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

ATHEER KADHIM IBADI

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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
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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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By

ATHEER KADHIM IBADI

October 2016

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

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\textit{Atheer Kadhim Ibadi}
I certify that a Thesis Examination Committee has met on 10 October 2016 to conduct the final examination of Atheer Kadhim Ibadi on his thesis entitled "Effectiveness of Health Education in Improving Knowledge and Attitude Towards Toxoplasmosis among Pregnant Women in Al Najaf, Iraq" 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 Doctor of Philosophy.

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# TABLE OF CONTENTS

<table>
<thead>
<tr>
<th>ABSTRACT</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>ABSTRAK</td>
<td></td>
</tr>
<tr>
<td>ACKNOWLEDGEMENTS</td>
<td>iii</td>
</tr>
<tr>
<td>APPROVAL</td>
<td>vi</td>
</tr>
<tr>
<td>DECLARATION</td>
<td>v</td>
</tr>
<tr>
<td>LIST OF TABLES</td>
<td>xiv</td>
</tr>
<tr>
<td>LIST OF FIGURES</td>
<td>xvi</td>
</tr>
<tr>
<td>LIST OF ABBREVIATIONS</td>
<td>xvii</td>
</tr>
</tbody>
</table>

## CHAPTER

### 1 INTRODUCTION

1.1 Background 1
1.2 Problem Statement 3
1.3 Study Justification 4
1.4 Objectives of the Study 5
  1.4.1 General Objectives 5
  1.4.2 Specific Objectives 5
1.5 Study Hypothesis 5
1.6 Conceptual Framework 5
1.7 Definitions of Terms 7

### 2 LITERATURE REVIEW

2.1 Introduction in Toxoplasmosis
  2.1.1 History of Toxoplasmosis 9
  2.1.2 Classification of Toxoplasmosis 9
  2.1.3 Mode Of Toxoplasmosis Transmission 9
  2.1.4 T. Gondii Life Cycle 9
  2.1.5 Toxoplasmosis in Pregnant Women 12
2.2 Epidemiology 13
  2.2.1 Toxoplasmosis in The World 13
  2.2.2 Toxoplasmosis in Arab Countries 12
  2.2.3 Toxoplasmosis in Iraq 15
2.3 Pathogenesis 15
2.4 Congenital Toxoplasmosis 19
2.5 Diagnosis of Toxoplasmosis 20
  2.5.1 Direct Microscope Examination Methods 21
    2.5.1.1 Animal Inoculation and Cell Culture 21
    2.5.1.2 Histological Diagnosis 21
    2.5.1.3 Isolation of T. Gondii 21
  2.5.2 Indirect Methods 21
    2.5.2.1 Skin Test (Delayed Hypersensitivity Test) 21
    2.5.2.2 Serological Tests 22
    2.5.2.3 Sabin-Feldman Dye Test (DT) 22
    2.5.2.4 Indirect Fluorescent Antibodies Test (IFAT) 22
    2.5.2.5 Direct Agglutination Test (DAT) 22

ix
2.5.2.6 Indirect Hemagglutination Test (IHAT) 22
2.5.2.7 Latex Agglutination Test (LAT) 22
2.5.2.8 Dipstick Dye Immunoassay (DDIA) 23
2.5.2.9 Enzyme-Linked Immunosorbent Assay (ELISA) 23
2.5.2.10 Enzyme-linked Fluorescent Assay (ELFA) 23
2.5.2.11 IgM-Immunosorbent Agglutination Assay (IgM-ISAGA) 23
2.5.2.12 IgG Avidity Test 23
2.5.2.13 Molecular Diagnosis 23

2.6 Treatment of Toxoplasmosis 24
2.7 Prevention of Toxoplasmosis 24
2.8 Risk Factors of Toxoplasmosis 26
2.8.1 Sociodemographic Characteristics 26
2.8.2 Geographical Distribution 26
2.8.3 Past Obstetric History 26
2.8.4 Past Medical History 27
2.8.5 Housing, Environmental And Location Conditions 27
2.8.6 History Immunization of Toxoplasmosis 27

2.9 Knowledge Toward Toxoplasmosis 27
2.10 Attitudes Toward Toxoplasmosis 29
2.11 Intervention Studies And Toxoplasmosis 30

