

**The Republic of Iraq  
Ministry of Higher Education  
And Scientific Research  
University of Babylon  
College of Nursing**



**Knowledge and Practices Related to the Preventive  
Measures for TORCH Diseases among Nurse-Midwives  
in Maternity Teaching Hospitals in Babylon Province**

Dissertation submitted by

***Marwa Mohammed Abed Al-Jaleel***

To the Council of College of Nursing, University of Babylon in  
partial fulfillment the requirement for the Degree of Doctorate of  
Philosophy in Nursing Sciences

*Supervisors*

***Prof. Dr. Saadya Hadi Humade (Ph.D)***

***Assist. Prof. Dr. Jenan Akbar Shakoor (Ph.D)***

**2022 A.D.**

**1444A.H.**

بِسْمِ اللَّهِ الرَّحْمَنِ الرَّحِيمِ

«وَإِذَا مَرِضْتُ فَهُوَ يَشْفِينِ»

صدق الله العلي العظيم

الآية 80 من سورة الشعراء «

## ***Dedication***

- *To the one who encouraged me to persevere all my life, to the most prominent man in my life (my dear **father**).*
- *To whom I rise, and upon whom I rest, to the giving heart (my great **mother**).*
- *To the spirit of my dear aunt and my uncle, if they were alive, they would be proud of me, I miss you so much.*
- *To My brothers & my sister for supporting me with all love and respect.*
- *To My dear colleagues with all appreciation, and respect.*

## ***Supervisor Certification***

We certify that this dissertation, which is entitled ***“Knowledge and Practices Related to the Preventive Measures for TORCH Diseases among Nurse-Midwives in Maternity Teaching Hospitals in Babylon Province”*** was prepared under my supervision at the College of Nursing, University of Babylon in partial fulfillment of the requirements for the Degree of Philosophy Doctorate in Nursing.

***Signature***

***Prof. Dr. Saadya H. Humade***

***Supervisor***

***Al-Mustaqbal University College /Nursing Department***

***Date:    /    / 2022***

***Signature***

***Assist. Prof. Dr. Jenan A. Shakoor***

***Supervisor***

***College of Nursing/ University of Kirkuk***

***Date:    /    / 2022***

***Signature***

***Assist. Prof. Dr. Wafaa Ahmed Ameen***

***The head of the Department of Maternal and Neonate Health Nursing***

***College of Nursing/ University of Babylon***

***Date:    /    / 2022***

# ***Committee Certification***

We, the examining committee, certify that we have read this dissertation entitled (***Knowledge and Practices Related to the Preventive Measures for TORCH Diseases among Nurse-Midwives in Maternity Teaching Hospitals in Babylon Province***) which is submitted by the student (***Marwa Mohammed Abed Al- Jaleel***) from the Department of Maternal and Neonate Nursing, and we have examined the student in its contents, and what is related to it and we decide that it is adequate for awarding the (***Doctorate of Philosophy in Nursing***) with specialty of Maternal and Neonate Nursing at an estimate of ( ).

**Signature**

***Prof. Dr. Bushra J. Umran AL-Rubyae***

**Member**

Date / / 2022

**Signature**

***Prof. Dr. Naji Y. Saadoon***

**Member**

Date / / 2022

**Signature**

***Prof. Dr. Nuhad Mohammed Al-Doori***

**Member**

Date / / 2022

**Signature**

***Assist. Prof. Dr. Hiba J. Hamza***

**Member**

Date / / 2022

**Signature**

***Prof. Dr. Amean A. Yasir***

**Chairman**

Date / / 2022

Approved by the council of the College of Nursing

**Dean**

***Prof. Dr. Amean A. Yasir***

College of Nursing/ University of Babylon

Date / / 2022

## Acknowledgment

- First of all, "great thanks to **Allah**" the most merciful, for granting me the wisdom, patience, and strength to initiate and successfully complete this research.
- I would like to express my thanks to the **Ministry of Health, and Ministry of Higher Education and Scientific Research** for offering me the opportunity to achieve my study.
- My sincere thanks to **Prof. Dr. Amean A. Yasir, Ph.D.** Dean of College of Nursing/ Babylon University.
- My great thanks to **Prof. Dr. Nuhad M. Al-Doori**, Associated dean for scientific affairs, Faculty of Nursing, University of Babylon.
- Special thanks to **Assist prof. Dr. Wafaa Ahmed, Ph.D.**, the head of the Department of Maternal and Neonate Nursing in Nursing College.
- Sincere thanks and appreciation to my supervisor **Prof. Dr. Saadya Hadi Humade** for her wisdom and continuous g that helped me to overcome and complete the dissertation, Al-Mustaqbal University college, department of nursing.
- Sincere thanks and appreciation to my supervisor **Assist. Prof. Dr. Jenan Akbar Shakoor** for her wisdom and continuous guidance that helped me to overcome and complete the dissertation, Faculty of Nursing, University of Kirkuk.
- I would like to express my sincere thanks and respect to **Prof. Dr. Hussein J. Al-Ibrahimi, Ph.D.**, college of nursing, Babylon university, may his soul rest and peace.
- I would like to express my sincere thanks and respect to **Assist. Prof. Dr. Haider Hamza, Ph.D.**, College of Nursing, Al-Kufa university for statistical guidance assistance.
- My deepest and sincere thanks to the **experts** for their suggestions and for evaluating the study instrument.
- I am grateful to the **library staff** at the Nursing College /University of Babylon for their cooperation and assistance.
- Special thanks to the hospital administration of **Babil teaching** hospital for maternity and children and **Al-amam Al-Sadeq** teaching hospital
- Finally, Great thanks to all **nurse-midwives** who participated in this study and who helped me in making this dissertation possible to be achieved.

## Abstract

TORCH diseases can cross the placenta and damage the fetus in utero or transmit to the infant during the peripartum period, resulting in neonatal infection. TORCH diseases abbreviated include Toxoplasmosis, Other (Varicella-Zoster virus infection, Syphilis, Hepatitis B), Rubella, Cytomegalovirus, and Herpes Simplex virus.

A cross-sectional descriptive study design was accomplished from 1<sup>st</sup> November /2020 to 3<sup>rd</sup> April/ 2022. The study involved (138) nurse-midwives was carried out in maternal teaching hospitals in Babylon province. The sample of the study was a non-probability convenient sampling technique. The researcher selected (75) from the Babil teaching hospital for maternity and children and (63) from Al-amam Al-Sadeq teaching hospital and selected from the maternity unit, emergency room, delivery room, and maternal operating room.

The validity was determined through the distribution of the questionnaire to (17) experts. A pilot study was conducted on (20) midwives to estimate the reliability of the questionnaire. The data were analyzed through descriptive and inferential statistics.

More than one-third of the nurse-midwives were reported at age 21–30 years, and less than half of the sample had a diploma in midwifery. The present study expressed that the majority of midwives have moderate knowledge related to toxoplasmosis. The majority of midwives were moderate knowledge related to preventive measures for TORCH, while less than two-thirds were poor practices. The current study revealed that there was a significant association between midwives' knowledge and their education level and their years of experience at a *p-value* <0.05. Also, the study results demonstrated that there was a significant association between the midwives' practices and their age groups, and their years of experience at a *p-value* <0.05. As well, the study illustrated that there was a significant

association between midwives' knowledge and their practices at a p-value  $<0.05$ .

The study concluded that there was a poor level of midwives' practices regarding preventive measures for TORCH diseases. As well a significant association was found between the knowledge and training courses of midwives. In addition, the study concluded that there was a significant association between practices and years of experience of midwives.

The study recommended that training courses about preventive measures for TORCH diseases for midwives as they are one of the main sources of information about diseases. Also, the study recommended that workshops to best practices guidelines for midwives on how to deal with TORCH diseases.

## Table of Contents

### Contents

Acknowledgment .....	I
Abstract .....	II
Table of Contents .....	IV
Table of Figures .....	VIII
Content of Table .....	IX
.....	XIII
Chapter One .....	1
Introduction.....	1
1.1 Introduction.....	1
1.2 Importance of Study.....	6
1.3 Statement of the Problem.....	10
1.4 Objectives of the Study .....	11
1.5 Research Questions.....	11
1.6 Research Hypothesis:.....	11
1.7 Definition of Term .....	12
1.7.1 Knowledge .....	12
1.7.2 Practices .....	12
1.7.3 Preventive Measures: .....	12
1.7.4 TORCH Diseases .....	13
1.7.5 Nurse-Midwives:.....	13
Chapter Two.....	14
Review of literature.....	14
2.1 Historical Background .....	14
2.2. Theoretical Framework:.....	21
2.3 Introduction to TORCH Diseases: .....	24
2.4 Toxoplasmosis: .....	25
2.4.1. Causative Organism: .....	25
2.4.2. Mode of Infection: .....	25
2.4.3. Prevalence:.....	25
2.4.4. Pathogenesis of Vertical Transmission: .....	26
2.4.5. Clinical Features: .....	26
2.4.6. Diagnosis: .....	27
2.4.7. Clinical Therapy: .....	30
2.4.8. Nursing Diagnosis:.....	31

2.4.9. Nursing Plan and Implementation: .....	31
2.5. Others .....	32
2.5.1 Chickenpox (Varicella-Zoster Virus): .....	32
2.5.1.1. Infective Organism.....	32
2.5.1.2. Mode of Infection: .....	32
2.5.1.3. Prevalence .....	32
2.5.1.4. Clinical Features: .....	33
2.5.1.5. Congenital Varicella Syndrome: .....	33
2.5.1.6. Zoster During Pregnancy: .....	33
2.5.1.7. Neonatal Varicella: .....	34
2.5.1.8. Maternal Infection around the Time of Delivery: .....	34
2.5.1.9. Preventive Measures .....	35
2.5.1.10. Diagnosis: .....	35
2.5.1.11. Management of Chickenpox in Pregnancy: .....	36
2.5.2. Syphilis .....	36
2.5.2.1. Causative Organism: .....	36
2.5.2.2 Mode of Infection: .....	37
2.5.2.3. Prevalence: .....	37
2.5.2.4. Mechanisms/Pathophysiology .....	38
2.5.2.5. Clinical Features .....	38
2.5.2.6. Diagnosis: .....	39
2.5.2.7. Management:.....	40
2.5.2.8 Complications: .....	41
2.5.3. Hepatitis B: .....	42
2.5.3.1. Causative Organism: .....	42
2.5.3.2. Mode of Infection: .....	42
2.5.3.3. Prevalence: .....	42
2.5.3.4 Clinical Features: .....	42
2.5.3.5. Diagnosis: .....	43
2.5.3.6. Management:.....	43
2.6. Rubella: .....	44
2.6.1. Causative Organism: .....	44
2.6.2. Mode of Infection: .....	44
2.6.3. Prevalence .....	44
2.6.4. Pathophysiology:.....	45
2.6.5. Clinical Features: .....	46
2.6.6. Complications: .....	46

2.6.7. Diagnosis: .....	47
2.6.8. Vaccines .....	47
2.6.9. Fetal-Neonatal Risks: .....	48
2.6.10. Clinical Therapy: .....	49
2.6.11. Nursing Care Management: .....	49
2.6.11.1. Nursing Diagnoses .....	49
2.6.11.2. Nursing Plan and Implementation.....	50
2.7. Cytomegalovirus: .....	50
2.7.1. Causative Organism: .....	50
2.7.2. Mode of Infection: .....	50
2.7.3. Prevalence: .....	50
2.7.4. Clinical Features: .....	51
2.7.5. Cytomegalovirus Pathogenicity .....	51
2.7.6. Diagnosis of Cytomegalovirus:.....	52
2.7.7. Fetal-Neonatal Risks .....	53
2.7.8. Management:.....	54
2.7.9. Vaccines against Cytomegalovirus .....	54
2.8. Genital Herpes: .....	55
2.8.1. Causative Organism: .....	55
2.8.2. Mode of Infection: .....	55
2.8.3. Incidence: .....	55
2.8.4. Pathophysiology.....	56
2.8.5. Risk Factors .....	56
2.8.6. Clinical Manifestations: .....	56
2.8.7. Diagnosis: .....	58
2.8.8. Complications of Genital Herpes:.....	59
2.8.9. Clinical Therapy: .....	59
2.8.10. Nursing Care Management: .....	61
2.8.10.1. Nursing Diagnosis:.....	61
2.8.10.2. Nursing Plan and Implementation:.....	61
2.9. Role of Knowledge in Preventing TORCH Diseases .....	61
2.10. Role of Practices in Preventing TORCH Diseases .....	62
2.11. Previous Studies.....	63
Chapter Three.....	69
Methodology .....	69
3.1. Design of the Study:.....	69
3.2. Ethical and Administrative Arrangement: .....	69

3.3 Ethical Consideration:.....	70
3.4. Setting of the Study:.....	70
3.5. The Sample of the Study:.....	70
3.6. Inclusion Criteria: .....	71
3.7. Instrument of the Study:.....	71
3.8 Validity of the Instrument: .....	72
3.9 Pilot Study:.....	73
3.10 Reliability of the Questionnaires: .....	74
3.11 Method of Data Collection:.....	75
3.12. Rating and Scoring:.....	76
3.13. Limitation of the Study: .....	76
3.14. Statistical Procedure for Data Analysis .....	77
Chapter Four Results of the Study .....	81
Chapter Five Discussion of the Results .....	113
Chapter Six.....	132
Conclusions &Recommendation.....	132
References.....	134

## Table of Figures

Figure 2. 1 Conceptual Framework of Florence Nightengale’s Environmental Theory (Aligood, 2013). .....	23
Figure 2. 2 Application of the Florence Environmental Theory on Nurse-Midwives regarding prevention of TORCH Diseases (design by the researcher). .....	24
Figure 2. 3 Congenital Toxoplasmosis. (A) Intracerebral calcifications and hydrocephalus. (B) Acute retinitis (Neu et al., 2015).....	27
Figure 2. 4 Vesicular Rashes (Gershon et al., 2015).....	36
Figure 2. 5 Syphilis Ulcer (Peeling et al., 2017).....	39
Figure 2. 6 Rubella Rash (Sati & Arya, 2019).....	46
Figure 2. 7 Genital herpes (Crimi et al., 2019). .....	57
Figure 4. 1 Overall Assessment of Nurses-midwives’ Knowledge Related to TORCH Diseases .....	101
Figure 4. 2 Overall Evaluation of Nurses-midwives Practices Related to TORCH Diseases....	108

## Content of Tables

Table 3. 1 Distribution of the Study Sample according to their Settings.....	70
Table 3. 2 Distribution of the Study Sample according to Hospitals.....	71
Table 3. 3 Reliability Coefficient of the Study Instrument.....	74
Table 4. 1 Distribution of Demographic Variables of the studied group (n=138).....	81
Table 4. 2 Nurse-midwives Knowledge Regarding Preventive Measures according to TORCH Diseases .....	83
Table 4. 3 Nurses-midwives Practices Preventive Measures TORCH Disease.....	102
Table 4. 4 Relationship between Nurses-midwives Knowledge and their Demographic Characteristics.....	108
Table 4. 5 Relationship between Nurses-midwives Practices and their Demographic Characteristics.....	110
Table 4. 6 Statistical Relationship between Knowledge and their Practices of Nurses-midwives (n=138).....	111
Table 4. 7 Correlation between Nurses-midwives Knowledge and Practices (n=138).....	112
Table 4.2. 1 Knowledge Related to Preventive Measures of Toxoplasmosis Diseases. (n=138)	83
Table 4.2. 2 Overall Assessment of Knowledge Related to Preventive Measures of Toxoplasmosis Disease (n=138).....	85
Table 4.2. 3 Knowledge Related to Preventive Measures of Chickenpox Disease(n=138).....	86
Table 4.2. 4 Overall Assessment of Knowledge Related to Preventive Measures of Chickenpox Disease(n=138) .....	88
Table 4.2. 5 Knowledge Related to Preventive Measures of Syphilis Disease(n=138).....	89
Table 4.2. 6 Overall Assessment of Knowledge Related to Preventive Measures of Syphilis Disease(n=138) .....	91
Table 4.2. 7 Knowledge Related to Preventive Measures of Hepatitis B Disease (n=138).....	91
Table 4.2. 8 Overall Assessment of Knowledge Preventive Measures of Hepatitis B Disease (n=138).....	93
Table 4.2. 9 Knowledge Related to Preventive Measures of Rubella Disease(n=138).....	93
Table 4.2. 10 Overall Assessment of Knowledge Related to Preventive Measures of Rubella Disease(n=138) .....	95
Table 4.2. 11 Knowledge Related to Preventive Measures of Cytomegalovirus Disease (n=138) .....	96
Table 4.2. 12 Overall Assessment of Knowledge related to Preventive Measures of Cytomegalovirus Disease (n=138).....	98
Table 4.2. 13 Knowledge Related to Preventive Measures of Herpes Simplex Virus Disease (n=138).....	98
Table 4.2. 14 Overall Assessment of Knowledge Related to Preventive Measures of Herpes Simplex Virus Disease (n=138) .....	100
Table 4.2. 15 Overall Nurses-midwives Knowledge of TORCH Diseases .....	101
Table 4.3. 1 Practices Related to Hand Hygiene.....	102
Table 4.3. 2 Overall Evaluation of Nurses-midwives Practices Concerning Hand Hygiene .....	103
Table 4.3. 3 Practices related to Personal Protective Equipment (PPE) .....	103
Table 4.3. 4 Overall Evaluation of Nurses-midwives Practices Concerning Personal Protective Equipment (PPE) .....	105
Table 4.3. 5 Practices Related to Environment Hygiene .....	106

Table 4.3. 6 Overall Evaluation of Nurses-midwives Practices Concerning Environment Hygiene.....	107
Table 4.3. 7 Overall Evaluation of Nurses-midwives Practices Concerning Preventive Measures of TORCH Diseases (n=138).....	107

