, my love, and partner of my life (my wife), To my dear daughter Fatemah the sense who make me possible to complete my study successfully

Abstract of thesis presented to the Senate of Universiti Putra Malaysia in fulfillment of the requirements for the degree of Doctor of Philosophy

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Chairman : Titi Rahmawati Binti Hamedon, PhD
Faculty : Medicine and Health Sciences, Department of Community Health

The aim of this study is to determine the effect of intervention by health education on the knowledge and attitude on toxoplasmosis among pregnant women with toxoplasmosis in Al- Najaf Al- Ashraf – Iraq-2014. The study compared the scores of knowledge and attitudes between the baseline against the first and second posttests and within three stages and groups, and determine the association of these factors with their sociodemographic characteristics, both Experiment and Control groups. Intervention study design, and a simple random sampling technique was used to select the 340 respondents, who were patients from gynecological clinic from three hospitals. Data was collected from 1st June to 31st October 2015 using a structured pre-tested questionnaire in Arabic language and the response rate was 100 %. The results of this study showed that most of the respondents were housewife, young, had low level of education and live in urban area. At base line there was no significant statistical differences of score between both groups in terms of the overall knowledge on toxoplasmosis. However, the knowledge score of both groups became different statistically at first and second posttests. Findings on the attitude showed that both groups had positive attitude towards toxoplasmosis at baseline and first posttest. However, at second posttest the attitude of the Control Group became negative, whereas the attitude of the Experimental Group remained positive. There was statistically significant difference of the mean score of knowledge between both groups in all different stages of data collections. Repeated measurement using ANOVA with a Greenhous-Geisser correction showed that the mean score according to all items of knowledge on toxoplasmosis infection were differed significantly within time and also differed significantly in the interaction between groups. The same test also showed that the mean score of attitudes on toxoplasmosis were significantly different within baseline, first posttest, and second posttest and also differed significantly within the time between groups. In conclusion, this study showed that the level of knowledge and attitude related to toxoplasmosis among the pregnant women infected with toxoplasmosis in Al-Najaf province is unsatisfactory at the baseline, but it became better after they were given health education on toxoplasmosis.

Abstrak tesis yang dikemukakan kepada Senat Universiti Putra Malaysia sebagai memenuhi keperluan untuk ijazah Doktor Falsafah

KEBERKESANAN PENDIDIKAN KESIHATAN DALAM MEMPERBAIKI PENGETAHUAN DAN SIKAP TENTANG TOXOPLASMOSIS DI KALANGAN WANITA MENGANDUNG DI AL NAJAF, IRAQ

Oleh:

ATHEER KADHIM IBADI

Oktober 2016

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Tujuan kajian ini adalah untuk menentukan kesan intervensi melalui pendidikan kesihatan ke atas pengetahuan dan sikap terhadap toxoplasmosis di kalangan wanita mengandung yang menghidap penyakit toxoplasmosis di Al-Najaf al-Ashraf - Iraq-2014. Kajian membandingkan skor pengetahuan dan sikap di peringkat awal, ujian pertama dan kedua pada dua kumpulan berbeza (Ujian dan Kawalan) dan untuk menentukan hubungan antara faktor sosiodemografi dengan pengetahuan dan sikap mereka terhadap toxoplasmosis. Dengan menggunakan rekabentuk kajian intervensi, seramai 340 orang peserta kajian telah dipilih secara rambang di klinik sakit puan dari tiga hospital. Data dikumpulkan mulai 1 Jun hingga 30 Oktober 2015 menggunakan borang soal selidik berstuktur yang telah di pra uji, menggunakan Bahasa Arab. Kadar respon adalah 100%. Hasil kajian menunjukkan kebanyakan peserta kajian adalah suri rumahtangga, berusia muda, berpendidikan rendah, serta tinggal di bandar. Di peringkat awal diadapati tiada perbezaan signikan skor pengetahuan antara dua kumpulan tersebut. Skor tersebut menjadi berbeza secara signifikan pada ujian pertama dan ke dua. Walaubagaimanapun sikap peserta kajian pada ke dua kumpulan adalah positive di peringkat awal. Pada ujian ke dua sikap Kumpulan Kawalan menjadi negative sedangkan sikap kumpulan Kajian tetap positif. Didapati perbezaan statistik yang signifikan untuk purata skor pengetahuan pada ke dua kumpulan di dalam semua peringkat pengumpulan data. Ujian berulang menggunakan kaedah ANOVA dengan pembetulan Greenhouse-Geisser menunjukkan perbezaan skor tersebut masih berbeza secara signifikan mengikut waktu dan interaksi antara kumpulan. Untuk sikap, hasil yang sama juga telah didapati dan ujian menggunakan kaedah yang sama menunjukkan purata skor sikap berbeza secara signikan mengikut waktu dan interaksi antara kumpulan. Secara kesimpulan, kajian ini menunjukkan bahawa tahap pengetahuan dan sikap peserta kajian terhadap toxoplasmosis adalah tidak memuaskan, tetapi menjadi lebih baik setelah diberikan pendidikan tentang toxoplasmosis.