3 MATERIALS AND METHODS
3.1 Ethical Consideration 33
3.2 Study Location 33
3.3 Design Of Study 35
3.4 Sampling 35
3.4.1 Study Population 35
3.4.2 Sample of Study 35
3.4.3 Selection Criteria 35
3.4.3.1 Inclusion Criteria 35
3.4.3.2 Exclusion Criteria 35
3.4.4 Sampling Frame 36
3.4.5 Sample Selection 36
3.4.6 Randomization and Blinding Procedure 36
3.4.7 Sample Size 38
3.4.7.1 Calculation of Sample Size 38
3.5 Study Intervention 39
3.6 Instrument 40
3.6.1 Knowledge, Attitudes and Practices Related to Toxoplasmosis 43
3.6.1.1 Knowledge on Toxoplasmosis 43
3.6.1.2 Attitudes on Toxoplasmosis 43

3.7 Validity and Reliability of Questionnaire 43
3.7.1 Pre-Testing 43
3.7.1.1 Reliability Results for Pre-Test 43
3.7.2 Reliability Results for Current Study 44
3.7.3 Validity of Contents 44
4 RESULTS
4.1 Response Rate 48
4.2 Results related to independent variables 48
  4.2.1 Socio-Demographic Characteristics of Respondents 49
  4.2.2 Housing, Environment, and Location Conditions 51
  4.2.3 Past Obstetric History 52
  4.2.4 Pet Ownership for Respondents 53
  4.2.5 Cooking Preferences and Meat Consumption 54
4.3 Knowledge and attitudes score at baseline, first and second posttest 55
  4.3.1 At Baseline 55
    4.3.1.1 Baseline Scores of Knowledge on Toxoplasmosis Infection 55
    4.3.1.2 Source of Information About Toxoplasmosis 57
    4.3.1.3 Description of Attitudes Score of Respondents Toward Toxoplasmosis at Baseline 58
  4.3.2 At First Post test Results 59
    4.3.2.1 The Results of knowledge Toward Toxoplasmosis 59
    4.3.2.2 Attitudes Scores of Respondents Toward Toxoplasmosis 62
  4.3.3 At Second Post test 64
    4.3.3.1 Knowledge Score of Respondents on The Toxoplasmosis Infection at Second Post test 64
    4.3.3.2 Attitudes scores of respondents Toward Toxoplasmosis at Second Post test 67
4.4 Comparison of knowledge and attitudes score within three stages and between groups 68
  4.4.1 Knowledge Scores Differences 69
  4.4.2 Attitudes Score Differences on Toxoplasmosis Infection 70
4.5 Association between the score of knowledge and attitude for three stages for both groups with sociodemographic characteristics 72
  4.5.1 Association of Score of Knowledge and Attitudes with Sociodemographic Characteristics 73
    4.5.1.1 At Baseline 73
    4.5.1.2 At the First Post test 75
    4.5.1.3 At the Second Post test 77
    4.5.1.4 Summary on Association of Knowledge and Attitudes with Sociodemographic Characteristics 79
4.6 Summarizing of the results 79
5 DISCUSSION

5.1 Sociodemographic Characteristics of Respondents
5.1.1 Age
5.1.2 Monthly income
5.1.3 Level of education
5.1.4 Occupation
5.1.5 Living location

5.2 Knowledge on Toxoplasmosis
5.2.1 Score of Knowledge at Baseline Level
5.2.1.1 Overall Knowledge Score
5.2.1.2 The Level of Knowledge Scores on Animals That Transmit of Toxoplasmosis
5.2.1.3 The Score of Knowledge on The Commonest Signs and Symptoms of Toxoplasmosis
5.2.1.4 The Score of Knowledge on Serious Complications of Toxoplasmosis
5.2.1.5 Knowledge on Toxoplasmosis Prevention
5.2.1.6 Source of Information
5.2.1.7 Knowledge on Source of Toxoplasmosis Infection

5.2.2 Scores of Knowledge at The First Post test
5.2.2.1 The Score of Knowledge About the Animals That Transmit of Toxoplasmosis
5.2.2.2 The Score of Knowledge on The Commonest Signs and Symptoms of Toxoplasmosis
5.2.2.3 According to The Serious Complications of Toxoplasmosis
5.2.2.4 The Score of Knowledge on The Methods of Toxoplasmosis Prevention
5.2.2.5 Knowledge on Source of Toxoplasmosis Infection