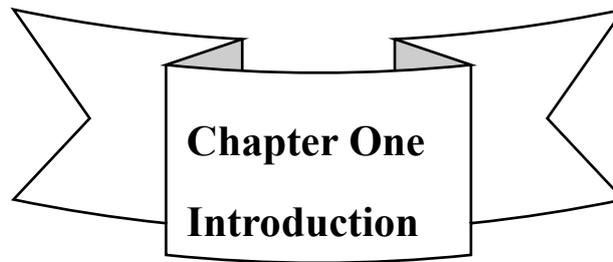
## List of Abbreviations

Abbreviations	Full Terms
<b>AIDS</b>	Acquired Immunodeficiency Syndrome
<b>CCTT</b>	Chicago Collaborative Treatment Trial
<b>CID</b>	Cytomegalic Inclusion Disease
<b>CMV</b>	Cytomegalovirus
<b>CRS</b>	Congenital Rubella Syndrome
<b>CVS</b>	Congenital Varicella Syndrome
<b>DNA</b>	Deoxyribonucleic Acid
<b>EIAs</b>	Enzyme Immunoassays
<b>ELISAs</b>	Enzyme-Linked Immunosorbent Assays
<b>FDA</b>	Food and Drug Administration
<b>FGR</b>	Fetal Growth Restriction
<b>FTA-abs</b>	Fluorescent Treponemal Antibody-absorbed test
<b>FVS</b>	Fetal Varicella Syndrome
<b>GUM</b>	Genitourinary Medicine
<b>HAI</b>	Hemagglutination Inhibition
<b>HAI</b>	Hemagglutination Inhibition
<b>HBsAb</b>	Surface antibody
<b>HBsAg</b>	Surface antigen
<b>HBV</b>	Hepatitis B Virus
<b>HHVs</b>	Human Herpes Viruses
<b>HIV</b>	Human Immunodeficiency Virus
<b>HSV</b>	Herpes Simplex Virus
<b>HZ</b>	Herpes Zoster
<b>IFA</b>	Indirect Fluorescent Assay
<b>IgG</b>	Immunoglobulin G
<b>IgM</b>	Immunoglobulin M
<b>IUGR</b>	Intrauterine Growth Restriction

<b>MMR</b>	Measles, Mumps, and Rubella
<b>PAHO</b>	Pan American Health Organization
<b>PCR</b>	Polymerase Chain Reaction
<b>PYR-SDZ</b>	Pyrimethamine-clindamycin - pyrimethamine-sulfadiazine
<b>RCOG</b>	The Royal College of Obstetricians and Gynecologists
<b>RNA</b>	Ribonucleic Acid
<b>RPR</b>	Rapid Plasma Regain
<b>RV</b>	Rubella Virus
<b>SFDT</b>	Sabin-Feldman Dye Test
<b>SGA</b>	Small Gestational Age
<b>STD</b>	Sexually Transmitted Viral Disease
<b>T. gondii</b>	Toxoplasma gondii
<b>TORCH</b>	Toxoplasmosis, (chickenpox, syphilis, and hepatitis B), Rubella, Cytomegalovirus, and Herpes simplex virus.
<b>TPHA</b>	T. Pallidum Hemagglutination Assay
<b>USA</b>	United States of America
<b>VDRL</b>	Venereal Diseases Research Laboratory
<b>VZIG</b>	Varicella Zoster Immunoglobulin
<b>VZV</b>	Varicella-zoster virus
<b>WG</b>	Weeks of gestation
<b>WHO</b>	World Health Organization

## List of Appendices

Items	Appendices
<b>Appendix(A)</b>	<b>Administrative Arrangement</b> <ul style="list-style-type: none"> <li>- The Research Ethics committee at the University of Babylon, College of nursing</li> <li>- The Research Committee of the Training and Human Development Center</li> <li>- An approval of Babil teaching hospital for maternity and children and Al-amam Al-Sadeq teaching hospital</li> </ul>
<b>Appendix(B)</b>	Lists of Experts
<b>Appendix(C)</b>	Questionnaire Format in English Questionnaire Format in Arabic
<b>Appendix (D)</b>	Linguistic Expert
<b>Appendix (E)</b>	Knowledge and Practices Figures



## **1.1 Introduction:**

Professional midwives use infection prevention as a major life-saving skill in undertaking the issue of maternal mortality. Maternal mortality refers to women who die as a result of diseases or other problems associated with pregnancy and childbirth (Grace & Onyeabara, 2016).

Nursing care entails more than just bedside manners and professional procedures. Nurse-midwives aim to develop their expertise to improve the level of prenatal care they provide and gain experience as health care becomes more complex. Understanding how to apply information in regular nursing practice is critical to improving educational preparation and healthcare quality.

Some infections are more common, but all of them need to be prevented as the primary infections of Toxoplasma, other infections (like a varicella-zoster virus, syphilis, and hepatitis B), Rubella, Cytomegalovirus, and Herpes (TORCH) diseases (Mercy, 2018).

Infection with the TORCH diseases may cause serious consequences in developing fetus, though it may remain mild or asymptomatic in expecting mothers. Intrauterine growth restriction, congenital abnormalities, and spontaneous miscarriage are all possibilities. In general, the chances of infection transmission are greatest during the third trimester, but infection during the first trimester, when organogenesis is taking place, has more serious consequences. So, knowledge about these diseases will support nurse-midwives in appropriately counseling pregnant women on preventive measures to avoid TORCH diseases and will help in counseling parents on the possible adverse fetal outcomes when these

infections or diseases are present, and they will have awareness in caring for pregnant women in labor and delivery rooms (Poudyal & Khanal, 2018).

Congenital infection can cause intrauterine growth restriction (IUGR) and small gestational age (SGA) at delivery due to fetal development. Regular TORCH screening for intrauterine growth restriction and infants of small gestational age has become routine practice for these diseases since growth retardation is a prevalent clinical sign (Chung *et al.*, 2018).

Toxoplasmosis (T) is a protozoan parasite infection by *Toxoplasma gondii*, and it is the third leading cause of mortality and morbidity from consumption of undercooked food containing oocysts, contact with contaminated cat feces, consumption of contaminated raw vegetables or water with *T. gondii* oocysts from cat feces, ingestion of infected meat, drinking raw milk. Blood transfusions can occasionally transmit the illness, and congenital transmission is an additional source of disease (Darweesh *et al.*, 2018; Hussein *et al.*, 2019).

The Food and Agriculture Organization and the World Health Organization rank toxoplasmosis fourth among the 24 most serious food-borne illnesses. It may be found all over the world. Although it is usually a harmless disease in immunocompetent people, it can be deadly in immunocompromised people and in situations of congenital infection. This is due to the parasite's transfer from the pregnant woman to the fetus during the gestation period. To varying degrees, *T. gondii* can infect the fetus depending on the pregnancy's trimester and the efficiency of the placental barrier (Laboudi *et al.*, 2020).

Epidemiological studies have identified a number of risk factors, including owning domestic cats, residing in regions inhabited by seropositive cats, notably on farms, eating raw or undercooked meat, poor hand hygiene, and contact with soil. Toxoplasmosis can be prevented by the

use of preventative measures directed at the risk factors (Al-Hellaly & Chyad, 2019).

In most cases, Toxoplasmosis infection in the mother is asymptomatic. Some of the symptoms include a mild fever, headaches, myalgias, maculopapular rash, sore throat, lymphadenopathy, and hepatomegaly. When toxoplasmosis is suspected, three tests can be used to diagnose the disease before the fetus is born. Serological assays to evaluate the levels of Toxoplasma-specific immunoglobulin G (IgG) and immunoglobulin M (IgM) antibodies in the maternal blood are routinely used to measure immunity to the parasite and any new infection in the antenatal woman. IgG develops one to two weeks after infection and lasts for the rest of one's life, resulting in immunity in the mother (Wilson *et al.*, 2014).

Varicella-zoster virus (VZV) is a human herpes virus that belongs to the Herpesviridae family of DNA-containing viruses (HHVs). Herpes zoster is caused by the reactivation of a latent varicella-zoster virus, whereas varicella (chickenpox) is the most common infection caused by the varicella-zoster virus. In immunocompetent people, it typically causes a mild to moderate disease, although it can lead to significant consequences such as central nervous system (CNS) involvement, pneumonia, subsequent bacterial infections, and death (Al-Turab & Chehadeh, 2018).

Syphilis is a chronic infectious illness caused by *Treponema Pallidum*, a spirochaete. It produces inflammatory vaginal lesions that facilitate the human immunodeficiency viruses (HIV) infection two to five times during sexual intercourse, throughout pregnancy, or during delivery (Amsalu *et al.*, 2018).

Congenital syphilis is most often caused by the placental transmission of *Treponema pallidum* in untreated or poorly treated pregnant women, particularly when HIV infection is present. The risk of fetal infection increases as pregnancy progresses. In untreated pregnant women,

vertical transmission is more likely in the first stage than in the last stage (Leung *et al.*, 2020).

In addition, congenital syphilis is a serious public health concern as it is linked to stillbirths, perinatal mortality, preterm births, and congenital infections. Screening for syphilis at prenatal clinics, followed by early treatment for infected women, could improve treatment rates and lower the disease's burden on both mothers and fetuses. The World Health Organization (WHO) recommends an increase in antenatal syphilis screening and treatment for mothers and their sexual partners as part of the global drive to eradicate congenital syphilis (Punguyire *et al.*, 2015).

Hepatitis B virus (HBV) affects people of all ages worldwide, including pregnant women and newborn infants. The hepatitis B virus is a deoxyribonucleic acid (DNA) virus that causes acute or chronic infection of the liver. It is a member of the Hepadnaviridae family. Contaminated blood transfusions, unprotected intercourse, and a streak with contaminated sharp equipment are all ways to spread HBV, among other methods. The most frequent way for a newborn to become infected is through mother-to-child transmission, which includes prenatal (in utero), natal (after delivery), and postnatal (after birth) transmission (during child care or through breast milk) (Gebrecherkos *et al.*, 2020).

Rubella is a *togavirus*-caused infectious viral disease that typically goes undiagnosed. During pregnancy, however, the maternal infection can cause fetal loss or congenital rubella syndrome (CRS). Infection throughout the first 8 to 10 weeks of pregnancy causes disorders in up to 90% of living fetuses, resulting in a variety of abnormalities (Alsamarai & Aljumaili, 2013).

Pregnant women with Rubella experience high temperatures and malaise in the prodromal stage, followed by a 3 rash that appears one to two days later. Over the course of three days, this rash begins on the face and extends to the trunk and limbs. It can show up following

lymphadenopathy, which can continue for up to 15 days after the rash has entirely disappeared. Rubella poses a significant risk to pregnant women, particularly during the first four months of pregnancy. Hearing loss, neurologic issues, congenital heart defects, enlargement of the liver and spleen, visual disorders such as and intrauterine growth retardation, glaucoma are all symptoms of congenital rubella syndrome (Ibrahim *et al.*, 2018).

After maternal infection, the risk of congenital abnormalities is basically limited to the first 16 weeks of pregnancy. Fetal growth limitation appears to be the consequence beyond 20 weeks of pregnancy. When there is a suspicion of maternal infection, serological tests can be used to confirm the diagnosis. Rubella infection is indicated by a four-fold increase in rubella-specific IgG titer between acute and convalescent blood samples, a positive rubella-specific IgM antibody test, or a positive rubella virus culture. If pregnant women are infected with the rubella virus in the 1st trimester of gestation, congenital rubella syndrome can occur (Leung *et al.*, 2020; Elnashar *et al.*, 2019).

Cytomegalovirus (CMV) belongs to the herpes virus family. In adults, the virus causes flu-like symptoms, but in a growing fetus, it can cause hearing loss, seizures, and mental retardation (Obaid & Juma, 2016).

Congenital CMV infections caused by primary maternal infections are more possible than non-primary maternal infections to cause symptoms and long-term abnormalities in neonates. Jaundice before birth, petechiae, hepatosplenomegaly, low birth weight, and microcephaly are the most common symptoms. Other clinical signs include premature birth, hypotonia, poor feeding, lethargy, sensorineural hearing loss, chorioretinitis, hydrocephalus, convulsions, thrombocytopenia, anemia, and pneumonitis. Congenital cytomegalovirus (CMV) infection can cause serious neurological problems such as sensorineural hearing loss and developmental difficulties,

and there are presently no therapies or vaccines for CMV (Leung *et al.*, 2020).

The Herpes simplex (HSV) virus is the most common sexually transmitted viral disease (STD) worldwide. HSV1 is spread through non-sexual contact during childhood, whereas HSV2 is transmitted only through sexual contact and is the most common cause of genital herpes. Herpes has a four-to-twenty-one-day incubation period. More than (75%) of patients with primary genital HSV infection are asymptomatic. This virus is still a leading cause of death and morbidity among neonates. Prematurity, congenital, and neonatal herpes are all possible outcomes of pregnancy (Prasoon *et al.*, 2014).

The first type, which is widely distributed, causes the formation of characteristic febrile vesicles on the face (lips, nostrils); it is also known as herpes simplex labial. The second type, called a genital infection, is spread through sexual and physical contact. Given the placement of virions in nerve ganglia, where they can remain dormant for long periods of time, the herpetic infection has repeated symptoms that correspond to immune system stressors and usually recur (Crimi *et al.*, 2019).

## **1.2 Importance of Study**

Because many pregnant women are unaware of the risks and consequences of infectious diseases and do not practice preventative techniques, nurse-midwives play an important role in alerting women about the TORCH diseases that can be avoided. In addition, because most pregnant women begin their antenatal care with primary midwifery care, midwives are crucial in offering preventive counseling. In addition, the nurse's efficient knowledge and best practices in infection prevention and control may help to reduce the rate of TORCH infection (Pereboom *et al.*, 2013; Pereboom *et al.*, 2014).

According to a survey, fewer than half of obstetricians in the United States educated patients on congenital infection prevention. Studies in France and the Netherlands similarly identified major gaps in understanding of maternal and congenital infections among prenatal care providers (Pass & Arav-Boger, 2018).

Congenital infections account for 2% to 3% of all congenital abnormalities and are a major source of morbidity in children. Approximately 30% of primary Toxoplasma infections in pregnant women result in vertical transmission of the illness to the fetus via the transplacental pathway. Congenital infection occurs most commonly in pregnant women following an initial infection during the parasitemic period (Leung *et al.*, 2020).

In the Babylon governorate, the prevalence of hepatitis B viruses in women was 4.6%. The prevalence of hepatitis B was found to be (0.66 %) in the governorate of Najaf and (3.5 %) in Karbala. Kuwaiti national donors' Hepatitis B prevalence ranged from (1.1 %) to (3.5 %). At Prince Rashed Ben Al-Hassan Hospital in Jordan's northern area, the frequency of hepatitis B was found to be (1.4 %) (Al-Rubaye *et al.*, 2017).

Pregnant women in Qurna City/Basrah province were predicted to be infected with TORCH at a rate of 60%. In contrast, the infection rate in Abi Al-Khasib city is predicted to be (32 %) toxoplasmosis. The rate of Rubella infection, which causes abortion, is (8 %) in the Qurnah & Abe al-Khasib district, and the rate of Cytomegalovirus infection is (16 %). The herpes virus was believed to be present in (48 %) of people (Hussein *et al.*, 2019).

Between (178), pregnant and non-pregnant women in Baghdad, (29) were infected with cytomegalovirus (CMV) and 21 with Rubella. Toxoplasma was (36.36 %), rubella was (20.45 %), cytomegalovirus was (29.55 %), and herpes simplex virus was (13.64 %) in a study of gynecology wards in hospitals and out clinics in Babylon,

Baghdad city, and Karbala using the TORCH screening test (Obaid & Juma, 2016).

A study in Waset province, Iraq, the prevalence of CMV was (60.2%) among women with a history of miscarriage. In Mosul, Iraq, (12%) of women of childbearing age were cytomegalovirus seropositive (CMV). Cytomegalovirus is a common cause of prenatal and neonatal infection, and it can cause difficulties during pregnancy. Cytomegalovirus seropositivity in pregnant and/or child-bearing age women varies widely. A Cytomegalovirus seroepidemiology investigation revealed a variety of seropositivity in pregnant and/or child-bearing age women, ranging from (30.4 %) in Ireland to (98.9 %) in Turkey. In addition, the prevalence rate among women with a negative obstetric history ranged from (14.2 %) in Iran to (91.05 %) in India. In Arab countries, the seroprevalence rate in pregnant women ranges from (77.8%) in Babylon, Iraq, to (88 %) in Jordan. In Bavaria, the prevalence was (4.8 %). The prevalence ranged from (4.8%) in Baghdad, Iraq, to (95% in Jordan in women with a bad obstetric history (Aljumailia *et al.*, 2014).

In Bangladesh, the prevalence of Toxoplasma was 38.5%. The high rate of disclosure in pregnant women was stated to be 75% for Brazil, while the low rate in pregnant women was 5.3% for Thailand. The highest reported rate was (76.1%) for pregnant women in Ghana. The median IgG frequency in Arab countries was (41.9 %), according to Sudan. In Bahrain, the highest reported IgG rate was reported at (94%) in pregnant women in Al-Bahrain. In Egypt, it was (2.8%) in pregnant women and (44.8%) in pregnant women in Iran. Toxoplasmosis was found to be (24.6%) prevalent in Turkey, and cytomegalovirus was found to be (1.34%) prevalent in Turkey (Alsamarai & Aljumaili, 2013).

The incidence of the varicella-zoster virus (VZV) in Saudi Arabia was (88.5%). In Qatar, according to the Qatar Annual Health Report, the number of reported cases of chickenpox was (82.5%). The VZV prevalence in Iraq was (53.3%). The prevalence rate of the varicella-zoster

virus in Iran was (89.35%). The incidence of varicella-zoster virus (VZV) in Turkey was (77.8%) (Al-Turab & Chehadeh, 2018).

In Sub-Saharan Africa, syphilis is a common cause of poor pregnancy outcomes. Infection with syphilis during pregnancy can result in spontaneous abortion, low birth weight, stillbirth, and infertility. In studies done in Zambia and Malawi, maternal syphilis was associated to (42 %) of stillbirths, (19 %) of spontaneous miscarriage, and (21 %) of perinatal deaths. In a study conducted in North-Western Tanzania, it was discovered that (24 %) of stillbirths and (51 %) of adverse pregnancy outcomes were due to stillbirths (Nnko *et al.*, 2016).