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LIST OF ABBREVIATIONS

KAP	Knowledge, Attitude, and Practice
AIDS	Acquired immuno Deficiency Syndrome
LAT	Latex Agglutination Test
DLA	Direct Latex Agglutination
ELA	Enzyme Immuno Assay
DDIA	Dipstick Dye Immuno Assay
ELISA	Enzyme Linked Immuno Sorbent Assay
IgG	Immunoglobulin G
IgM	Immunoglobulin M
Kg	Kilogram
HIV	Human Immuno Viruses
CSF	Cerebral Spinal Fluid
AbS	Antibodies
DAT	Direct Agglutination Test
T. gondii	Toxoplasma gondii
IHAT	Indirect Haemagglutination Test
AF	Amniotic Fluid
CMI	Cell Mediated Immunity
IFAT	Indirect Fluorescent Antibodies
RH	Rimbunan Hijau Group
TSA	Tachyzoites soluble antigen
ELFA	Enzyme -Linked Fluorescent
ISAGA	Immuno Sorbent Agglutination Assay
PCR	Polymerase Chain Reaction
DNA	Deoxyribo Nucleic Acid
WHO	World Health Organization
UPM	University Putra Malaysia

US	United Nation of America
VIDAS	Routine batch or random access testing for serology, immunochemistry, antigen detection and immunohemostasis.
DT	Sabin-Feldman Dye Test
IFAT	Indirect Immuno-Fluorescent Antibody Test
n	Sample size
Ho	Null hypothesis
Ha	Alternative Hypothesis
ANOVA	Analysis of Variance
IQD	Iraqi Dinar
US	The United State of America
RM	Malaysian Ringet
Abs	Antibodies

CHAPTER 1

INTRODUCTION

1.1 Background

Toxoplasmosis is defined as a parasitic disease caused by an intracellular protozoan called *Toxoplasma gondii* (Jones et al., 2001). This parasite infect human and most of warm blooded animals genus, but cat are considered as the essential host. The dangerous implications of this disease can not only affect pregnant women but it can also have severe consequences on fetuses. The transmission rate of this disease to the fetus ranges from 10-15% at the first trimester of pregnancy and may reach to 68% in the third trimester of pregnancy (Remington, Thulliez, & Montoya, 2004).

Toxoplasmosis is the third leading cause of infectious disease in the US after salmonellosis and listeriosis (Dubey & Jones, 2008). The infection has a worldwide distribution. Onethird of all human beings have been exposed to this parasite. However, the seroprevalence of this disease varies considerably between countries, from less than 10% to more than 90% (Pawlowski et al., 2001). Toxoplasmosis infection occurs worldwide even though the rates of infection differs substantially geographically. A survey which was conducted on women of childbearing age from 44 countries and which included 99 studies found the areas with high prevalence of toxoplasmosis (Pappas, Roussos & Falagas, 2009). The findings are shown in Table 1 below.

Table 1.1: Prevalence of toxoplasmosis among women of childbearing age in selected continents

Place	**Prevalence (%)**
Within Latin America	50–80
Parts of Eastern and Central Europe	20–60
The Middle East	30-50
Parts of Southeast Asia	20–60
Parts of Africa	20–55

(Pappas, Roussos & Falagas, 2009)

In other studies, the prevalence of disease and risk factors of transmission of toxoplasmosis infection varies substantially between countries (Abu-Madi, Al-Molawi & Behnke, 2008).