5.2.3 Score of Knowledge at The Second Post test
5.2.3.1 The Score of Knowledge About the Animals That Transmit of Toxoplasmosis
5.2.3.2 The Score of Knowledge on The Commonest Signs and Symptoms of Toxoplasmosis
5.2.3.3 According to The Serious Complications of Toxoplasmosis
5.2.3.4 The Score of Knowledge on The Methods of Toxoplasmosis Prevention
5.2.3.5 Knowledge on Source of Toxoplasmosis Infection

5.3 Differences in knowledge Among the Three Phases of Study

5.4 Difference of Attitudes and Practices Toward Toxoplasmosis Between Groups
5.4.1 At Baseline
5.4.2 At the First Post test 99
5.4.3 At the Second Post test 99
5.5 Differences in Attitudes and Practices Toward Toxoplasmosis Among the Three Phases of Study 100
5.6 The Relationship Between Knowledge, Attitudes, and Practices with The Sociodemographic Characteristics 101

6 SUMMARY AND CONCLUSION
6.1 Acceptance and Rejection of the study hypothesis 106
6.2 Summary and Conclusion 106
6.3 Limitations and Strength of the study 107
6.4 Recommendations and Further studies 108

REFERENCES 109
APPENDICES 137
BIODATA OF STUDENT 186
LIST OF PUBLICATIONS 187
# LIST OF TABLES

<table>
<thead>
<tr>
<th>Table</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.1 Prevalence of toxoplasmosis among women of childbearing age in selected continents</td>
<td>1</td>
</tr>
<tr>
<td>2.1 Studies on health education intervention about toxoplasma infection in pregnancy in selected countries</td>
<td>25</td>
</tr>
<tr>
<td>2.2 Different intervention studies in selected countries</td>
<td>32</td>
</tr>
<tr>
<td>3.1 Pre-testing reliability test result</td>
<td>41</td>
</tr>
<tr>
<td>3.2 Reliability test results for this study</td>
<td>44</td>
</tr>
<tr>
<td>4.1 Comparing the sociodemographic characteristics of respondent (Experiment and Control)</td>
<td>49</td>
</tr>
<tr>
<td>4.2 Comparison of the response of respondents according to housing conditions</td>
<td>51</td>
</tr>
<tr>
<td>4.3 Distribution of respondents who have a past obstetric history</td>
<td>52</td>
</tr>
<tr>
<td>4.4 Distribution of respondents according to their parity</td>
<td>52</td>
</tr>
<tr>
<td>4.5 Distribution of respondents according to animal’s ownership</td>
<td>53</td>
</tr>
<tr>
<td>4.6 Distribution of respondents according to types of food and its preferences</td>
<td>54</td>
</tr>
<tr>
<td>4.7 Comparison the level of attitudes of respondents according to the types of food and its preferences</td>
<td>54</td>
</tr>
<tr>
<td>4.8 Knowledge score of respondents who had a correct answer about toxoplasmosis infection</td>
<td>56</td>
</tr>
<tr>
<td>4.9 Distribution of perception scores of respondents about toxoplasmosis infection</td>
<td>58</td>
</tr>
<tr>
<td>4.10 Comparing the levels of attitudes score of respondents on toxoplasmosis infection at baseline</td>
<td>59</td>
</tr>
<tr>
<td>4.11 Knowledge score of respondents who had a correct answer about toxoplasmosis infection at first post test</td>
<td>60</td>
</tr>
<tr>
<td>4.12 Comparing the score of knowledge on toxoplasmosis at first post test</td>
<td>61</td>
</tr>
<tr>
<td>4.13 Distribution of perception score of respondents about toxoplasmosis infection at first post test</td>
<td>63</td>
</tr>
<tr>
<td>4.14 Comparing the level attitudes score of respondents about toxoplasmosis infection at first post test</td>
<td>63</td>
</tr>
</tbody>
</table>
4.15 knowledge scores of respondents who had a correct answer about toxoplasmosis infection at second post test