However, (56.5 %) of pregnant women with syphilis received insufficient treatment, (27.3 %) received no treatment at all, (12.1%) of cases were ignored, and only (4.1 %) received appropriate treatment. It's worth mentioning that the majority of antenatal women who aren't treated or aren't treated adequately can transfer the illness to their fetus, leading to fetal mortality, neonatal mortality, preterm delivery, low birth weight, or congenital infection (Padovani *et al.*, 2018).

Globally, an estimated 1.8 million antenatal women are infected with syphilis, with less than 10% being recognized and treated. Asia (44.3%) and Africa (39.3%), respectively, have the highest number of infected antenatal women, with the Americas accounting for (7.8%) of global cases. In Ethiopia, syphilis incidence increased from (1 %) to (1.2 %), and the incidence of syphilis was (5.1%) among pregnant women in Uganda. In Tanzania and Zambia, pregnant women had a syphilis rate of (8.2 %) (Amsalu *et al.*, 2018; Rodrigues & Domingues, 2017).

Hepatitis B virus infection is a serious infection with an incidence varying from (0.1 to 20%) in different parts of the world. Hepatitis B virus prevalence in antenatal women varies across Asia, Taiwan (> 10 %) and Thailand (> 8%) have the highest percentages, while Japan (0.8%) has the lowest, and the vast majority of countries have rates below (8%). Prenatal

women who test positive for HBsAg vary widely across the country: Ethiopia, Ghana, and Nigeria have less than 2%; Zimbabwe has (3.3 %); South Africa has (4.6 %); Senegal has (9.5 %); Zambia has (16.1 %); and southern Tanzania has (24 %) (Gebrecherkos *et al.*, 2020).

According to the World Health Organization's global estimates, there were more than 110,000 infants born with congenital rubella syndrome (CRS) worldwide, making rubella a leading cause of congenital anomalies. These estimates have pointed out that the highest CRS burden is occurring in the developing world, i.e., the Southeast Asian region and the African region (Mohammed & Kokaz1, 2019).

In people aged 0–49 years, the prevalence of herpes first type (HSV-1) was 3.7 billion (or (67 %) of the world population), whereas the prevalence of second type (HSV-2) reached up to 400 million in humans aged 15–49 years (or (11.3 %) of the world population) (AL-Aaraje & Khilkhali, 2020).

### **1.3 Statement of the Problem**

Knowledge and Practices Related to the Preventive Measures for TORCH Diseases among Nurse-Midwives' in Maternity Teaching Hospitals in Babylon Province

A research problem is a matter in which there is a knowledge gap that is required for nursing practice. Nurses do not use infection prevention in the hospital context, which is necessary to ensure patient safety, according to the researcher. The high incidence of hospital-acquired illnesses is due to a lack of infection prevention knowledge and procedures (Mishra *et al.*, 2014).

## 1.4 Objectives of the Study

1. To assess nurse-midwives knowledge of TORCH diseases.
2. To evaluate nurse-midwives practices concerning preventive measures for TORCH diseases.
3. To find out the relationship between nurse-midwives' knowledge and demographic variables.
4. To find out the relationship between nurse-midwives' practices and demographic variables.
5. To find out the relationship between nurse-midwives' knowledge and practices.
6. To find out the correlation between nurse-midwives' knowledge and practices.

## 1.5 Research Questions

1. What is the level of knowledge of nurse-midwives' related to the preventive measures for TORCH diseases?
2. What is the level of practice of nurse-midwives' related to the preventive measures for TORCH diseases?

## 1.6 Research Hypothesis:

**H01:** there is a non-significant relationship between nurse-midwives' knowledge and practices and demographic characteristics (level of education and years of experience) of the sample at a P-value  $\geq 0.05$ .

**Ha1:** there is a significant relationship between nurse-midwives' knowledge and practices and demographic characteristics (level of education and years of experience) of the sample at a P-value  $\leq 0.05$ .

**H02:** there is a non-significant relationship between nurse-midwives' knowledge and practices at a P-value  $\geq 0.05$ .

**Ha2:** there is a significant relationship between nurse-midwives' knowledge and practices at P-value  $\leq 0.05$ .

## **1.7 Definition of Term**

### **1.7.1 Knowledge**

#### **1.7.1.a Theoretical Definition:**

The information, understanding, and skills that you gain through education or experience (Oxford Learner's Dictionary, 2021).

#### **1.7.1.b Operational Definition:**

It is information that the nurse-midwife responds to about TORCH diseases and how to prevent them while working in the ward or delivery room.

### **1.7.2 Practices**

#### **1.7.2.a Theoretical Definition:**

The actual application or use of an idea, belief, or method, as opposed to theories relating to it (Oxford Learner's Dictionary, 2021).

#### **1.7.2. b. Operational Definition:**

It is the practical application of nurse-midwives to methods of preventing TORCH diseases.

### **1.7.3 Preventive Measures:**

#### **1.7.3.a. Theoretical Definition:**

Intended to try to stop something that causes problems or difficulties from happening (Oxford Learner's Dictionary, 2021).

#### **1.7.3.b. Operational Definition:**

It is a set of measures taken by a nurse-midwives to reduce the transmission of infection.

## **1.7.4 TORCH Diseases**

### **1.7.4.a. Theoretical Definition:**

Congenital infections are those that can cross the placenta and damage the fetus in utero or transmit to the infant during the peripartum period of birth, resulting in neonatal infection (Leung *et al.*, 2020).

### **1.7.4.b. Operational Definition:**

They are diseases that affect a pregnant woman during pregnancy and cause harm to the fetus and the mother, as well as harm to the nurse-midwives during the birth of the fetus.

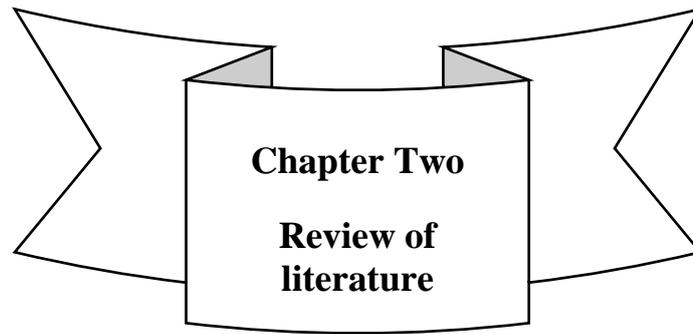
## **1.7.5 Nurse-Midwives:**

### **1.7.5.a. Theoretical Definition:**

Nurse-midwife refers to a registered nurse who has qualified by advanced education and clinical experience in obstetric and neonatal care. The nurse-midwife manages the perinatal care of women having a normal pregnancy, labor and child-birth (Muzeya, 2015).

### **1.7.5.b. Operational Definition:**

Nurse-midwives offer care to pregnant women during pregnancy and deliver the fetus so that the mother can take care of herself through the postpartum period.



The literature review will offer a comprehensive overview of the current review and research that has been described regarding TORCH diseases and includes:

## **2.1 Historical Background**

TORCH was coined by immunologist Andres Nahmias in 1971 to characterize prenatal illnesses caused by toxoplasma (To), rubella (R), cytomegalovirus (C), and herpes simplex virus (H); these diseases are difficult to distinguish clinically. Harold Fuerst recommended in 1975 that syphilis, another major congenital illness, be added to the list and that the abbreviation be changed to STORCH. In 1975, Roger Brumback suggested that STORCH be replaced with TORCHES because the latter word was more readily accepted and recognized by pediatricians who were familiar with the earlier abbreviation (Leung *et al.*, 2020).

In 1908, Tunisians Nicolle and Manceaux and Brazilians Splendore were the first to define *Toxoplasma gondii*(T). Splendore identified the protozoan in a rabbit, while Nicolle and Manceaux detected it in a North African rodent dubbed the gundi by Nicolle and Manceaux (*Ctenodactylus gundi*). The first instance of congenital toxoplasmosis was reported in 1923, although it was not associated to *Toxoplasma gondii*. Jank (1923) described the postmortem results of an 11-month-old child with hydrocephalus who had been taken to the hospital. The neonate developed chorioretinitis, which is a classic sign of toxoplasmosis (Choroid and retinal inflammation in the eye). Although Jank could not identify the sporocytes as

*Toxoplasma gondii*, histology revealed a number of them (Weiss& Dubey, 2015).

The first comprehensive scientific investigation of *Toxoplasma gondii*, utilizing procedures previously developed for examining viruses, did not take place until 1937. In 1937, Sabin and Olitsky used laboratory monkeys and mice to study *Toxoplasma gondii*. *Toxoplasma gondii* was shown to be an obligate intracellular parasite by Sabin and Olitsky, who also discovered that mice given *Toxoplasma gondii*-contaminated tissue developed the infection. *Toxoplasma gondii* was initially discovered as a human disease in New York City's Babies Hospital in 1939. The virus was identified in a full-term infant girl who had been delivered via Caesarean section, according to Wolf, Cowen, and Paige. When he was three days born, the newborn experienced convulsions and chorioretinitis in both eyes. *Toxoplasma gondii* was identified from brain tissue lesions by Wolf, Cowen, and Paige. Additional instances were examined by Wolf, Cowen, and Paige, who came to the conclusion that *Toxoplasma gondii* caused identifiable symptoms and might be passed from mother to child. In 1948, Sabin and Feldman developed a serological dye test based on the patient's antibodies' capacity to modify *Toxoplasma* staining (Weiss & Dubey, 2015).

Desmonts et al. demonstrated *Toxoplasma* transmission by eating raw or undercooked beef in Paris in 1965. In a TB hospital, Desmonts discovered that therapeutic ingestion of raw beef or horse meat was connected to a (50 %) increase in *toxoplasma* antibodies over the course of a year. This suggests that *Toxoplasma gondii* was transmitted more widely when raw meat was consumed. In 1974, Desmonts and Couvreur reported that infection in the first two trimesters causes the most harm to the fetus, that transmission is dependent on when mothers become infected throughout gestation, and that mothers with antibodies gestational do not transmit the

infection to the fetus, and that spiramycin reduces fetus transmission. Toxoplasma became more well-known in the 1970s as the usage of immunosuppressive medication increased as the number of organs and bone marrow transplants increased. Patients who have a compromised immune system are far more vulnerable to infection (Weiss& Dubey, 2015).

Ancient civilizations recognized and characterized chickenpox-like rashes; the association between zoster and chickenpox was not discovered until 1888. The resemblance between viral particles recovered from zoster lesions and those from chickenpox was discovered in 1943. The first chickenpox vaccine was introduced in 1974. Von Bokay proposed in 1888 that chickenpox and herpes zoster (HZ) were caused by the same agent. This relationship was verified only after Weller and Stoddard isolated viruses from both chickenpox and zoster and compared the viruses; chickenpox and herpes zoster were caused by the same virus. Despite the fact that a safe and effective vaccine has been available since the 1970s, varicella immunization in Europe has been paused, with only a few European countries including the vaccine in their national programs due to concerns over the vaccine's impact on herpes zoster incidence (Marangi *et al.*, 2017).

In terms of syphilis, the earliest known epidemic in Europe happened during a French invasion of Naples and Italy, in 1494/1495. The disease was called French sickness because it was transmitted by returning French troops, and it wasn't until 1530 that the Italian physician and poet Girolamo Fracastoro coined the name syphilis. In 1905, Fritz Schaudinn and Erich Hoffmann identified *Treponema pallidum* is the causative bacterium. Sahachir Hata created Salvarsan in Paul Ehrlich's laboratory in 1910, and it was the first effective treatment. Schaudinn and Hoffmann found *Treponema pallidum* in syphilis patients' tissue in 1905. The Hinton test, which was created by William Augustus Hinton and is based

on flocculation, was proven to have less false-positive results than the Wassermann test in the 1930s (Simon & Kevin, 2020).

Mercury was a frequent, long-standing therapy for syphilis, and its usage has been traced back to the Persian physician Ibn Sina (Avicenna Canon)'s *Canon of Medicine* (1025). In 1496, Giorgio Sommariva of Verona is credited with being the first physician to employ mercury to cure syphilis, despite the fact that he may not have been a physician. Mercury was given to syphilitic patients in a variety of ways throughout the sixteenth century, including rubbing it on the skin, putting it on a plaster, and taking it by mouth (Tampa & Mircea, 2014).

When the illness was better understood, more effective therapies were discovered. Salvarsan, discovered in 1908 by Sahachiro Hata in the laboratory of Nobel Laureate Paul Ehrlich, was an antibiotic used to cure illness. It was discovered that people with high fevers were sometimes healed of syphilis. Malaria was utilized as a treatment for tertiary syphilis for a short period because it caused protracted and high fevers. This was deemed a reasonable risk because malaria could be treated later with quinine, which was readily available at the time. Malaria was typically used to treat late-stage syphilis, particularly neurosyphilis, and was then followed with either Salvarsan or Neosalvarsan as adjuvant therapy. The discovery of penicillin and its widespread production following World War II rendered these therapies obsolete, allowing syphilis to be effectively and consistently treated (Grimes *et al.*, 2014).

In 1885, Lurman published the first report of a hepatitis B virus outbreak. In 1883, there was a smallpox outbreak in Bremen, and 1,289 shipyard workers were vaccinated using lymph from other persons. Within a few weeks or up to eight months, 191 of the vaccinated employees got jaundice and were identified with serum hepatitis. Other employees who had had lymph injections in separate batches remained well. Lurman's paper,

which is today considered a classic example of epidemiological research, established that the outbreak was caused by tainted lymph. Following the advent of hypodermic needles in 1909, which were utilized and, more crucially, reused for injecting Salvarsan for the treatment of syphilis, several comparable epidemics were recorded (Jacobsen, 2014).

Between 1941 and 1942, 330,000 American troops were infected with Hepatitis B, resulting in the development of jaundice in 50,000 of them. This was not made public until 1987 when the US Public Health Service linked it to a tainted yellow-fever vaccine made from a chronic carrier's human serum, it became a national scandal. In the year 1937, while on a Rockefeller Foundation research grant in New York City, Eugen Haagen developed the contaminated yellow-fever vaccine. Researchers researched the American pandemic and the Hepatitis B disease model in secret to avoid causing problems, forming a covert Cold War rivalry with the Soviet Union to solve the Hepatitis B viral contamination problem with the Yellow Fever vaccination. According to their results, Nazi doctors such as Hagen forced concentration camp inmates to eat stomach scrapings from patients who had turned yellow from liver disease but did not have Hepatitis A (Paraskevis& Dimitrios, 2013).

The virus was first found in the blood of Aboriginal Australians, the Australian antigen was identified in 1966 by Baruch Blumberg, who was then working at the National Institutes of Health (NIH) (later known as the hepatitis B surface antigen, (HBsAg). Although a virus had been suspected since Frederick MacCallum's 1947 research, David Dane and others used electron microscopy to find the viral particle in 1970. The Food and Drug Administration issued the first blood supply screening directive to blood banks in 1971. The virus's genome had been sequenced by the early 1980s (Davis *et al.*, 2013).

In the mid-eighteenth century, the disease Rubella was first described. Rubella was first described in 1740 by Friedrich Hoffmann, it was later validated by de Bergen in 1752 and Orlov in 1758, both German physicians and chemists. George de Maton was the first to suggest that it be classed separately from measles and scarlet fever in 1814. The illness was known as Rötheln, and all of these doctors were German (German for reddish or pink). The popular moniker German measles came from the fact that it was described by three Germans. An epidemic in India was recorded by Henry Veale, an English Royal Artillery surgeon. He came up with the term rubella (which comes from the Latin word meaning) (Lambert *et al.*, 2015).

George Maton initially noticed a mellow illness with symptoms such as dermatitis, adenopathy, and a very low temperature in 1814. In 1866, Henry Veale coined the term rubella to describe the disease. Prior to 1942, when Norman Gregg discovered that maternal rubella in the first trimester produced actual birth difficulties, the illness received little attention. The entire breadth and consequences of rubella embryopathy were unknown until Parkman, Buescher, and Artenstein, as well as Neva and Weller, separated rubella infection in tissue culture in 1962. Inborn rubella contamination has recently been linked to newborn thrombocytopenic purpura, hepatitis, bone damage, and meningoencephalitis. The widespread distribution of rubella vaccination in 1969 resulted in a significant reduction in rubella cases. However, a rubella plague broke out in Europe in 1963, expanding to the United States in 1964 and 1965, causing a huge number of newborn children to be infected with congenital rubella (Sati and Arya, 2019).

A rubella outbreak swept Australia in 1940. Following that, ophthalmologist Norman McAllister Gregg observed 78 newborns with congenital cataracts, 68 of them were born to rubella-infected mothers. Gregg authored *Congenital Cataract* in 1941 when his mother got

German measles. He discovered that the earlier the mother was infected, the more serious the consequences of congenital rubella syndrome (CRS). Because there was no vaccine at the time, several popular publications encouraged German measles parties for affected children to transfer the disease to other children (particularly females) to immunize them. Between 1962 and 1965, a rubella pandemic broke out in Europe and extended to the United States. In 1964–65, there were an estimated 12.5 million rubella cases in the United States. As a result, 11,000 therapeutic miscarriages occurred, with 20,000 cases of congenital rubella syndrome documented (McNeil & Donald, 2015).

The first live attenuated virus vaccination received Food and Drug Administration (FDA) approval in 1969. By 2006, the number of confirmed cases per year in the Americas had decreased below (3000). Though, an epidemic in Argentina, Brazil, and Chile in 2007 pushed the total number of cases to (13,000) that year. Colombia was declared and verified free of rubella by the World Health Organization (WHO) and the Pan American Health Organization (PAHO) on January 22, 2014, making it the 1<sup>st</sup> Latin American country to do so. The Americas became the first WHO area to declare the disease eradicated on April 29, 2015. The most recent non-imported instances occurred in Argentina and Brazil in 2009 (Davey, 2018).