In Iraq, many studies were done concerning that seroprevalence of toxoplasmosis by using different diagnostic techniques in various regions (Al-Kalaby, 2008; Khalil, 2008; and Al- Mousawi, 2008). These studies found that the incidence rate of

toxoplasmosis among women who had abortion in Najaf, Baghdad, and Basrah were 31.9%, 25%, and 26.1% respectively (Taher, 2011). A study was conducted in 2007 in Al-Najaf to determine the prevalence of *Toxoplasma gondii* among female in the age group of 16-26 years old. This study showed that the highest prevalence of the infection was highest, 68%, among those respondents in the age group 25-26 years (Al-Nahi & Al-Abbas, 2007).

Toxoplasmosis can be avoided by giving health information about the source of infection to those who are at risk, especially pregnant women. This will encourage them to change their behavior, and thereby reducing the probability to acquire the infection during pregnancy (Hall, Ryan & Buxton, 2001). However, few studies have examined the effectiveness of health education despite numerous pleas in the published literature for a stronger focus on primary prevention of toxoplasma infection among pregnant women. Existing guidelines for such care are also lacking (Jones, et al, 2003; Conyn-van Spaendonck & Van Knapen, 1992; Baril, et al, 1999; Foulon, Naessens & Ho-Yen, 2000).

There are not many report available that address the effectiveness of health education in reducing toxoplasmosis. One exception is a 1994 survey of 196 health districts in the United Kingdom which demonstrated that health education was offered in approximately half of the health units surveyed. However there were serious deficiencies found in the monitoring to see whether information was given to all women (Newton and Hall., 1994). In France, primary prevention for toxoplasmosis was also recommended, but its practices were not assessed or evaluated (Ancelle, et al., 1996). One case control study of risk factors for toxoplasmosis seroconversion in pregnant women showed that controls were more likely to have received documentary advice on prevention than cases (Baril, et al., 1999).

Health care providers should make preconception, prenatal and natal investigations and health education to prevent toxoplasmosis as standard of care for pregnant women. Educational materials that contain messages on how to prevent pregnant women from becoming infected have resulted in reducing rates of seroconversion (Gollub et al., 2008). Effective prevention of congenital toxoplasmosis depends on avoidance of infection during pregnancy (Lebech, et al., 1999).

There is no much published work found on the information about the frequency of preventive practice behaviors on toxoplasmosis infection among pregnant women. While knowledge is a crucial determinant to establish behavioral change, precise knowledge may not lead to appropriate preventive behavior. Attitudes of pregnant women towards changing their behavior and their perception about the likelihood of contracting the infectious disease during their pregnancy may also be important contributors to establish behavioral change (Pereboom et al., 2013).

1.2 Problem statement

Toxoplasmosis is an important public health problem. This disease is responsible for substantial rate of neonatal morbidity and mortality, particularly in congenitally infected and immuno-compromised individuals (Tenter, Heckeroth & Weiss, 2000; Luft, et al., 1993). In Iraq 2011, women with previous history of abortion and those with abnormal pregnancies had the highest prevalence of toxoplasmosis (57.1%), and those women are within the age range of 26 and 30 years old. One of the reasons for the high prevalence is related to female handling raw meat more frequently than male, and they spend more time cooking at home (Mohammed, Ahmed & Hussain, 2013). There were many studies conducted on toxoplasmosis among pregnant women in different regions in Iraq (Mohammed, 2011; Mohammad, Ahmed, & Hussain, 2013; Al- Mousawi, 2008). For example, in Tikrit, the prevalence of toxoplasmosis among pregnant women who attended gynecological clinics were about 49-95% (Al-Doori, 2010). In Thi-Qar, the figure was 50% (Hadi, 2011). Many studies were carried out to the determine the seroprevalence of toxoplasmosis by using different diagnostic techniques among pregnant women in various regions of Iraq (Al-Kalaby, 2008; Khalil, 2008; Al- Mousawi, 2008). These studies found the incidence rate of toxoplasmosis among women with previous history of abortion in Najaf, Baghdad, and Basrah were 31.9%, 25%, and 26.1% respectively (Taher, 2011).