4.16 Comparing the knowledge score of respondents on toxoplasmosis infection at second post test

4.17 Distribution of perception scores of respondents on toxoplasmosis infection at second post test

4.18 Comparing the levels of attitudes scores of respondents on toxoplasmosis infection at second post test

4.19 Comparison the knowledge score in baseline stage, after intervention and after three months from intervention within the Experiment and Control groups

4.20 Comparing the knowledge scores on toxoplasmosis between the Experiment and Control groups

4.21 Attitudes score of respondents for three stages of study on toxoplasmosis infection

4.22 Comparison the attitudes score in baseline stage, after intervention and after three months from intervention within the Experiment and control groups

4.23 Comparing the attitudes score on toxoplasmosis between the Experiment and Control groups

4.24 Summary the association of the score of knowledge and attitudes with sociodemographic characteristics

4.25 Correlation regression among overall knowledge and attitudes scores and sociodemographic characteristics between the Experiment and Control groups
# LIST OF FIGURES

<table>
<thead>
<tr>
<th>Figure</th>
<th>Description</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.1</td>
<td>Conceptual framework of this study</td>
<td>6</td>
</tr>
<tr>
<td>2.1</td>
<td>Major routes of transmission of T. gondii</td>
<td>11</td>
</tr>
<tr>
<td>2.2</td>
<td>Life cycle of T. gondii</td>
<td>12</td>
</tr>
<tr>
<td>2.3</td>
<td>Prevalence of toxoplasmosis in Iraq from 2000 to 2012</td>
<td>16</td>
</tr>
<tr>
<td>2.4</td>
<td>Prevalence of toxoplasmosis in Al-Najaf according to the real time of work</td>
<td>17</td>
</tr>
<tr>
<td>2.5</td>
<td>Prevalence of toxoplasmosis according to the geographical distribution for years 2003-2012 from different studies</td>
<td>18</td>
</tr>
<tr>
<td>2.6</td>
<td>Number of toxoplasmosis cases in Iraq for years 1989-2001</td>
<td>19</td>
</tr>
<tr>
<td>3.1</td>
<td>Map of the study location</td>
<td>34</td>
</tr>
<tr>
<td>3.2</td>
<td>Study flow chart of Experiment and Control groups</td>
<td>37</td>
</tr>
<tr>
<td>3.3</td>
<td>Flow chart development of the questionnaire of this study</td>
<td>41</td>
</tr>
<tr>
<td>3.4</td>
<td>Flow chart of data collection process for the study of both groups</td>
<td>45</td>
</tr>
<tr>
<td>4.1</td>
<td>Distribution of respondents according to the source of respondent’s information about toxoplasmosis</td>
<td>57</td>
</tr>
<tr>
<td>4.2</td>
<td>Scatter plot of correlation between the overall knowledge score and overall attitudes score of Experiment at baseline</td>
<td>73</td>
</tr>
<tr>
<td>4.3</td>
<td>Scatter plot of correlation between the overall knowledge score and overall attitudes score of Control group at baseline</td>
<td>74</td>
</tr>
</tbody>
</table>
# LIST OF ABBREVIATIONS

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

<table>
<thead>
<tr>
<th>Place</th>
<th>Prevalence (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Within Latin America</td>
<td>50–80</td>
</tr>
<tr>
<td>Parts of Eastern and Central Europe</td>
<td>20–60</td>
</tr>
<tr>
<td>The Middle East</td>
<td>30–50</td>
</tr>
<tr>
<td>Parts of Southeast Asia</td>
<td>20–60</td>
</tr>
<tr>
<td>Parts of Africa</td>
<td>20–55</td>
</tr>
</tbody>
</table>

(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 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).
Sociodemographic characteristics

Housing, environmental and living conditions

Pet ownership

Cooking preferences and meat consumption

Source of toxoplasmosis infection

Past obstetric history

Past medical history

History of previous infection with toxoplasmosis

Toxoplasmosis immunization status

Knowledge score related to toxoplasmosis

Attitudes score related to toxoplasmosis

Change in knowledge related to toxoplasmosis

Change in attitudes related to toxoplasmosis

Intervention

Expected outcomes

Independent Variables

Dependent Variables

Intervention

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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BIODATA OF STUDENT

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