Hugo Ribbert, a German pathologist, first detected CMV in the cells of a newborn in 1881 when he discovered bigger cells with expanded nuclei. Years later, in 1956 and 1957, Thomas Huckle Weller, Smith, and Rowe isolated the virus, which was later known as cytomegalovirus. In 1990, the first draft of the human cytomegalovirus genome was published, making it the largest contiguous genome sequenced at the time. In January 2020, scientists at Rockefeller University, led by Jean-

Laurent Casanova, discovered a connection between a nitric oxide synthase 2 (NOS2) deficiency and fatal cases of CMV (Marti & Maes, 2019).

Although the virus origin was unknown at the time, Wyatt et al. proposed the term generalized cytomegalic inclusion disease (CID) in 1950. Using electron microscopy, Minder discovered the virus in the clear halo around the intranuclear inclusion of pancreatic cells in the case of CID in 1953. In 1970, Weller used the term cytomegalovirus to describe the virus (Lazim & Kadhim, 2018).

Herpes virus infections have been around since ancient Greece. Hippocrates described the cutaneous spread of herpes simplex lesions, and researchers of Greek civilization defined the Greek name herpes to mean to creep or crawl in reference to the herpetic skin sores' proclivity to spread. Shakespeare is thought to have been aware of the spread of recurrent herpes simplex lesions. Vidal did not discover herpes simplex infection transfer from one person to another until 1893 (Bibbins-Domingo *et al.*, 2016).

In the early twentieth century, public health law in the United Kingdom mandated treatment for sexually transmitted illnesses, but not for herpes since it was deemed insignificant. Herpes was not included in nursing textbooks until 1975 since it was thought to be no worse than a regular cold. Following the discovery of acyclovir in the 1970s, the pharmaceutical company Burroughs Wellcome embarked on a comprehensive marketing drive to raise awareness of the disease, which included the formation of victim support groups (Le Cleach *et al.*, 2014).

## **2.2. Theoretical Framework:**

The following study is based on the Florence Nightingale theory (environmental theory). This theory is applicable to multiple areas in nursing care because the environmental theory is a grand theory. According to Nightingale, the management of the physical environment was an

important part of nursing care. Household health, ventilation and warmth, light, noise, variety, bed and bedding, room and wall cleanliness, personal cleanliness, and nutrition (taking food and what food) were recognized as key aspects of the environment that the nurse could manage. The individual's social and psychological environment also has an impact on these physical environment components (George, 2014).

### **Major Concepts of Florence Nightingale's Theory (Environmental Theory):**

#### **1. Nursing**

Nursing differs from medicine in that its objective is to put the patient in the best possible position for nature to intervene. Nursing is defined as health-promoting behaviors that occur in every caring situation (Smith & Parker, 2015).

#### **2. Person**

People are multifaceted, including biological, psychological, social, and spiritual elements. The environmental hypothesis focuses on the patient. For smooth recuperation, the nurse should execute the work for the patient and maintain control of the surroundings (Smith & Parker, 2015).

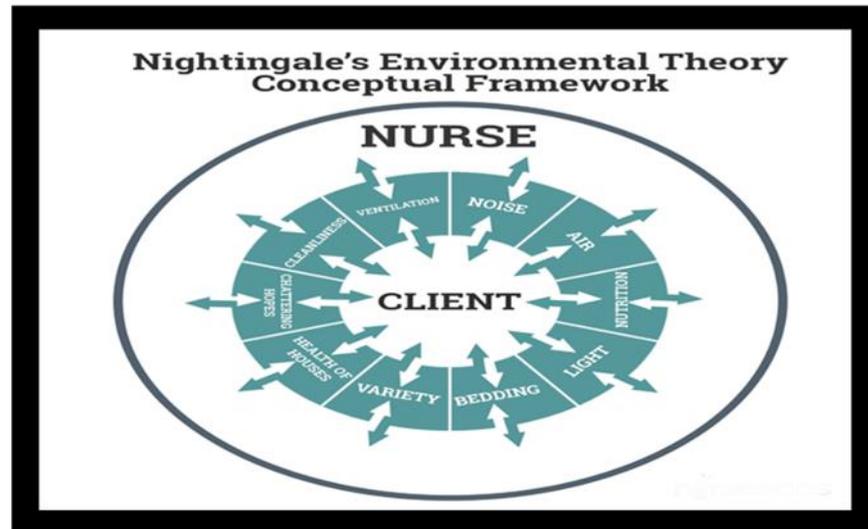
#### **3. Health**

Health is not only being well but being able to use every power we have. A healthy body can recover and undergo a reparative process (Smith & Parker, 2015).

#### **4. Environment:**

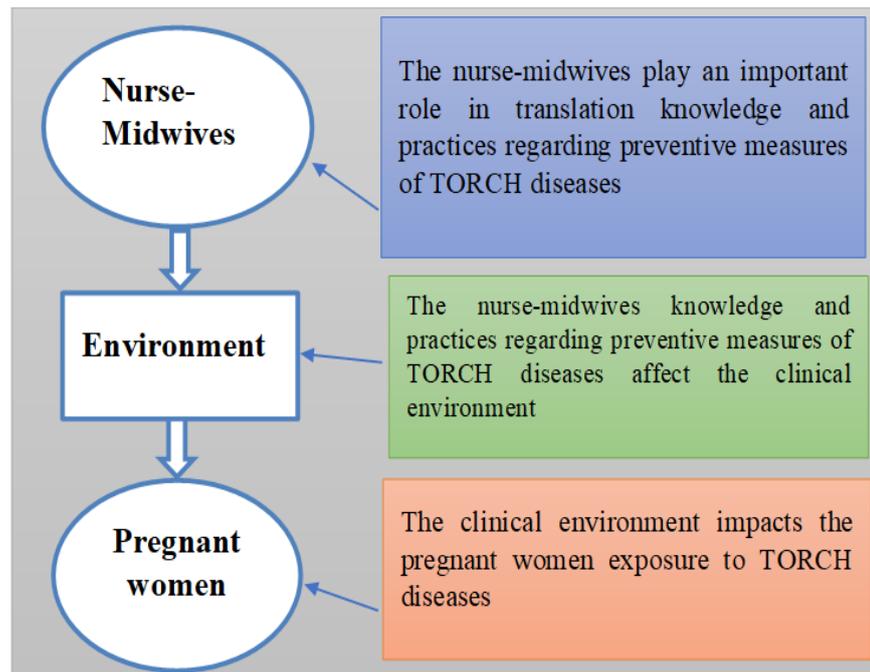
Poor health and illness are caused by poor or challenging surroundings. Environmental control leads to the maintenance of health. Change the environment to improve conditions that allow the natural laws to heal (Smith & Parker, 2015).

The environment theory has been used extensively to guide practice and to establish nursing education. The goal of nursing is to promote the health of the patient and environmental health in any area where the nurse-midwives are giving nursing care, as shown in figure (2.1).



*Figure 2.1 Conceptual Framework of Florence Nightengale's Environmental Theory (Aligood, 2013).*

According to Florence Nightingale, there is a relationship between cleanliness and illness transmission, indicating that hand washing reduces infection rates. Hand cleanliness is the most effective way to prevent TORCH virus transmission. Nurses-midwives' knowledge and practices in preventive measures for TORCH can affect the health environment of pregnant women as shown in figure (2.2) (Chisanga, 2017).



**Figure 2. 2 Application of the Florence Environmental Theory on Nurse-Midwives regarding prevention of TORCH Diseases (design by the researcher).**

### 2.3 Introduction to TORCH Diseases:

Toxoplasmosis, Other (Varicella-Zoster virus infection, Syphilis, Hepatitis B), Rubella virus, Cytomegalovirus infection, and Herpes Simplex virus infection are all abbreviated as TORCH. These are the most common causes of severe congenital infection through gestation, which can result in fetal harm or other abnormalities. In most situations, the infection is severe enough to harm a fetus more than its mother. The severity of the condition was determined by the fetus' gestational age. During the first trimester of pregnancy, the placenta acts as a barrier between the mother and the fetus, protecting the fetus from humoral and cell-mediated immune responses. Despite the fact that the fetus receives immunity from the mother, they are severely affected by these viruses after the first trimester of pregnancy owing to a lack of immunity. All diseases have their own causal agent, and they are disseminated mostly by unsanitary environments, contaminated blood, water, and soil, and respiratory droplets in the air. The

harm caused by a primary infection is greater than that caused by a subsequent or reactivated illness (Yadav *et al.*, 2014).

## **2.4 Toxoplasmosis:**

### **2.4.1. Causative Organism:**

*Toxoplasma gondii* (*T. gondii*) is the causal agent of toxoplasmosis, an intracellular parasitic parasite that causes miscarriage in humans and animals (Mohamed, 2020).

### **2.4.2. Mode of Infection:**

*Toxoplasma gondii* is a parasitic protozoan found in cat feces and raw meat. Infection develops when the parasite is consumed through undercooked meat or unclean hands. Congenital toxoplasmosis is usually undetectable at birth, and (70-90 %) of children eventually develop severe clinical disease (Kenny & Myers, 2017).

### **2.4.3. Prevalence:**

In the United States of America (USA), toxoplasmosis has become less common, and comparable trends have been documented in France and Sweden. Toxoplasmosis is most common in the Middle East and low-income African countries. In Korea, the seroprevalence rate of toxoplasmosis in pregnant women ranged from (0.88 % to 3.7 %), in comparison to Europe and America, this is a low estimate. The prevalence of toxoplasma in the general Korean population ranges (from 8% to 25.8%), with positive results being substantially higher in older age groups, which explains the low rates of toxoplasmosis seroprevalence among antenatal women (Chung *et al.*, 2018).

In Iraq and across the world, the rate of human infection has been recorded in a variety of ways. Infection with *Toxoplasma* in humans, particularly in those with a weakened immune system, pregnant women, HIV/AIDS patients, young people, and those with underlying diseases, can cause catastrophic consequences. Despite the fact that almost

70% of infected people are essentially asymptomatic, immunocompromised people with this infection have a high risk of morbidity and death (Hadi *et al.*, 2016).

#### **2.4.4. Pathogenesis of Vertical Transmission:**

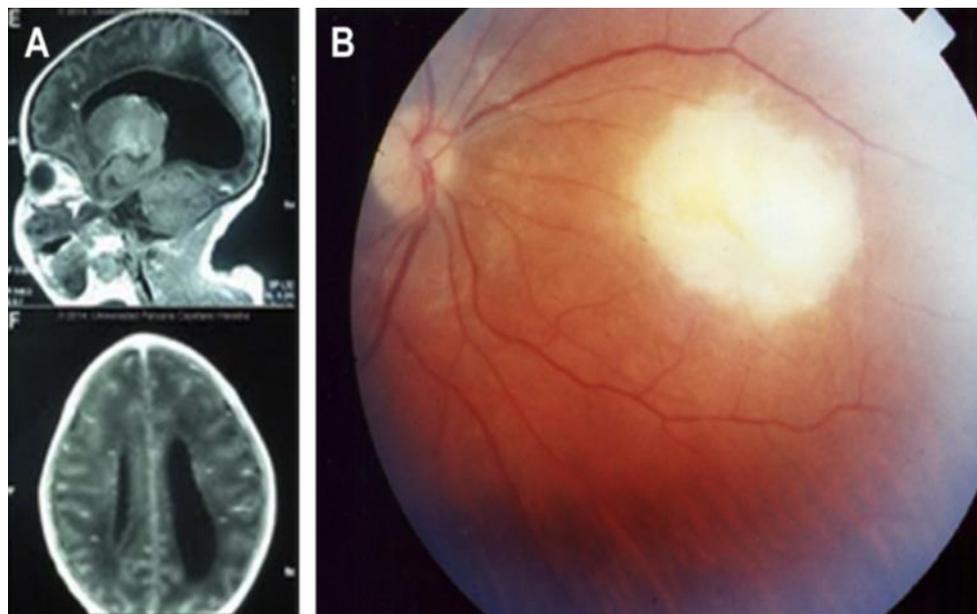
Acute tachyzoite infection in the bloodstream through gestation, with the risk of transplacental infection. Tachyzoites infiltrate the placenta and can overcome the barrier to reaching the fetus, causing illness in 30% of cases. The frequency of tachyzoite transmission to the fetus is proportional to gestational age, with low transmission rates in the 1<sup>st</sup> trimester (10–15%) and the greatest transmission rates in the 3<sup>rd</sup> trimester between (50–60%) and (60-90 %). However, if the infection occurs early in gestation, the illness is more severe. The variables that influence tachyzoite transmission to the fetus are not well known. Ingestion of unpasteurized milk or direct entrance into the circulation by a blood transfusion or laboratory mishap is a rare cause of tachyzoite infection (Mose *et al.*, 2020).

#### **2.4.5. Clinical Features:**

The first infection is typically asymptomatic; however, it might be glandular fever. Parasitemia generally develops 3 weeks after infection. As a result, congenital infection is only a serious danger if the mother has it through or just before gestation. Although infection through the 1<sup>st</sup> trimester of gestation is the greatest possible cause for serious fetal harm (85 %), only 10 % of illnesses are transferred to the fetus at this stage of pregnancy. Despite the fact that (85 %) of infections are transmitted through the 3<sup>rd</sup> trimester, the danger of fetal harm is only about 10%. Infants with a severe infection may develop ventriculomegaly or microcephaly, as well as chorioretinitis and calcification of the brain, these characteristics can be recognized via ultrasound, as shown in figure (2.3). The majority of infected infants are asymptomatic when they are born, but eventually suffer complications (Singh, 2016).

### 2.4.6. Diagnosis:

The identification of several types of antibodies, each of which has a distinct meaning, is still used to diagnose toxoplasmosis. The tests assess the levels of several type of antibodies, such as IgM, IgG, IgA, and IgE, which grow and decrease during and after infection. IgM detection in a patient's blood sample using the enzyme-linked immunosorbent assays (ELISAs) method indicates an infection in the acute phase, whereas IgG detection indicates a previous infection. To avoid infection in pregnant women, various measures should be taken, the most important of which is not touching a cat or the place where it resides (Mohamed, 2020).



**Figure 2. 3 Congenital Toxoplasmosis. (A) Intracerebral calcifications and hydrocephalus. (B) Acute retinitis (Neu et al., 2015).**

One week after infection, immunoglobulin M (IgM) is a serological marker for acute toxoplasmosis that can be identified. It might, however, be present serologically for months or even years. IgM antibodies in the maternal blood can be identified 18 months after infection in an infected gestation, which might make determining whether the noticed antibody is from an ongoing or past infection difficult. When a fetus is exposed to an antibody from a previous illness, there are typically no

negative repercussions. If the infection develops through gestation, however, the clinician should determine whether or not to treat the unborn child with anti-parasitic medication to avoid illness problems (Liu *et al.*, 2015).

This antibody is a sign of a past infection since residual titers might last a lifetime. Since then, it has become a routine diagnostic indicator for persistent infection. Though, this antibody has trouble distinguishing between prior and recent infections. In an asymptomatic patient, an additional IgG-based test has been developed to identify acute from chronic infection. Other IgE and IgA-based diagnostics have been advanced. Antibodies are created in the 1<sup>st</sup> few weeks of disease and fade early. Various serological procedures for determining recent and earlier exposures have previously been established.: Sabin-Feldman dye test (SFDT), agglutination tests, polymerase chain reaction (PCR), indirect fluorescent assay (IFA), and enzyme-linked immunosorbent assays (ELISAs) (Ybaez *et al.*, 2020).

### **1. Sabin-Feldman Dye Test (SFDT)**

The Sabin-Feldman dye test (SFDT) was created more than seven decades ago for the laboratory investigation of *T. gondii* infection. SFDT is still considered the gold standard because of its excellent sensitivity and specificity. It employs patient serum to complement live tachyzoite incubation. If the serum includes particular antibodies against *T. gondii*, the complement system will coat and lyse the parasites, and staining with the dye methylene blue will not occur. The end-point titer is calculated using the number of stained (alive) and unstained (dead) tachyzoites. Antibody titers cannot distinguish between acute and chronic diseases, despite the fact that SFDT can detect both IgM and IgG antibodies. The utilization of live parasites is also required in SFDT, which is a biohazard, hence it can only be used in a few facilities (Ybaez *et al.*, 2020).

## **2. Polymerase Chain Reaction (PCR):**

The Polymerase Chain Reaction assay is a significant advancement in toxoplasmosis diagnosis. The initial application of PCR was for the detection of congenital toxoplasmosis in amniotic fluid. When compared to radiological signs and histology, the detection of *T. gondii* DNA in blood has highlighted the possibility of anticipating the diagnosis. When the only guide to Toxoplasma reactivation is the identification of circulating DNA, the PCR assay is an essential tool for determining the prevalence of reactivation. Researchers recently showed that a positive Toxoplasma-specific PCR result from blood samples taken in the first half of pregnancy could validate the serological diagnosis of recent infection in early pregnancy. However, when the main clue to Toxoplasma reactivation is the detection of circulating deoxyribonucleic acid (DNA), the PCR's reproducibility is critical for determining the prevalence of reactivation (Bakre, 2016).

## **3. Agglutination Tests**

Particulate antigens that can association with antibodies are required for agglutination testing. When multivalent antibodies (also known as agglutinins) are present, they form large aggregates with dispersed particle antigens, which can be observed without magnification. These tests are used to figure out how much of a specific antibody there is. Direct agglutination test (DAT), modified agglutination test (MAT), indirect hemagglutination test (IHAT), and latex agglutination test (LAT) are examples of agglutination tests (LAT) that have been utilized to diagnose toxoplasmosis in humans and animals (Liu *et al.*, 2015).

## **4. Indirect Fluorescent Assay (IFA):**

An indirect fluorescence test is a non-live tachyzoite-based diagnostic approach that is easy and safe. The antigen-antibody interaction of diluted serum specimens with dead Toxoplasma tachyzoites is the basis

for this approach. Under a fluorescence microscope, the contact will be identified by adding fluorescent-labeled anti-human IgG or IgM antibodies (Liu *et al.*, 2015; Ybaez *et al.*, 2020).