In 2007, the highest prevalence of *Toxoplasma gondii* infection detected using latex agglutination test (LAT) technique was recorded among female (pregnant and non-pregnant women) in the age group of 25-26 year (68 %) (Al-Nahi & Al-Abbas, 2007). Two years later in Al-Abbasiya Najaf, the same technique showed a prevalence of 43.7% positive cases of toxoplasmosis among respondent in the age group of 18-27 years old (Hussain, Yousif & Nassir, 2010). In Baghdad province in the same year, about 33.3% of women who had abortion found to have infected with toxoplasmosis (Al-Garawia, Al-Fartusie & Al-Bairmani, 2012). In 2013 in Kirkuk city there was 7.2% of pregnant women who had abortion twice were infected with toxoplasmosis (Salman, 2014). In 2011 in Al-Najaf province, 35% of newborns were infected with congenital toxoplasmosis (Al-haris, Saheb & Abdul-Sada, 2015). Most of the infection occurred among young pregnant women of 26-30-year-old group (Al-Nahi & Al-Abbas, 2007; Mohammed, Ahmed & Hussain, 2013). Also, in the same place in 2009, a study found that there was 48% of patient's children age less than six years (pre-school age) positive with IgG anti-toxoplasma antibodies (Taher, 2011). Although there were many studies conducted in Iraq generally and in Al-Najaf particularly to diagnose toxoplasmosis infection, there were none that looked into the knowledge and attitudes of pregnant women toward toxoplasmosis.

Globally, it is estimated that about one-third of the world's population is infected with toxoplasmosis (Pappas et al., 2009). In the Netherlands, the incidence rate of congenital toxoplasmosis is two children per 1000 live births, which is ten times higher than those in Denmark and twenty times higher than those in Ireland (Ross, Jones & Lynch, 2006). High prevalence of toxoplasmosis infection has been reported among pregnant women and women of reproductive age from different areas around the world including the in the Middle East (Pappas et al., 2009). The prevalence of toxoplasmosis among the pregnant women who attended to the gynecological clinic in

Saudi Arabia-Jazan was 24.1% in 2014 (Aqeely, et al., 2014), 31.6% in Jordan (Jumaian, 2005), 35.1% in Qatar, Abu-Madi et. al., (2010) and 55% in Lebanon Beirut Bouhamdan, et al., (2010). The prevalence of such infection was 34.6% in the United Arab Emirates (Abu-Zeid, 2002).

1.3 Study justification

Pregnant women are exposed to various health risks during pregnancy. The global maternal mortality from the year 1990 to 2015 dropped by about 44% (WHO, UNICEF & UNFPA, 2012). However, the maternal mortality is still higher in the poorer communities. The large gap in the number of maternal deaths in some regions in the world illustrates inequities of health care services and highlights the differences between the rich and poor. In developing countries, the maternal mortality rate is 239 for every 100 000 live births in 2015, whereas, in developed countries it is 12 per 100 000 live births (WHO, 2015).

Among the serious complications of toxoplasmosis during pregnancy are fetal death and stillbirths (Moncada & Montoya, 2012). Stillbirths that are caused by toxoplasmosis infections are more commonly occurring in developing than in developed countries (Goldenberg & Thompson, 2003). The knowledge about the epidemiology of *T. gondii* infection in women who had stillbirths, miscarriages and abnormal pregnancy are still poor (Adesiyun, et al., 2007).

In Iraq, health problems during with pregnancy and deaths associated with childbirth have increased. The estimation of maternal mortality for 2013 was 84 per 100 000 live births; the neonatal deaths rate was 19 per 100 000 live births (UNICEF, 2013). According to the Iraqi Ministry of Health in 2000, 24.3% of registered newborn babies had birth weight that is less than 2.5 kg (Wells et al., 2011). About 15.3% of women with history of abortion in Baghdad in 2013 were infected with toxoplasmosis (Hussan, 2013). The rate of toxoplasmosis infection among those with abnormal pregnancy was 2% in Kirkuk city in 2012 (Aljumaily & Alsamarai, 2013). In the same city in 2014, there was 26.7% of women with bad obstetric history infected with toxoplasmosis, 94.1% of them had a stillbirth and 74.1% of them had a miscarriage (Mohammad & Salman, 2014). In 2009, there were 55% of pregnant women who were infected with toxoplasmosis in Erbil Governorate and majority of them were illiterate (Hamad & Kadir, 2014). One study conducted in Kirkuk city in 2012 found that 21% of pregnant women were positive for IgG of toxoplasmosis antibodies, and most of them were not educated about toxoplasmosis (Aljumaily & Alsamarai, 2013). Many studies have been conducted to detect of toxoplasmosis in Iraq using different techniques. However, there were no studies that looked at the knowledge and attitudes related to toxoplasmosis.