## **5. Enzyme-Linked Immunosorbent Assay (ELISA):**

Enzyme-Linked Immunosorbent Assay (ELISA) is still recognized as one of the most common procedures for the quantitative detection of antibodies and all antigenically active substances, with great sensitivity and specificity, even after four decades of use in toxoplasmosis diagnosis. A solid-phase antigen or antibody, an enzyme-labeled antigen or antibody, and a substrate for the enzyme reaction help compensate an ELISA system. Antibodies and antigens can be tested with it. To detect *T. gondii* antibodies or antigens, a variety of ELISAs have been developed, including indirect ELISA, sandwich ELISA, and dot-ELISA. Anti-*T. gondii* IgG, IgM, and IgA antibodies are detected by indirect ELISA rather than antigens (Döskaya *et al.*, 2014; Liu *et al.*, 2015).

### **2.4.7. Clinical Therapy:**

The goal of medical treatment is to recognize women who are at risk for toxoplasmosis and treat them as soon as possible after the disease is discovered. Spiramycin should be given to women who have established maternal infection to reduce the frequency of fetal transmission, especially in the first trimester. While spiramycin can decrease the risk of congenital infection, it does not cross the placenta reliably, it cannot treat an infection that has already begun. If fetal infection is diagnosed after the 18th week of pregnancy, Pyrimethamine, sulfadiazine, or folinic acid should be used instead of spiramycin. In the United States, spiramycin is not commercially available, although it can be obtained if a Food and Drug Administration (FDA) Investigational New Drug number is secured (Davidson *et al.*, 2019).

After a congenital infection diagnosis is confirmed, postnatal treatment begins with the goal of preventing or reducing clinical symptoms at delivery, as well as treating possible long-term sequelae or clinical relapses, particularly eye sequelae. The 1994 Chicago Collaborative Treatment Trial (CCTT), found that a year-long Pyrimethamine-clindamycin vs. pyrimethamine-sulfadiazine (PYR-SDZ) treatment in 120 infected neonates followed up between 1981 and 2004 had a significantly better outcome than untreated (or sub-optimally treated) historical controls, was a landmark study that changed the general approach to the post-natal treatment of congenital toxoplasmosis despite their poor birth presentations, (80 %) of the children had a normal motor function, (64 %) had no new ocular abnormalities, and none had sensorineural hearing loss. The PYR-SDZ treatment regimen was standardized by the CCTT, and it was recommended that it be given regularly throughout a congenitally infected child's first year; updated recommendations were just released (Konstantinovica *et al.*, 2019).

#### **2.4.8. Nursing Diagnosis:**

Readiness for Enhanced Knowledge (Toxoplasmosis) related to a desire to understand the ways in which a pregnant woman can contract the disease (Davidson *et al.*, 2019).

#### **2.4.9. Nursing Plan and Implementation:**

The nurse-midwives who care for women through the antepartum period is the ideal person to discuss toxoplasmosis prevention with a pregnant woman. The woman must be aware of the necessity of avoiding undercooked or raw meat, particularly pork, beef, and lamb. *T. gondii* cysts have been found in ten percent to seventy percent of lamb, (25 %) of pork, and (10 %) of beef samples. Fruits and vegetables should be washed before consumption. By letting someone else clean the cat litter box, the woman can avoid contact with it. Furthermore, because a cat's feces take around 48 hours to become contagious, the litter should be cleaned

frequently. The nurse-midwives should also go over the necessity of the woman wearing gloves when gardening and staying away from cat-infested regions (Davidson *et al.*, 2019).

## **2.5. Others**

### **2.5.1 Chickenpox (Varicella-Zoster Virus):**

#### **2.5.1.1. Infective Organism**

The varicella-zoster virus (VZV), a herpes virus, causes chickenpox (Kenny & Myers, 2017).

#### **2.5.1.2. Mode of Infection:**

Chickenpox is transferred via droplets and through direct human touch (Gershon *et al.*, 2015).

#### **2.5.1.3. Prevalence**

Chickenpox immunity is present in approximately 90% of people over the age of 15 in the United Kingdom. Although chickenpox exposure is prevalent through gestation, infection is rare, with an estimated rate of 3/1,000 gestations. Iraq is classified as a temperate zone country. Between four and nine people per 100,000 will die from chickenpox, with (81–85 %) of those being adults. In pregnant women, chickenpox is five times more likely to be fatal than in non-pregnant individuals. Although varicella is normally a harmless pediatric disease with few serious consequences, the varicella-zoster virus can cause pneumonia or encephalitis, which can lead to long-term complications or death. Secondary bacterial infections of the vesicles can result in disfiguring scars, necrotizing fasciitis, and septicemia. Increased adult morbidity and the prevalence of congenital varicella syndrome (CVS) and severe newborn varicella may result from universal vaccination programs, which may lead to increase in the average age of infection. In Iraq, chickenpox is a monthly notifiable disease (Khalil *et al.*, 2020).

#### **2.5.1.4. Clinical Features:**

Chickenpox is more likely to affect non-immune pregnant women, who may suffer acute pneumonia, hepatitis, or encephalitis. Pregnant women have a mortality risk that is almost five times higher than non-pregnant people. Pneumonia affects about 10% of women who have chickenpox, and it appears to be more severe later in pregnancy. It can also result in fetal varicella syndrome (FVS) or newborn varicella infection (Gershon *et al.*, 2015).

#### **2.5.1.5. Congenital Varicella Syndrome:**

In up to a quarter of instances, primary varicella-zoster virus (VZV) infection through the 1<sup>st</sup> two trimesters of gestation can lead to intrauterine infection. However, the reported risk of spontaneous miscarriage in pregnant women with acute varicella was not higher than the rate of abortion in pregnant women who had not had chickenpox. Infected fetuses are likely to develop congenital varicella syndrome (CVS) in roughly 12% of cases. Skin lesions in the dermatomal distribution, neurological problems, eye illnesses, and limb hypoplasia are all common clinical signs. Muscle hypoplasia, internal organ diseases, and gastrointestinal, genitourinary, and cardiovascular symptoms are among the less common disorders. About 30% of neonates born with congenital varicella syndrome die during the first few months of life (The Royal College of Obstetricians and Gynecologists (RCOG), 2015).

#### **2.5.1.6. Zoster During Pregnancy:**

According to current research, zoster during pregnancy is not associated to birth abnormalities. Although there have been instances of neonates with congenital abnormalities being born to mothers who had zoster through early gestation, no case has been found to have laboratory evidence of varicella-zoster virus infection intrauterine. Furthermore, because newborns have unique maternal IgG class antibodies, maternal zoster

through the perinatal period does not pose issues for them, and there is usually no viremic transmission of the varicella-zoster virus unless the woman is immunocompromised (RCOG, 2015).

#### **2.5.1.7. Neonatal Varicella:**

Maternal varicella can infect the newborn through one of three routes through the perinatal period: 1) transplacental viremia, 2) ascending infection during labor and delivery, or 3) respiratory droplet/direct contact with infectious lesions after birth. The fetus is more likely to receive varicella if the mother gets chickenpox throughout the last three weeks of gestation. Intrauterine acquired neonatal varicella is the term for chickenpox that occurs within the first 12 days of life. According to clinical data, the incubation period for intrauterine transmitted varicella is around 12 days from the beginning of maternal varicella rash to the onset of rash in the neonate, however, it can be decreased to a few days. Based on these findings, neonatal chickenpox that occurs after the 12<sup>th</sup> day of the neonatal period is most likely acquired through postnatal varicella-zoster virus infection rather than through intrauterine infection. A few days before or after delivery, maternal chickenpox can produce life-threatening neonatal chickenpox (Gershon *et al.*, 2015).

#### **2.5.1.8. Maternal Infection around the Time of Delivery:**

There is a substantial chance of varicella in the newborn if the mother is infected during pregnancy. To allow for passive antibody transmission from mother to newborn, elective deliveries should be postponed for 5–7 days after the onset of maternal rash. After the neonate is born, a newborn ophthalmic examination should be scheduled. The newborn should be given varicella-zoster immunoglobulin (VZIG) if birth occurs within 7 days of the development of the maternal rash, or if the mother gets the chickenpox rash within 7 days after birth. For the first 28 days after the commencement of maternal infection, the newborn should be checked for

indications of infection. Following consultation with a neonatologist and virologist, acyclovir should be used to treat neonatal infection (Silbert-Flagg & Pillitteri, 2018).

#### **2.5.1.9. Preventive Measures**

Only aggressive immunization of seronegative women before pregnancy allows for effective chickenpox prevention in pregnant women and newborns. Adults have been demonstrated to be safe and effective against chickenpox after receiving a live attenuated varicella vaccination. Varicella vaccine is not advised for pregnant women, as is the case with all live-attenuated vaccinations, and pregnancy should be avoided for at least four weeks after vaccination (Kenny & Myers, 2017).

#### **2.5.1.10. Diagnosis:**

Varicella and zoster are typically diagnosed clinically based on the distinctive generalized or unilateral dermatomal vesicular rashes, as seen in figure (2.4). Atypical rashes, such as disseminated zoster or a minimal or absent dermatomal rash; zosteriform herpes simplex; modified varicella in vaccinated individuals; rashes caused by enteroviruses, poxviruses, rickettsia, drug reactions, or contact dermatitis; and varicella-zoster virus (VZV) infection in the absence of a rash is all notable. If a woman report having had chickenpox, she should have a blood test to confirm varicella-zoster virus immunity, which includes testing for varicella-zoster virus immunoglobulin (G). The virology lab may be able to be using serum from the blood sample taken throughout early pregnancy booking, which can usually be done in 24–48 hours. If neurological symptoms or signs are present, polymerase chain reaction (PCR) on material from skin vesicles (supplied as swabs, fluid, or scabs), saliva, and cerebrospinal fluid (Gershon *et al.*, 2015).



*Figure 2. 4 Vesicular Rashes (Gershon et al., 2015).*

#### **2.5.1.11. Management of Chickenpox in Pregnancy:**

Until the lesions have crusted over, women with chickenpox must prevent contact with other antenatal women and newborns. According to current recommendations, pregnant women with chickenpox should be treated with oral acyclovir (for seven days, take 800 mg five times a day) if the rash appears within 24 hours of the commencement of the rash and they are more than 20 weeks pregnant. Before 20 weeks of pregnancy, acyclovir should also be explored. Once chickenpox has been established, varicella-zoster immunoglobulin (VZIG) has little therapeutic value. Even if there are no complications, a hospital assessment should be considered if the woman smokes, has chronic lung disease, is on corticosteroids, or is in the second half of her gestation. Varicella-infected women should be nursed separately from infants, pregnant women who may be at risk, and non-immune staff (Silbert-Flagg & Pillitteri, 2018).

### **2.5.2. Syphilis**

#### **2.5.2.1. Causative Organism:**

Syphilis is a sexually transmitted infection (STI) that can be passed from one person to another. *Treponema pallidum* subspecies *pallidum*, a spirochaete, causes it (order Spirochaetales). Nonvenereal or endemic treponematoses are caused by three different species in this genus. Yaws is caused by *T. pallidum* subspecies *pertenue*, while endemic

(nonvenereal) syphilis is caused by *T. pallidum* subspecies endemic (Peeling *et al.*, 2017; Mattei *et al.*, 2012).

### **2.5.2.2 Mode of Infection:**

Syphilis is most usually transmitted by sexual contact (vaginal, anogenital, and orogenital), however, it can also be spread congenitally (in utero or less commonly, during passage through the birth canal). Congenital syphilis is caused by transplacental transfer or contact with infectious lesions at delivery and can occur at any time during pregnancy, resulting in stillbirth or neonatal congenital infection. Rare cases of acquisition through blood products and organ donation, as well as cases originating from occupational and other exposures, have also been recorded (Stoltey & Cohen, 2015).

### **2.5.2.3. Prevalence:**

According to the World Health Organization's most current estimate, 17.7 million people aged 15 to 49 had syphilis, with an estimated 5.6 million new cases per year. Syphilis' estimated prevalence or incidence varies greatly by location or country. Africa has the highest prevalence of maternal syphilis, accounting for more than 60% of the global total (Peeling *et al.*, 2017).

According to estimates, there are 927,936 maternal infections attributable to active syphilis and 350,915 poor pregnancy outcomes worldwide. This infection is a severe public health issue because it is associated to prenatal problems including congenital syphilis. 143,100 fetal fatalities or stillbirths, 61,860 neonatal deaths, and 44,132 preterm or low birth-weight infants were among the 350,915 unfavorable effects. Despite this, the incidence rate of congenital syphilis in Brazil has risen steadily over the last 10 years, from 2.0 cases per thousand live births to 6.5 cases per thousand live births (Padovani *et al.*, 2018).

#### 2.5.2.4. Mechanisms/Pathophysiology

Although all clinical manifestations of syphilis are assumed to be caused by a local inflammatory response elicited by Spirochaetes, the mechanisms that cause tissue damage, as well as the host defenses that eventually achieve a measure of control over the bacterium, are unknown. The recalcitrance of *Treponema pallidum* to in vitro culture and the consequent inability to harness genetic techniques to delineate its virulence determinants remain the primary obstacles to progress. Furthermore, the outer membrane's fragility and low protein composition have hampered efforts to describe surface-exposed molecules. Finally, there are no simple mouse models for dissecting the host response and the components of protective immunity (Peeling *et al.*, 2017).

#### 2.5.2.5. Clinical Features

Primary syphilis can manifest as a painless vaginal ulcer (condylomata lata) 3–6 weeks after infection, as shown in figure (2.5). Though, this could be on the cervix and go unrecognized. Secondary symptoms appear six weeks to six months after infection, such as a maculopapular rash or mucous membrane lesions. Untreated individuals would develop symptomatic cardiovascular tertiary syphilis in 20% of cases and symptomatic neurosyphilis in 5–10% of cases. 70–100% of infants infected by early, untreated (primary or secondary) syphilis will be stillborn, while around 25% will be infected by early, untreated (primary or secondary) syphilis. Fetal hydrops, fetal growth restriction, stillbirth, congenital syphilis (which has the potential to cause long-term impairment), preterm labor, and neonatal death are all linked to syphilis transmission from mother to child during pregnancy. The likelihood of congenital transmission decreases as the period of maternal syphilis before gestation increases. Treatment with benzathine penicillin enhances the fetus's prognosis significantly (Nyatsanza & Tipple, 2016).



*Figure 2.5 Syphilis Ulcer (Peeling et al., 2017).*

Condyloma lata (papulosquamous eruption), lesions on the hands and feet, macular rash, widespread lymphadenopathy, headache, myalgia, arthralgia, pharyngitis, hepatosplenomegaly, alopecia, and weariness are all secondary syphilis symptoms. As a consequence, Syphilis has earned the label great imitator. Without treatment, both the primary and secondary lesions fade away, and the patient enters a pre-clinical or latent stage with no clinical symptoms. Cardiovascular syphilis, neurosyphilis, and late benign syphilis are all symptoms of the third stage, which affects some people. The incubation phase lasts somewhere between 20 and 90 days. Although the organism enters the Central nervous system early, symptoms do not develop until later (Mattei *et al.*, 2012).

#### **2.5.2.6. Diagnosis:**

The production of non-specific and specific treponemal antibodies is the body's immunological reaction to syphilis. Serological tests can be used to detect these. To detect non-specific treponemal antibodies, non-treponemal assays such as the Venereal Diseases Research Laboratory (VDRL) and rapid plasma regain are used (RPR). Treponemal tests that detect specific treponemal antibodies involve enzyme immunoassays (EIAs), *T. pallidum* hemagglutination assay (TPHA), and the fluorescent treponemal antibody absorbed test (FTA-abs). In the United Kingdom, for

syphilis screening, VDRL and TPHA tests are rapidly being replaced by immunoglobulin (Ig) G or IgG and IgM assays. EIAs have a sensitivity of more than 98% and a specificity of more than 99%. Non-treponemal tests, on the other hand, can result in false negatives, particularly in patients with very early or late syphilis, reinfection, or HIV infection. In women with lupus, the VDRL may be mistakenly positive. Because screening tests have a (20 %) false-positive rate, women should be referred to a genitourinary medicine (GUM) clinic for expert assessment and diagnosis (Peeling *et al.*, 2017).

### **2.5.2.7. Management:**

Treatment for pregnant women is depending on the stage of syphilis and follows the same guidelines as for the general population. For early latent syphilis, benzathine penicillin G IM (2.4 million units) is used (less than a year duration). Ceftriaxone 1 to 2 gm IM or IV daily for 10 to 14 days. (2.4) million units of benzathine penicillin G IM once a week for three weeks for late latent syphilis (lasting more than a year) or latent syphilis of undetermined period. Penicillin-allergic pregnant women should be desensitized before being treated with the antibiotic. Sexual partners must be examined and treated as well (Tipple *et al.*, 2015; Davidson *et al.*, 2015).

As a consequence of pro-inflammatory cytokines being released in reaction to dying organisms, a Jarish–Herxheimer reaction may occur during treatment. For 12–24 hours after starting treatment, this manifests as a worsening of symptoms and a temperature. It has been linked to uterine contractions as well as fetal discomfort. As a result, many practitioners admit women for monitoring at the start of treatment. If a mother isn't treated when she's pregnant, her child should be treated after she gives birth. It's possible that an infected infant will be delivered with no signs or symptoms of infection, nonetheless if not treated right away, he or she

could develop major difficulties in a matter of weeks. Infants who are not treated often experience developmental delays, seizures, or even death if they are not treated (Kenny & Myers, 2017).

Induction of early labor or fetal distress is some of the risks associated with the Jarisch-Herxheimer reaction in pregnant women. Pregnant women should be informed about this risk prior to treatment, but treatment should not be postponed or discontinued (Clement *et al.*, 2014).

### **World Health Organization Guidelines**

1. Intramuscular administration of benzathine penicillin is the preferred treatment.
2. Procaine penicillin is administered intramuscularly 10 to 14 days. And is considered the second choice
3. Doxycycline is popular since it is both affordable and simple to use. However, it is not advised for antenatal women.
4. Because azithromycin does not pass the placenta, the infant must be treated after birth (Clement *et al.*, 2014).

#### **2.5.2.8 Complications:**

Syphilis infection that goes untreated can cause irreparable neurological and cardiovascular problems. Neurosyphilis can cause meningitis, stroke, cranial nerve palsies, and general paresis in early neurosyphilis, as well as dementia and general paresis in late neurosyphilis, depending on the stage. Cardiovascular syphilis can present as aortitis, aortic regurgitation, carotid ostial stenosis, or granulomatous lesions in numerous body organs as a result of tertiary syphilis. Untreated syphilis has an impact on the course of human immunodeficiency virus infection, including increased virus replication and faster development of late syphilis. Primary and secondary syphilis can cause newborn infection and poor gestation outcomes if left untreated throughout gestation (Clement *et al.*, 2014).

### **2.5.3. Hepatitis B:**

#### **2.5.3.1. Causative Organism:**

Hepatitis B virus (HBV) is a DNA virus that causes liver disease (Gerlich, 2013).

#### **2.5.3.2. Mode of Infection:**

Hepatitis B is spread mostly by blood, but it can also be spread through saliva, sperm, and vaginal fluids after childbirth. Drug users who share needles are putting themselves in risk. Chronic hepatitis B is frequent in several parts of the world (for example, China), and vertical transmission is common. Intracellular HBV does not cause cytopenia. It replicates in hepatocytes and interferes with hepatic functions. The cytotoxic T cell is triggered to fight against HBV protein-producing cells in order to assault the virus. Inflammatory reactions and cellular damage ensue as a result of this (Yadav *et al.*, 2014).

#### **2.5.3.3. Prevalence:**

Infection with the hepatitis B virus (HBV) is the tenth-largest cause of death worldwide, accounting for up to 1.2 million fatalities per year. Globally, about 2 billion people are affected. HBV is carried by almost 350 million people on a long-term basis. Chronic (lifelong) infections affect more than 350 million people worldwide. In the United Kingdom, it is estimated that one in every 1,000 people is infected with the virus. The prevalence of hepatitis B surface antigen (HBsAg) in antenatal women is believed to be between 0.5 and 1% (Al-Rubaye *et al.*, 2016).

#### **2.5.3.4 Clinical Features:**

Although hepatitis B is a virus that attacks the liver, many individuals who have it have no symptoms. The incubation period for HBV is 6 weeks to 6 months (Malewezi *et al.*, 2016).

**2.5.3.5. Diagnosis:**

The serologic diagnosis is somewhat complicated. Surface antigen (HBsAg), surface antibody (HBsAb), core antigen (HBcAg), and core antibody (HBcAb) are all part of a conventional HBV infection screening panel (HBcAb). In a brief, HBV core antigen (HBcAg) emerges initially in acute infection, followed by seroconversion to core antibody (HBcAb). The presence of HBV surface antigen (HBsAg) indicates active infection and may remain; the formation of HBV surface antibody (HBsAb) indicates resolution and immunity. (It's worth noting that the change from surface antigen to surface antibody positive can take up to a year after an acute infection, so therapy shouldn't be considered right away). Hepatitis B e antigen (HBeAg) is associated to viral replication and infectivity in chronic infection, whereas hepatitis B e antibody (HBeAb) shows limited replication and infectivity. Chronic infection is indicated by HBsAg positivity (Lee-Allen & Jacquelyn, 2017).

**2.5.3.6. Management:**

Pregnant women who test positive for hepatitis B should be sent to a hepatologist for long-term surveillance for hepatocellular cancer and other long-term effects of chronic infection. Hepatitis B Ig and hepatitis B vaccine can be given together to prevent hepatitis B vertical spread. A suitable regimen is usually recommended by virology laboratories. The combined treatment is more effective than each treatment alone. The passive Ig is given immediately after delivery and gives instant protection against any virus delivered to the newborn through contact with blood through birth. The active vaccine gives long-term protection against subsequent household exposure. The active vaccination is administered in three doses: at birth, one month later, and six months later (Kenny & Myers, 2017).

## **2.6. Rubella:**

### **2.6.1. Causative Organism:**

Rubella is caused by the virus named Rubella virus the only member of the Rubi virus of *Togaviridae* family (Mali & Giri, 2018).

### **2.6.2. Mode of Infection:**

Postnatal rubella is disseminated through airborne respiratory droplets caused by coughing and sneezing, direct contact with an infected person's nasopharyngeal fluid, or urine of infants with congenital rubella syndrome (CRS). Infected people can be contagious for up to a week before the rubella rash appears and for up to a week after the rash emerges. It is most contagious at the time the rash first appears (Mali & Giri, 2018).

### **2.6.3. Prevalence**

Rubella is still prevalent in various underdeveloped countries and around the world; each year, congenital rubella syndrome affects nearly 100,000 children (CRS). Rubella cases have reduced dramatically in the United States, but there is a wide range of susceptibility in developing countries with lower vaccination rates. According to the World Health Organization's global estimates, there were more than 110,000 infants born with CRS worldwide, making rubella a leading cause of congenital anomalies. These estimates have pointed out that the highest CRS burden is occurring in the developing world, i.e., the Southeast Asian region and the African region. In India, the incidence of rubella in females with a poor obstetric history has been found to be as high as 86.90% (Poudyal & Khanal, 2018; Chung et al., 2018; Mohammed & Kokaz, 2020).

The risk of congenital infection and abnormalities is proportional to the gestational age at the time of infection. According to Miller et al., the congenital infection rate approaches 90% before 11 weeks of gestation (WG), drops to 30% between 24-and 26 weeks of gestation, and

rises to approximately 100% after 36 weeks of gestation. The risk of significant fetal abnormalities rises to over 85% during the first 12 weeks of pregnancy, with about 20% of instances terminating in spontaneous miscarriages in the first 8 weeks. After 18-week gestation, the risk decreases rapidly and varies between 11- and 18-week gestation, eventually nearing 0% (Bouthry *et al.*, 2014).

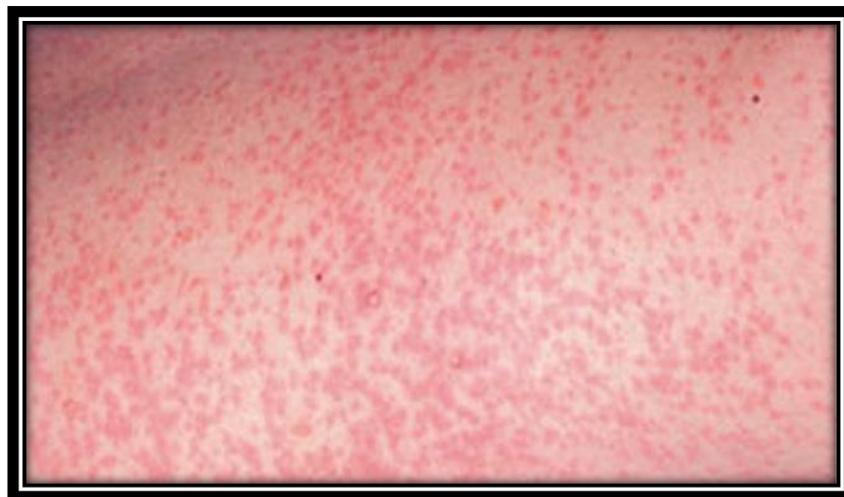
#### **2.6.4. Pathophysiology:**

Humans are the only known reservoir for rubella. The virus is spread from person to person by aerosolized particles from infected people's respiratory tract secretions. After infecting the cells of the susceptible host via receptor-mediated endocytosis, the virus replicates in the nasopharyngeal cells and subsequently moves to the regional lymphoid tissue of the nasopharynx and upper respiratory tract. The virus subsequently enters a viremic phase, which lasts 5 to 7 days following inoculation and is characterized by hematogenous dissemination of the virus to many organs. A rash or eruption on the skin appears 2 to 8 days after the commencement of viremia and disappears 3 days later when the human immune system develops. An infected person is contagious for 8 days before and after the rash emerges. However, after both wild-type rubella infection and one dose of rubella vaccine, reinfection has been documented (Lambert *et al.*, 2015; Bouthry *et al.*, 2014).

Congenital rubella syndrome (CRS) has a complex pathophysiology that is poorly understood. CRS can cause chorionic villi epithelial necrosis, death of infected cells through direct viral damage, suppression of mitosis, and reduced precursor cell proliferation, as well as cytopathic damage to blood artery endothelial cells, resulting in ischemia of developing organs. Rubella infection is assumed to be replicated in the nasopharynx and territorial lymph nodes once it is transmitted through the air (Leung *et al.*, 2015).

### 2.6.5. Clinical Features:

Rubella infection causes a fever rash, as seen in figure (2.6), however, in 20–50 % of cases, the mother is asymptomatic. Sensorineural deafness, blindness, congenital cataracts, endocrine disorders, and encephalitis are all possible symptoms of congenital rubella syndrome (CRS). The risk of congenital rubella infection decreases as the pregnancy progresses. If a fetus becomes infected, the resulting problems are less severe as the pregnancy progresses. The congenital infection affects nearly 80% of women with symptoms in the first 12 weeks of gestation, but only 25% by the end of the 2<sup>nd</sup> trimester. Rubella causes birth defects in (100 %) of fetuses who are infected throughout the first 11 weeks of gestation, although there is a modest risk of deafness from primary rubella between 16 and 20 weeks of pregnancy. There is no reported risk to the fetus from rubella infection before the anticipated date of conception or after 20 weeks of pregnancy (Sati & Arya, 2019).



*Figure 2. 6 Rubella Rash (Sati & Arya, 2019).*

### 2.6.6. Complications:

Rubella infection acquired after birth is linked to complications rather than joint discomfort. Rubella can cause complications such as congenital rubella syndrome, arthralgia, encephalopathy, Guillain-Barre syndrome, transient inflammation, thrombocytopenia, and hemolytic anemia (Mali & Giri, 2018).

## **2.6.7. Diagnosis:**

### **2.6.7.1. Rubella IgM test**

The presence of IgM antibodies is tested. IgM test specimens are accessible commercially. The sample should be drawn at least three days after the rash appears and no later than six weeks after the rash appears (the sample required is 2 ml of serum) (Mali& Giri, 2018).

### **2.6.7.2. Rubella Total Antibody Paired - Titter test**

When rubella IgM results are unreadable, paired total antibody testing can be useful. Acute serum should be taken as soon as possible when the rash appears, and convalescent serum 14 days later (Sati & Arya, 2019).

### **2.6.7.3. Polymerase Chain Reactions Techniques**

The test involves looking for positively sensed ribonucleic acid (RNA) genomes in the sample (Sati & Arya, 2019).

## **2.6.8. Vaccines**

The most extensively utilized rubella vaccines are based on the RA 27/3 strain, which is an alive, attenuated strain generated in human diploid cells, with the TO-336 and BRD-2 strains being used in Japan and China, respectively. Rubella vaccines are available as monovalent formulations or in combination with measles, measles, and mumps, or measles, mumps, and varicella vaccines. A single dosage of antibody produces a response rate of more than 95%. Despite declining rubella virus-specific immunoglobulin G (Rubella Virus (RV) IgG) titers, the response rate after two doses approaches (100 %), and immunization is obvious at over 21 years of age (McLean *et al.*, 2013).

In most countries, rubella immunization is given in two doses before the age of 24 months, similar to measles vaccination. In France, individuals born after 1980 and seronegative children aged 24 months and older are given the trivalent vaccine twice. Rubella vaccinations are

generally well accepted, with minor side effects being the most common. There have been reports of fever (15 %), rashes (5%), transient lymphadenopathy, and parotiditis. Mild to severe complications including febrile seizures, thrombocytopenic purpura, anaphylaxis, or encephalitis are relatively uncommon. A significantly increased occurrence of acute joint symptoms, as well as arthralgia and arthritis, has been seen in post pubertal female individuals following immunization (Bouthry *et al.*, 2014).

Vaccination during pregnancy is not recommended due to the possibility that the vaccine could be teratogenic given the fact that it is a live vaccination. There have been no reports of congenital rubella syndrome as a result of rubella immunization throughout gestation. To avoid Rubella infection, women who have been vaccinated after giving birth should be recommended to take contraception for one month (Kenny & Myers, 2017).

Rubella immunization is primarily intended to prevent congenital rubella infection. The time it takes to eradicate rubella and congenital rubella syndrome (CRS) can vary depending on the technique chosen, although it might take anywhere from 10 to 30 years. Vaccinating young girls and women of childbearing age is one way to lower the incidence of CRS. Another technique, which is adopted in most industrialized nations, is to immunize boys and girls as early as childhood, as well as adults who are susceptible to rubella, in order to prevent the virus from spreading. Several immunization programs have been conducted in various parts of the world. Rubella vaccines were included with measles vaccines in (67 %) of World Health Organization member states' national immunization regimens in 2010. The Global Measles and Rubella Strategic Plan 2012–2020, according to the new vaccine program, intends to eradicate measles and rubella in at least five WHO zones by the end of 2020 (Bouthry *et al.*, 2014).

### **2.6.9. Fetal-Neonatal Risks:**

The risk of teratogenic consequences on the fetus is greatest throughout the first trimester when up to (80 %) of instances of maternal

rubella infection result in maternal-fetal transmission. When infection occurs after 20 weeks of pregnancy, defects are uncommon. Because congenital rubella syndrome is contagious, infants born with it should be isolated. These newborns may shed the virus for up to 12 months and should be considered contagious until nasopharyngeal and urine cultures are negative for the rubella virus after 3 months of age (Davidson *et al.*, 2015).

#### **2.6.10. Clinical Therapy:**

If they are vulnerable and it is determined that they are not pregnant, if women of reproductive age are at risk, they should be screened for immunity and vaccinated. Premarital clinic visits and health counseling in high school might emphasize the significance of screening prior to planning a gestation. Hemagglutination inhibition is utilized to test the woman for rubella (HAI), a serology test, as part of the prenatal laboratory screening. Immunity is indicated by the presence of a 1:18 titer or higher. Rubella susceptibility is indicated by a titer of less than 1:8. Pregnant women are not vaccinated since the vaccine is created with an attenuated virus. Newly vaccinated children, on the other hand, are regarded as safe to interact with pregnant women. In the postpartum period, all rubella-susceptible women should get the measles, mumps, and rubella (MMR) vaccine. Therapeutic abortion may be an option if a pregnant woman becomes infected during the first trimester (Davidson *et al.*, 2019).

#### **2.6.11. Nursing Care Management:**

##### **2.6.11.1. Nursing Diagnoses**

- Ineffective Coping due to an inability to accept the possibility of fetal anomalies secondary to maternal rubella exposure.
- Risk for Ineffective Health Maintenance related to lack of knowledge about the importance of rubella immunization before becoming pregnant (Davidson *et al.*, 2015).

### **2.6.11.2. Nursing Plan and Implementation**

For a couple considering miscarriage due to a rubella diagnosis, nursing care and empathy are critical. A decision like this may cause a crisis for a couple who had planned their gestation. They require objective data in order to comprehend the potential consequences for their fetus and the prognosis of their baby (Davidson *et al.*, 2019).

## **2.7. Cytomegalovirus:**

### **2.7.1. Causative Organism:**

Cytomegalovirus (CMV) is a deoxyribonucleic acid (DNA) herpes virus (Lazim & Kadhim, 2018).

### **2.7.2. Mode of Infection:**

Transmission can be vertical (from mother to fetus) or horizontal (from mother to fetus) (through sexual intercourse or contact with bodily fluids such as urine, saliva, breast milk, maternal vaginal secretions, or blood) (Lazim & Kadhim, 2018).

### **2.7.3. Prevalence:**

The prevalence of cytomegalovirus (CMV) was determined to be between (45 %) to 100 percent in both developed and developing countries. The frequency of CMV Immunoglobulin G (IgG) was as high as 90% in some parts of India. In India, seropositivity for CMV immunoglobulin (IgM) ranges from (0.8 %) to (34.7 %) in women with a terrible obstetrics history. In a hospital in central Nepal, women's seropositivity to CMV was determined to be (63.9 %) for IgG and (0.1 %) for IgM, respectively. However, the seroprevalence of the cytomegalovirus (CMV) is higher in South America, Africa, and Asia (Chung *et al.*, 2018; Poudyal & Khanal, 2018).

The first investigation in Babylon found (79.5%) and (18.8 %) positive cases for cytomegalovirus IgM and IgG, respectively, in 120 aborted women. Cytomegalovirus was found in (65%) of the patients, and the diagnosis was made using a serological approach (IgM and IgG). In 2014,

Ahmed published the results of a study involving 214 pregnant women from Baghdad and Al-Hilla. The findings revealed that (33.8 %), (47.3 %), and (18.5 %) of the cases tested positive for CMV IgG, IgM, and both IgM+IgG antibodies, respectively. The results showed that women aged 25 and up have a greater cytomegalovirus/deoxyribonucleic acid viral load than women aged 25 and up who were seropositive to cytomegalovirus (had high IgM and or IgG ELISA titer). In the Holy Karbala governorate, a study involving (130) women having a bad obstetric history was done. The women's medical histories included miscarriage in 116 cases (89.23 %), early newborn mortality in 8 cases (0.61%), and congenital deformity in 6 cases (0.46%), with 46 cases (35.38 %) testing positive for cytomegalovirus IgM (Lazim & Kadhim, 2018).

#### **2.7.4. Clinical Features:**

In most cases, the mother experiences no symptoms or mild non-specific flu-like symptoms as a result of the primary infection. The diagnosis is frequently made when an ultrasound scan reveals abnormalities in the fetus. Growth restriction, microcephaly, cerebral calcification, ventriculomegaly, ascites, or hydrops are the most common symptoms in an affected fetus. Although antenatal ultrasound may not reveal any abnormalities, affected newborns may subsequently be discovered to suffer neurological impairment like blindness, deafness, or developmental delay. Hepatosplenomegaly, a purpural rash, and jaundice can also occur in the newborn, as well as anemia and thrombocytopenia (Kenny & Myers, 2017).