Hence, establishing the database about the knowledge and attitudes related to toxoplasmosis is considered to be very crucial in order to plan for making prevention programs. The prevention programs will, hopefully reduce the maternity risks of developing toxoplasmosis and increase their quality life. Health education, if done regularly will increase their knowledge and awareness about the disease, and

eventually will reduce the incidence of getting toxoplasmosis.

1.4 Objectives of the study

1.4.1 General Objectives

The main purpose of this study is to determine the effect of health education intervention on the knowledge and attitudes related to toxoplasmosis among pregnant women with toxoplasmosis in Al- Najaf Al- Ashraf – Iraq.

1.4.2 Specific Objective

1- To describe the socio-demographic characteristics of respondents.
2- To determine the knowledge and attitudes scores on toxoplasmosis among the respondents at different stages - at baseline stage, after there were given health education intervention and at three months after the intervention.
3- To compare the level of knowledge and attitudes on toxoplasmosis among the respondents within at different stages (as mentioned above).
4- To determine the association between the level of knowledge and attitudes with socio-demographic characteristics of the respondents.
5- To determine the correlation between the level of knowledge and attitudes on toxoplasmosis with sociodemographic characteristics of respondent.

1.5 Study Hypothesis

1- There is a significant difference in the level of knowledge and attitudes towards toxoplasmosis between Experiment and Control groups.
2- The level of knowledge related to toxoplasmosis among pregnant women in Al-Najaf province is low.
3- The attitude related to toxoplasmosis among pregnant women in Al-Najaf province is negative.
4- There is a significant association between knowledge and attitudes related to toxoplasmosis among pregnant women in Al-Najaf province and socio-demographic characteristics.
5- There is a significant difference in the levels of knowledge and attitudes related to toxoplasmosis among three stages of data collection of the study.

1.6 Conceptual framework

Toxoplasmosis has been known as a disease with various risk factors, which include past medical and obstetric history, socio-demographic characteristics, geographical distribution, housing conditions index, source of infection, pet ownership, toxoplasmosis immunization status, and knowledge, attitudes, and practices (KAP).