#### **2.7.5. Cytomegalovirus Pathogenicity**

The virus can also infect parenchymal and connective tissue cells in any organ, as well as a variety of hematological cell types. The most typical targets for virus replication are epithelial cells, endothelial cells, fibroblasts, and smooth muscle cells. The infection spreads primarily through the respiratory system or through sexual contact. After several years of initial infection, like other herpesviruses, Cytomegalovirus can live for a

long time, and its reservoir is monocytes and polymorph nuclear leukocytes, from which the virus is discharged (present in the throat and urine). Because of the presence of discrete intracellular inclusions surrounded by a halo of low reflection, infection appears as Owl-eyes in larger cells. The virus infects the salivary gland, the breast epithelium, the prostate, the endometrium, the tubules of the kidneys, and other organs such as the lungs and bone marrow. It can be isolated using saliva, breast milk, tears, semen, blood products, cervical secretions, and urine (Griffiths & Reeves, 2021).

#### **2.7.6. Diagnosis of Cytomegalovirus:**

The progress of cytomegalovirus antibodies in a seronegative woman who first grows viral IgM antibody and then IgG antibody could be used to make a serological diagnosis of primary CMV. If the infection is suspected, a sample taken during a presentation and one taken during booking could be compared to check if seroconversion has happened. Because IgM can be produced for months, having IgM in a sample at the time of presentation is not sufficient; it must be a new result in a woman who has tested negative for the antibody in the past (Kenny & Myers, 2017).

At the conclusion of the 1<sup>st</sup> trimester (or until week 20), repeat serologic screening of previously seronegative antenatal women with CMV-specific immunoglobulin G (IgG) and -M(IgM) antibodies may reveal maternal primary cytomegalovirus infection. Despite the lack of broadly accepted guidelines, testing before 18–20 weeks of gestation is feasible in order to detect late seroconversion at the end of the 1<sup>st</sup> trimester and commence fetal investigations. Parents should be advised of the danger of vertical transmission (32%), as well as the potential implications if seroconversion occurs (Lazzarotto *et al.*, 2020).

Maternal screening at the 1<sup>st</sup> prenatal visit and at birth, as well as neonatal screening at birth for those whose mothers tested seropositive, with a diagnosis of the neonate by saliva or urine cytomegalovirus deoxyribonucleic acid detection, are all procedures that

could be implemented. This method of targeted testing was previously discovered (82 %) of all CMV infections. This study used culture for diagnosis; nevertheless, polymerase chain reaction (PCR) is expected to enhance the detection rate (Chiopris *et al.*, 2020).

### **2.7.7. Fetal-Neonatal Risks**

The most frequent viral infection in a human fetus is cytomegalovirus (CMV). It affects between (0.5 and 2%) of all births. Though the majority of infected fetuses are asymptomatic at birth (85% to 90%), the remaining 10% to 15% will have varying degrees of abnormalities. The symptomatic newborns have a (20 %) to (30 %) mortality rate, and (90 %) of those who survive have substantial neurologic sequelae. Subclinical infections in newborns can cause intellectual disability (mental retardation) and auditory deficits that can go undetected for months, or learning difficulties that don't show up until later in life. CMV could be the most prevalent cause of mental illness (Davidson *et al.*, 2019).

Infected newborns are frequently of small gestational age (SGA). The blood, brain, and liver are the main tissues and organs affected. Nonetheless, practically all organs are at risk. Anemia and hyperbilirubinemia are symptoms of hemolysis. Thrombocytopenia and hepatosplenomegaly are other possible side effects (Davidson *et al.*, 2019).

Both reactivations of the latent virus and reinfection with a fresh CMV strain put the newborns of seropositive mothers in risk (known as superinfection). Because it is currently not possible to screen for children with CMV infection that may cause long-term health implications, the United Kingdom National Screening Committee did not recommend screening all newborns for CMV using a saliva test in December 2017. This is because most children who are positive for CMV will not have any symptoms. Screening for asymptomatic children was not suggested because it is unclear whether it will improve their results (Krishna *et al.*, 2019).

### **2.7.8. Management:**

Amniotic fluid can be tested for the virus using a polymerase chain reaction if there is a suspicion that the fetus is infected. The virus can be discovered in amniotic fluid since it is secreted in fetal urine. If anomalies are discovered on ultrasound and are suspected to be caused by congenital cytomegalovirus (CMV) infection, the gestation should be terminated. When a CMV infection is discovered, yet the fetus appears to be normal on ultrasound, it's a lot more challenging because there's still a 20% possibility of neurological impairment in this fetus. CMV, like other herpes viruses, has the ability to go dormant and then reawaken. Adults excrete the virus for weeks or months after infection, while newborns excrete the virus for years. It can be spread by blood transfusion or transplantation since it stays in lymphocytes for the rest of one's life. Reactivation happens on a regular basis, with shedding in the genital, urinary, and respiratory tracts (Bruminhent & Razonable, 2014).

### **2.7.9. Vaccines against Cytomegalovirus**

Vaccines against the Cytomegalovirus are still in development, the Institute of Medicine has given a CMV vaccine the highest priority category, while the Centers for Disease Control has given it the second-highest priority objective. This is due to a well-known combination of extensive infection, severe illness, and limited antiviral and newer treatment options. As long as the vaccination produced an immunological response equal to natural immunity, the risk of CMV infection following transplantation might be greatly reduced, as well as lower rates of CMV infection throughout gestation, lowering congenital CMV transmission rates. CMV raises the risk of cardiovascular disease and all-cause death in addition to acute CMV infection. Because CMV seroprevalence is higher in lower socioeconomic categories, such as African-Americans, a CMV vaccination might help close some of the health outcomes that have been found (Krishna *et al.*, 2019).

## **2.8. Genital Herpes:**

### **2.8.1. Causative Organism:**

The herpes simplex virus (HSV) is a DNA virus with two strands (Kenny & Myers, 2017).

### **2.8.2. Mode of Infection:**

Herpes simplex virus-1 and Herpes simplex virus-2 are the two types of HSV viruses. HSV-1 is the most common cause of Oro-labial infections. These infections are commonly gained throughout childhood by direct physical contact, such as kissing. H-2 is the most prevalent cause of genital herpes, which is a sexually transmitted infection (Jaishankar & Shukla, 2016).

### **2.8.3. Incidence:**

Globally, an estimated 3.7 billion people under the age of 50 (67 %) are infected with HSV-1. Globally, an estimated 491 million persons aged 15–49 (13 %) are infected with HSV-2. HSV-2 causes genital herpes in about 400 million people around the world. HSV-2 infection affects almost one in every five persons in the United States (approximately 50 million people), every year, one million new infections occur. As a result of less childhood exposure to orolabial herpes, HSV-1 seroprevalence is decreasing overall, but genital acquisition rates are increasing, with HSV-1 accounting for at least half of all new cases. This rise can be attributed in part to changing adolescent sexual behaviors, which now include greater oral-genital contact (Spicknall *et al.*, 2021).

In addition, the prevalence of genital herpes was found to be higher (>80%) in Sub-Saharan Africa. In India, IgM seropositivity reached as high as (33.5 %). Globally, an estimated 3.7 billion people under the age of 50 (67 %) are infected with HSV-1. HSV-2 infection affects 491 million people globally (13%) between the ages of 15 and 49 (Poudyal & Khanal, 2018).

#### **2.8.4. Pathophysiology**

A previously unexposed person gets a primary HSV infection after coming into close contact with someone who is actively shedding the virus from their skin or saliva. A prodrome of tingling, itching, or burning at the site of exposure can continue anywhere from hours to days. Epithelial damage at the portal of entry causes vesicles to erupt, ulcerate, then epithelialized throughout a two-week epidemic. Virus DNA goes by axon to the spinal cord sensory ganglion upon infection and remains there for the rest of one's life. When HSV is reactivated, it migrates back to the skin and mucosa via the axon, its branches, or contralateral axons (Mary& Groves, 2016).

#### **2.8.5. Risk Factors**

According to a study conducted in the United States, higher numbers of sexual partners, a prior history of any sexually transmitted infection, including HIV, a history of a genital lesion in oneself or a partner, non-Caucasian race, female gender, increasing age, and low socioeconomic status are all risk factors for genital herpes infection (primarily HSV-2) (Sauerbrei, 2016).

#### **2.8.6. Clinical Manifestations:**

On the genitalia, perineum, upper thighs, buttocks, or perianal areas, a visible outbreak comprises single or clustered vesicles that ulcerate before resolving as shown in figure (2.7). Malaise, fever, and localized adenopathy are all symptoms of primary infections. Reactivation of latent viruses causes subsequent outbreaks, which are usually milder. The characteristic HSV appearance, whether it's a primary infection or a subsequent outbreak, is rarely seen, with many patients reporting little or no symptoms. According to studies, (65 % to 90 %) of individuals with genital HSV infection are unaware of their illness. Clinically evident secondary breakouts may have a prodrome anywhere along the involved axon, are milder, and recover in six to 12 days. HSV-1 infections, both primary and

secondary, are usually less severe than HSV-2 infections (Mary & Groves, 2016).



**Figure 2. 7 Genital Herpes (Crimi et al., 2019).**

The most prevalent source of neonatal HSV infection is viral transfer to the newborn via the mother's vaginal system during birth; HSV-2 causes 70–85 % of these infections. Perinatal maternal primary HSV infection poses the greatest risk; nonetheless, the majority of neonatal infections occur around the time of birth, when there is asymptomatic genital tract viral shedding. Localized infection of the skin, eyes, and mucous membranes, CNS infection, or diffused systemic infection are all symptoms of the disease (Sauerbrei, 2016).

Localized central nervous system (CNS) disease; skin, eye, and/or mouth disease (encephalitis alone); and disseminated infection involving several organs are the three types of neonatal herpes. The type of maternal infection (primary or recurrent), maternal neutralizing antibodies in the placenta, the time between membrane rupture and birth, the utilization of fetal scalp electrodes, and the delivery process all influence transmission. When a woman gets a new infection (primary genital herpes) in the 3<sup>rd</sup> trimester, the risks are highest, especially within 6 weeks of birth. The infected newborn is usually asymptomatic at delivery, although symptoms

might arise up to four weeks after birth. Fever (or hypothermia), jaundice, convulsions, and poor feeding are among the symptoms. The typical vesicular skin lesions appear in about half of affected babies (Davidson *et al.*, 2015; Kenny & Myers, 2017).

### **2.8.7. Diagnosis:**

A genital herpes diagnosis based on clinical symptoms is frequently inaccurate and deceptive. Additional bacterial infections, such as *Treponema pallidum* or *Haemophilus ducreyi*, might mimic HSV symptoms, leading to an inaccurate diagnosis. Direct detection of HSV confirms symptomatic genital herpes infections. The use of a swab for viral detection is recommended. Any woman who suspects she has herpes should see a genitourinary physician, who will approve the diagnosis with a viral culture or polymerase chain reaction, provide care advice, and arrange for screening for other sexually transmitted illnesses (Mary & Groves, 2016).

Polymerase Chain Reaction (PCR): This nucleic acid amplification technique is the second most widely used method for identifying HSV. When compared to viral culture, PCR detection of HSV is four times faster and four times more sensitive. The United States Food and Drug Administration has agreed to three assays for the identification of HSV in vaginal lesions based on this approach. BioHelix Corporation's IsoAmp HSV Assay, EraGen Biosciences, Inc.'s MultiCode-RTx Herpes Simplex Virus 1 and 2 Kit, and BD Diagnostic Systems' BD ProbeTec Herpes Simplex Viruses (HSV I and 2) QX Amplified DNA Assays are among them. This approach is quickly replacing the viral culture assay, owing to advances in technology and kit development for HSV detection and typing utilizing PCR (Jaishankar & Shukla, 2016).

This method can be utilized to not only detect HSV but also to distinguish between herpes simplex virus-1 and herpes simplex virus-2-related genital herpes. Type-specific IgG antibodies against HSV-1 and HSV -2 glycoprotein G (gG) are available and can be utilized to differentiate

the two viruses. Another benefit of serotyping is that it detects the presence of the herpes simplex virus, allowing you to determine whether the infection is primary or recurrent. Type-specific herpes simplex virus antibodies might take anywhere from 2 to 3 months to develop after a first infection. As a result, the absence of IgG antibodies specific for gG at the start of the infection, followed by the production of such antibodies after 12 weeks, demonstrates fresh herpes simplex virus infection. Clinicians also suggest this procedure for diagnosing genital herpes when no lesions are present or the above-mentioned detection tests produce inconsistent findings (Jaishankar & Shukla, 2016).

### **2.8.8. Complications of Genital Herpes:**

Human immunodeficiency virus (HIV) infection is three times as likely in people who have HSV-2 infection. This could be due to open ulcers or lymphocytes at the site of eruptions, allowing HIV to enter the body through sexual contact. Acute urinary retention (especially in women), disseminated herpes encephalitis, hepatitis, newborn, and pelvic inflammatory illness are all complications of genital herpes (Stephenson-Famy & Gardella, 2014).

### **2.8.9. Clinical Therapy:**

Women who have recurrent breakouts throughout pregnancy should start antiviral medication after 36 weeks of pregnancy. Oral antiviral medications such as acyclovir (Zovirax), famciclovir, and valacyclovir are available. Acyclovir is an antiviral medicine that relieves pain and reduces the number of lesions in people who have genital herpes for the first time. It also reduces the occurrence and severity of recurring infections. It's available in capsules, tablets, suspensions, injections, injectable powders, and ointments. The ointment is applied topically and helps to relieve pain, speed up healing, and prevent infection spread. Oral acyclovir may shorten the length of symptoms and lesions in persons who are experiencing their first episode of genital herpes, although the risk of side

effects is unknown. In terms of the length of symptoms and lesions, as well as the risk of unpleasant effects, there may be little or no difference between topical acyclovir and placebo (Le Cleach *et al.*, 2014).

Valacyclovir (Valtrex) is a prodrug that is transformed to acyclovir once it reaches the human body. It relieves pain and suffering while also speeding up the healing of wounds. It's only available in caplets, however, it has a longer duration of action than acyclovir. For a primary lesion, take it twice a day for 10 days and once a day for three days if you have a recurring episode. Another antiviral medication in the same class is famciclovir. Famciclovir (Famvir) is a prodrug that in the body is transformed to penciclovir. The latter is the one that combats viruses. It lasts longer than acyclovir and is only available in tablet form. In comparison to acyclovir, Famciclovir and valacyclovir have a longer half-life and better absorption. There is currently no evidence that exposure to any of these medicines throughout any trimester has any negative impact on the fetus. All newborns with neonatal herpes should be assessed and treated with acyclovir as soon as possible (Le Cleach *et al.*, 2014; Davidson *et al.*, 2019).

There are also preventive measures for effectively reducing virus transmission, when paired with the other treatments, this could result in a significant decrease in viral transmission. The most common preventive strategy for those who have symptomatic viral shedding is to avoid sexual activity or to utilize condoms. A prospective study found that partners who used male condoms had significantly lower rates of virus transmission. Female condoms are thought to prevent virus transmission as well, but this has not been clinically tested. Topical microbicides are also being studied as a way to prevent genital herpes infections. The utilization of natural or synthetic medicines to either improve natural vaginal defenses or render herpes simplex virus virions inactive is part of this strategy. According to a current study, vaginal administration of tenofovir gel, an antiviral

microbicide that acts as a nucleotide reverse transcriptase inhibitor, can reduce the risk of cervical cancer, as well reduce herpes simplex virus -2 infection among women in South Africa (Jaishankar & Shukla, 2016).

### **2.8.10. Nursing Care Management:**

#### **2.8.10.1. Nursing Diagnosis:**

Acute Pain related to the presence of lesions secondary to herpes infection (Silbert- Flagg & Pillitteri, 2018).

#### **2.8.10.2. Nursing Plan and Implementation:**

Nurse-midwives should pay special attention to patient education about this rapidly expanding disease. Women should be educated on what herpes is, how it spreads, and how to prevent it. Because condoms do not provide complete protection, couples should be counseled to avoid sexual contact if lesions are present (about 50 % effective). Women should also be informed about the link between genital herpes and spontaneous miscarriage, newborn mortality and morbidity, and the likelihood of giving delivery by cesarean section. A woman's infection must be disclosed to her future healthcare professionals. They should also be aware of the association between vaginal herpes and cervical cancer, as well as the need for a yearly Pap smear. As a mature young adult who needs to start a family, a woman who contracted the herpes simplex virus as an adolescent may be apprehensive about the risks. Counseling that allows patients to express their anger, embarrassment, and depression, which are common in women with herpes, may be beneficial (Silbert-Flagg & Pillitteri, 2018).

### **2.9. Role of Knowledge in Preventing TORCH Diseases**

The body of knowledge contained in science must be abstracted to the point where it may be applied in practice and provide knowledge that is evidence for practice. Increasing one's knowledge has long been viewed as a significant goal in enhancing one's health. It also aids in the development of a method for reducing TORCH transmission from

pregnant women to nurse-midwives. A lack of awareness, on the other hand, can be attributed to a range of responses, including the transfer of genital infection during labor and the delivery of a fetus among nurse-midwives. In fact, understanding these diseases will assist nurse-midwives in properly counseling mothers on how to prevent these infections and in properly counseling parents on the possibility of bad fetal outcomes when these infections are present (Alligood, 2013; Elnashar et al., 2019).

One of the modules established is infection prevention for TORCH infections, and midwives who are entrusted with maternal and child care are expected to have the necessary knowledge and proficiency in the use of this life-saving skill method. Compliance with conventional precautionary measures and, as a result, providing quality health care services to ensure the client's safety is one way to prevent infection. The Centers for Disease Control and Prevention also stated that the normal preventive measures are critical in preventing the spread of TORCH infection (Grace & Onyeabara, 2016).

### **2.10. Role of Practices in Preventing TORCH Diseases**

Nurse-midwives must employ nursing practice approaches to advance in the profession. Continued development is depending on evidence of high-quality results from the perspective of nurses. Several nurses who practice according to nursing models appear to describe their work in terms of nursing interventions or nursing roles. Improving knowledge and practices about TORCH diseases is an important factor in providing support and protection to nurse-midwives. Nurse-midwives have been acknowledged as being consistent with shifting health care ideas in the planning and administration of health care (Alligood, 2013).