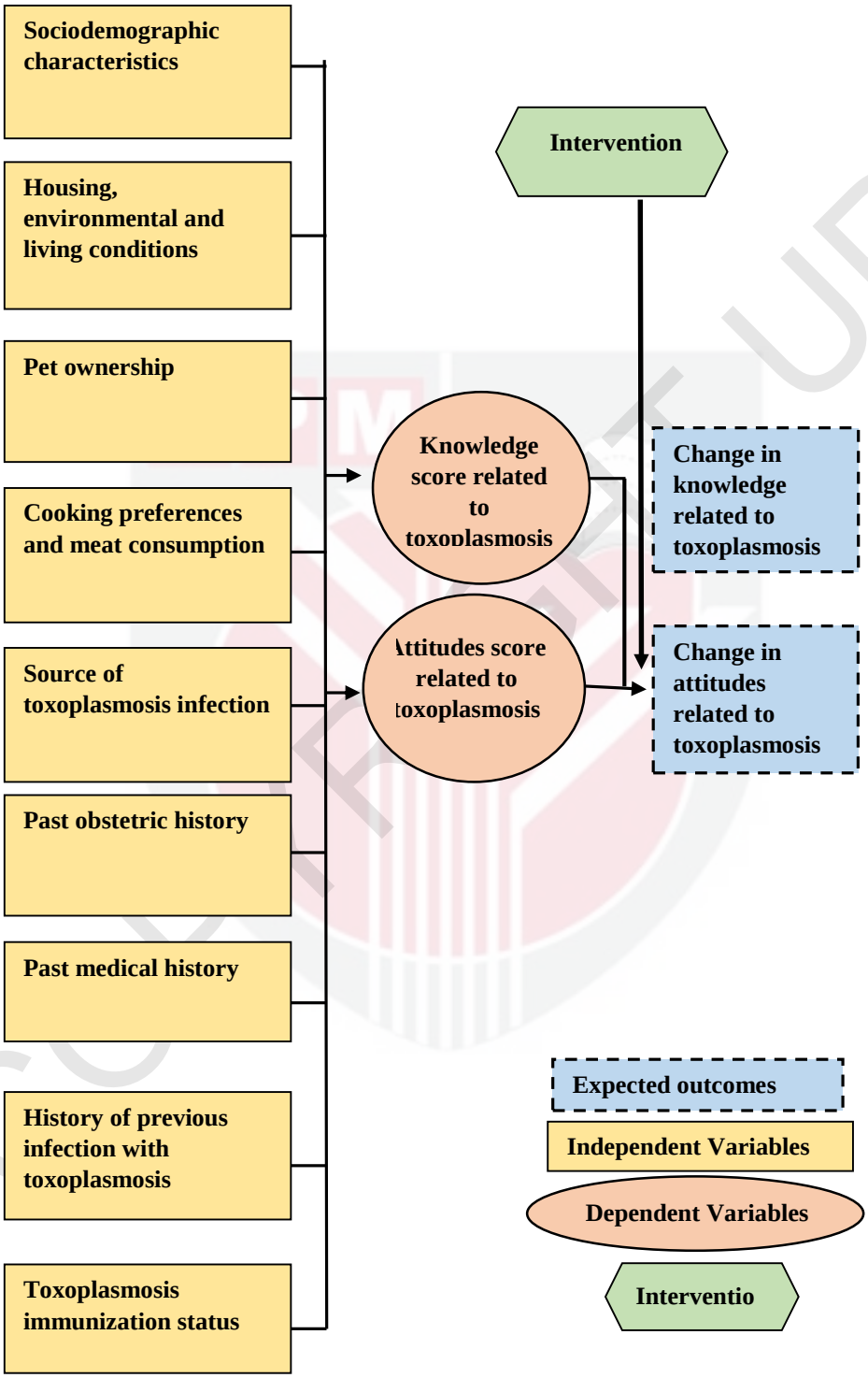

Figure 1.1: Conceptual framework of this study

1.7 Definitions of Terms

Risk Factors: Factors that increase a woman's chances of getting toxoplasmosis are called risk factors. Risk factors are not necessarily causes of toxoplasmosis but are associated with an increased chance of getting toxoplasmosis. Different risk factors can control (modifiable risk factors, e.g. diet and lifestyle) (Goldman & Hatch, 2000).

Toxoplasmosis infection: A parasitic disease caused by toxoplasma gondii. This disease usually causes no symptoms in adult humans. Sometimes there may be a few weeks or months of mild flu-like illness such as muscle aches and tender lymph nodes. This parasite may invade tissues and damage the brain, especially of the fetus and newborn (CDC, 2012).

Socio-demographic characteristics: Define as a set of variables for any human such as a given population's age, ethnicity, and socioeconomic status, whether they reside in an urban or rural area (Fletcher & Hirdes, 2002).

Housing conditions: A group of elements of the quality for any house to be suitable for people who are living at that place such as availability of sufficient space in the dwelling, availability of basic sanitary facilities (such as a bath or shower or indoor flushing toilet), the wider residential area, availability of good ventilation and availability of natural and artificial lighting (Verma & Betti, 2006).

Pet ownership: A person who owns a pet such as dog or cat (Conlee, Stephens & Rowan, 2009).

Cooking preferences: The type of food that is liked, wanted and preferred more than another type. Cooking preferences can describe user-configured values for cooking parameters (Tasevska, et al., 2011).

The source of infection: Defined as the person, animal, object or substance have the ability to harboring the infectious agent and spread it to the host (Friis & Sellers, 2013).

Past obstetric history: Define as the previous information about gestational age, history of current pregnancy, antenatal history, previous pregnancies, menstrual history, sexual history, and gynecological conditions (O'Connor & Kovacs, 2003).

Past medical history: The patient's health status before the presenting problem, which is included the medical information about the past diseases and medical conditions (O'Connor & Kovacs, 2003).

Immunization status: Describes the current status of the vaccination event or a record of a vaccination as reported by a patient, a clinician's or another party (Shefer, et al., 2011).

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LIST OF PUBLICATIONS

Ibadi, A. K., & Hamedon, T. R. (2015). The Sociodemographic Characteristics Of Pregnant Women With Toxoplasmosis In Al-Qadisiyah-Iraq. *International Journal Of Public Health And Clinical Sciences*, *2*(6), 59-67.

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