Nurse-midwives also serve as role models for other employees by training and mentoring them at the point of care and influencing behavior to follow TORCH infection prevention guidelines. Multimodal interventions that are successful are associated to a shift in

organizational culture. Because nurses and midwives make up the majority of the healthcare workforce, their involvement and leadership can help to achieve and influence culture change (World Health Organization, 2020).

According to the World Health Organization's Nursing and Midwifery Programme, nurses and midwives play a critical role in health service delivery – promotion, prevention, treatment, and rehabilitation – in areas of high health need, where they may be the only frontline health providers, particularly in remote areas... Because nurses and midwives form the majority of the clinical health workforce in most countries, developing and strengthening human resources for health entails recognizing that nursing and midwifery services play a critical role in improving health service delivery; developing and implementing nursing and midwifery policy and practice; addressing nursing and midwifery personnel's education, training, and career development; and assisting in maximizing management of TORCH diseases (World Health Organization, 2020).

## **2.11. Previous Studies**

### **1. The First Report of the Evaluation of the Knowledge regarding Toxoplasmosis among Health Professionals in Public Health Centers in Rabat, Morocco**

A cross-sectional study was conducted by (Laboudi *et al.*, 2020) in Rabat, Morocco. The goal of the study was to assess toxoplasmosis knowledge and awareness among health professionals working in urban health clinics in the Moroccan prefecture of Rabat. Participants answered questions about the epidemiology and diagnosis of toxoplasmosis related to the infection on a standardized questionnaire. Medical physicians, nurses, midwives, and laboratory technicians were among the 96 health professionals that took part in the study. The women made up the majority of the group (86, 89.58 %). The average age was (40.51-10.26), and the average time spent working in healthcare was (15.92- 8.55) years. The toxoplasmosis agent was known by (81%) of health professionals (86,

81.25%), and the parasite's definitive host was known by (64.5 %). In terms of clinical symptoms, (57.29 %) of those questioned were aware that toxoplasmosis in immunocompetent adults is an asymptomatic condition. Raw or undercooked foods, unwashed fruits and vegetables, and direct contact with cats were accurately identified as the principal routes of transmission by more than half of those questioned. Water, on the other hand, was thought to be a risk factor for toxoplasmosis transmission by only (30.21 %) of them. When it comes to diagnosis, only (14.58 percent) of health professionals were aware of the avidity test. According to the findings, toxoplasmosis awareness among health professionals who offer prenatal care has increased in public health centers.

## **2. Awareness and Knowledge of Congenital Infections (TORCH) among Women and Health care Providers in Al Taif Area Saudi Arabia**

A cross-sectional study was conducted by (Elnashar *et al.*, 2019) in the Al Taif area, Saudi Arabia. The goal of the study was to determine how well health care practitioners, female students at Taif University, and women of reproductive age were aware of vertically transmitted illnesses (TORCH). A convenient sample of (100) reproductive-age women and (139) female Taif University students. Data on the women's and students' knowledge of vertically transmitted infections were collected using a pre-designed questionnaire (TORCH). Laboratory methods for serological identification of early infection with vertically transmitted pathogens were asked about by healthcare providers. Congenital infections are communicable, according to 87 percent of students and (71 %) of mothers, and congenital infections can cause congenital defects, according to 57.46 percent and 75 percent of them. With a college degree, both students and mothers had a much larger percentage of individuals who had sufficient knowledge. The media, parents, and friends (32.37 percent) were the most

common sources of knowledge for students concerning congenital infection, whereas the media (65 percent), then gynecologists and obstetricians, were the most common sources of information for mothers.

### **3. Awareness of Congenital Cytomegalovirus and Acceptance of Maternal and Newborn Screening**

A survey study was done by (Tastad *et al.*, 2019) in Minnesota State, Canada. The goal of the study was to determine how much people knew about the cytomegalovirus (CMV), their attitudes toward screening, and the frequency of actions that could raise the risk of prenatal infection. The study was conducted using a poll of 726 women who attended the 2017 Minnesota State Fair. Residents of Minnesota aged 18–44 who had never been pregnant or had been pregnant during the previous ten years were eligible. We contrasted the reactions of women who had never been pregnant and those who had just become pregnant. Only 20% of the survey participants had heard of CMV before. After controlling for relevant confounders, recent-pregnant women were no more likely than never-pregnant women to be aware of CMV. Following their education on CMV, nearly all participants (96%) agreed that prenatal (96%) or neonatal (96%) screening should be available. The study found that while CMV awareness was poor (even among recently-pregnant women), women favored screening after learning more about the hazards. Several states have implemented or proposed laws to encourage CMV education and/or screening. We discovered significant gaps in CMV knowledge among women who could benefit from instruction on how to lower their risk of infection and who may need to decide whether or not to be screened for CMV in the future.

#### **4. Educational Program about Rubella among Pregnant Women attending Antenatal Clinic in Women's Health Hospital, Assiut University, Egypt**

A quasi-experiment study was carried out by (Ibrahim *et al.*, 2018) at Assiut University, Egypt. The study's goal was to raise their awareness and reduce the risk of infection, thus learning about rubella is a key element of closing this gap, which can be accomplished through a rubella education program for pregnant women. As an intervention, (300) women in their first trimester were given an educational program through session meeting classes. After the intervention, knowledge data was collected and assessed. Moreover, a third of the pregnant women studied (38%) were between the ages of 25 and 30. The pretest means score for rubella knowledge among pregnant women was (5.83 2.48), but the post-test score was significantly higher at (20.07 1.86). The findings demonstrated a lack of rubella knowledge among the women investigated, which improved after the teaching program was implemented.

#### **5. Knowledge and Practice for Prevention of Hepatitis B among Practicing Midwives in University of Calabar Teaching Hospital, Calabar Nigeria**

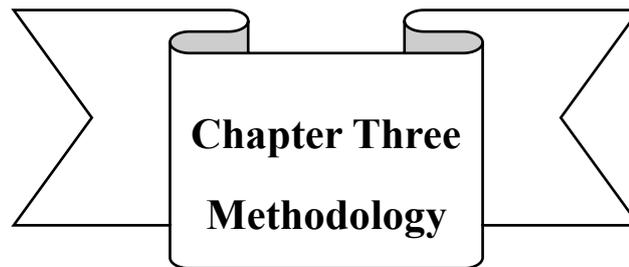
A descriptive design study was carried out by (Ella *et al.*, 2016) at the University of Calabar Teaching Hospital, Nigeria. The goal of the study was to evaluate the proportion of practicing midwives who use universal hepatitis B preventative and control strategies, as well as their degree of awareness about HBV infection prevention. A sample of 120 midwives selected through purposive sampling was used. A self-structured questionnaire with a content validity score of 0.79 and a test-retest reliability value of 0.81 was used to gather data. Simple proportion and parametric test-chi-square ( $X^2$ ) at  $p$  0.05 were used to evaluate the data. The majority of respondents (48.4%) were between the ages of 25 and (31.6%) were between

the ages of 35 and (13.3%) were 45 years or older; and only (6.7%) were between the ages of 20 and (69.2%) had 6-20 years of experience, whereas (17.5%) had 1–5 years and (13.3%) had more than 21 years of experience, respectively. The majority, (80%), had earned a diploma. Females made up the entire sample. The findings also found that (65 %) of respondents had a strong understanding of the hepatitis B virus, (69.2%) used universal precautions, and (30.8 percent) did not. Hepatitis B infection had never been contracted by 95.5 percent of responders, whereas 2.5 percent had contracted it through practice. A large majority (63.3%) had gotten the hepatitis B vaccine, but a large minority (36.7%) had not. Further findings revealed a statistically significant link between knowledge of hepatitis B infection prevention and the use of universal precaution (cal  $X^2 = 15.6$ ;  $p < 0.05$ ). In conclusion, this study found that midwives have a good level of awareness of HBV and how to avoid it, but there is a small gap in their knowledge, which is cause for concern. It is advised that purposeful programs of continued education and training be developed for the target population and other health care personnel in order to ensure that vaccines are delivered on a regular basis to improve compliance.

#### **6. Poor Awareness of Syphilis Prevention and Treatment Knowledge among Six Different Populations in South China)**

A study done by (Wu *et al.*, 2016) conducted a survey in South China. The goal of the study is to determine the level of public knowledge in a city in southern China. This study included urban dwellers, factory employees, college students, pregnant women, female sex workers (FSWs), and males who have sex with men from six different populations (MSM). The participants' knowledge of syphilis was assessed using a questionnaire created by the National Center for Disease Control and Prevention. A telephone survey was conducted with about 5% of the participants at random to confirm the validity of the fieldwork. The study

included 3470 participants, with the awareness group accounting for 61.2 percent of the total. College students had the lowest level of awareness, at (51.7 %), followed by FSWs (53.9 %), factory employees (56.0 %), urban residents (65.4 %), pregnant women (66.0 %), and MSMs (66.0 %) (81.1 %). When comparing MSM and FSWs to urban inhabitants, multivariate logistic regression analysis revealed that MSM and FSWs—but not factory employees or pregnant women—were more aware of syphilis information. College students, on the other hand, were less knowledgeable about syphilis than city dwellers. Participants who were younger, female, had lower education levels and did not have Shenzhen hukou had less awareness of syphilis information than those who were older, male, had higher education levels, and did have Shenzhen hukou. Conclusions The percentages of people who are aware of syphilis in this survey are substantially below the national 10-year plan's benchmark. Individualized initiatives to raise syphilis awareness for various subgroups are urgently needed.



This chapter discusses the method of this study including the design of the study and how the data was collected and analyzed.

### **3.1. Design of the Study:**

A cross-sectional descriptive study design to describe and examine the relationship between variables was accomplished from 1<sup>st</sup> November /2020 to 3<sup>rd</sup> April/ 2022. The study aimed to assess the nurse midwives' knowledge and evaluate practices regarding preventive measures for TORCH infections.

### **3.2. Ethical and Administrative Arrangement:**

Before data collection, official administrative consent was got for the study:

1. Approval of the higher Studies Committee through the presentation of a seminar with the topic, objectives and statistical evidence that shows the importance of the study.
2. The Research Ethics and scientific research committee at the College of Nursing, University of Babylon discussed the application of the study and approved the study to be conducted on March 6/ 2021, as shown in appendix (A).
3. The department of Babylon Health Directorate approved the conduct of the study on March 17/2021, as shown in appendix (A)
4. The Research Committee of the Training and Human Development Center agreed to conduct the research on May 10/2021, as shown in appendix (A)

5. The researcher obtained approval from Al-amam Alsadeq teaching hospital and Babil teaching hospital for maternity and children as shown in the (A).

### 3.3 Ethical Consideration:

Verbal agreement was obtained from Nurse-midwives after an explanation of the research aims, which is voluntariness, anonymity, respect, and confidentiality of the data.

### 3.4. Setting of the Study:

The study was carried out in two maternal teaching hospitals in Babylon province. The researcher selected Babil teaching hospital for maternity and children and Al-amam Alsadeq teaching hospital in as shown in **table (3.1)**.

*Table 3. 1 Distribution of the Study Sample according to their Settings*

Maternal Teaching Hospitals	The department that Selected in the Hospital	Working Shift
Babil Teaching Hospital for Maternity and Children & Alamam Alsadeq teaching hospital	Emergency room department	Morning and evening shift
	Maternity ward department	
	Labor and delivery department	
	Maternal operating department	

### 3.5. The Sample of the Study:

Non-probability using a convenient sample of (138) nurse-midwives, the study sample included (75) nurse-midwives from Babil teaching hospital for maternity and children and (63) from Al-amam Alsadeq teaching hospital who worked in the maternity ward, emergency room, delivery room, and maternal operating room.

**Table 3. 2 Distribution of the Study Sample according to Hospitals**

Hospitals	Number of midwives in each department	Number of nurse-midwives were selected
Babil Teaching Hospital for Maternity and Children.	Maternity ward, morning (10) and evening shift (7)	75
	Emergency room (10) morning shift, (12) evening shift	
	Delivery room (20) morning shift, (13) evening shift	
	Maternal operating room. (7) morning shift, (6) evening shift	
<b>Total</b>	<b>85</b>	
Al-amam Alsadeq teaching hospital	Maternity ward (12) morning shift, (9) evening shift	63
	Emergency room (11) morning shift, (6) evening shift	
	Delivery room (19) morning shift, (16) evening shift	
	Maternal operating room. (6) morning shift, (4) evening shift	
<b>Total</b>	<b>83</b>	
	<b>168</b>	138

### 3.6. Inclusion Criteria:

1. Nurse-midwives who work in the maternity ward, emergency room, delivery room, and maternity operating room.
2. Nurse-midwives who have at least one year of experience.

### 3.7. Instrument of the Study:

The researcher developed and constructed the study instrument after reviewing related literature and studies relevant to the study problem, and also added incorrect items for all knowledge domains of TORCH diseases. The instrument was translated to Arabic and presented to an expert in the Arabic language for linguistic correction. The study instrument consists of three parts, as shown in the appendix (C):

### **Part I Demographic Characteristics**

Includes: (age, level of education, marital status, place of work, working shift, years of experience, courses on TORCH diseases, and source of information).

**Part II Nurse- Midwives' Knowledge** Regarding Preventive Measures of TORCH Diseases comprise the following parts:

1. Knowledge Regarding **toxoplasmosis** consists of (22) items.
2. Knowledge Regarding **chickenpox** consists of (28) items.
3. Knowledge Regarding **syphilis** consists of (24) items.
4. Knowledge Regarding **hepatitis B** consists of (19) items.
5. Knowledge Regarding **Rubella** consists of (21) items.
6. Knowledge Regarding **cytomegalovirus** consists of (31) items.
7. Knowledge Regarding the **herpes simplex** virus consists of (24) items. **Total items of knowledge (169)**

**Part III Nurse- Midwives' Practices** Regarding Preventive Measures of TORCH Diseases comprise the following parts:

1. Practices regarding hand hygiene practices consists of (6) items.
2. Practices regarding wearing personal protective equipment consisting of (17) items.
3. Practices regarding environmental hygiene consist of (12) items. **Total items of practices (35).**

### **3.8 Validity of the Instrument:**

Validity is a measurement quality that refers to how accurately an instrument measures what it claims to measure (Polit & Beck, 2018). The researcher distributed the instrument on 28 December/2020 to (17) experts with more than (10) years of experience in the specialty to ensure the instrument's validity and to confirm the accuracy, relevancy, and adequacy of the questionnaires in order to prepare them for sample collection, as shown in appendix (B).

There are five nursing faculty members from the college of nursing at the University of Babylon; six obstetrician and gynecologist physicians from the college of medicine at the University of Babylon; one nursing consultant from Al-Furat Al-Awsat Technical University; one obstetrician and gynecologist physician from the college of nursing at Diwaniyah; one nursing consultant from the college of nursing at Hawler; one nursing consultant from the college of nursing at Kirkuk University; and an Arabic language expert from the college of nursing, University of Babylon.

The experts evaluated the instrument. Some of them recommended deleting some items while others added items. The researcher has taken the expert adjustments into consideration and the final copy of the instrument has become organized and appropriate to conduct the study.

### **3.9 Pilot Study:**

The researcher accomplished the pilot study before gathering data to determine the reliability of the questionnaire from the period (6th to 30th April/2021) which was conducted on (20) nurse-midwives at the maternal ward, maternal emergency room, labor and birth room, and maternal operating room in Babil teaching hospital for maternity and children and Al- Alamam Alsadeq teaching hospital. However, the pilot study was used to confirm instruments, precision, and estimate the time required for data collection. The pilot study sample was excluded from the main sample.

**A pilot study was carried out before starting the data gathering for the following purposes:**

1. To identify the reliability of the questionnaire format.
2. To enhance the validity of the questionnaire.
3. Throughout the comprehension of the subject, confirm the precision and content sufficiency of the instrument construction and decide the appropriate adjustments.

4. To determine the average time required for data gathering for respectively nurse-midwives during self-reporting.
5. To identify the barrier that may be encountered during the data collection process.

### 3.10 Reliability of the Questionnaires:

The degree to which scores are free of measurement error is referred to as reliability. Reliability is defined as the degree to which scores for people who have not changed are consistent across multiple measurements (Polit & Beck, 2018). The researcher employed the coefficient alpha (Cronbach's Alpha) to quantify internal consistency dependability as shown in table (3.3). Coefficient alpha for knowledge items was (0.77), for practice items was (0.883), and for the total items was (0.868), which was statistically acceptable. Cronbach's alpha for knowledge and practices was calculated by using SPSS version (25).

**Table 3. 3 Reliability Coefficient of the Study Instrument**

Cronbach's Alpha for Knowledge		Reliability Technique	Assessment
Cronbach's Alpha	No of items	Alpha (Cronbach)	<b>pass</b>
<b>0.771</b>	169		
Cronbach's Alpha for Practices (Evaluation of Practice)		Inter-rater/inter-observer	<b>pass</b>
Cronbach's Alpha	No of items		
<b>0.883</b>	<b>35</b>		

**Table (3.3)** This table illustrates that the reliability of the Cronbach alpha level for knowledge and practices is at an acceptable level, therefore the instrument is appropriate to apply for the study of TORCH diseases.

### **3.11 Method of Data Collection:**

The researcher started the collection of data from the period of May 15<sup>th</sup> to August 20<sup>th</sup> / 2021. Primary assessment to find out where nurse-midwives are working and how many nurse-midwives are working in the delivery room, emergency room, maternal ward, and maternal operating room in each hospital through the time of data gathering.

All nurses-midwives were interviewed and informed about the study objectives. After that, the researcher offered adequate information to nurse-midwives and had the ability of free choice, allowing nurse-midwives to voluntarily consent to or refuse participation. The researcher then obtained verbal informed consent from the nurse-midwives and selected the nurse-midwives based on purposive sampling.

For knowledge, after completing the required approvals, data was gathered through the use of a self-administered report in the Arabic language questionnaire. The researcher introduced herself to the participants and explained the purpose of the study in order to get verbal agreement. The questionnaire fills out an answer by the participants (nurse-midwives). Each self-report took approximately (25 to 30) minutes.

According to practices, the researcher collected data on the objective's responses by using direct observation a method of data collecting. Nurse-midwives were observed while they were working. The researcher observed each midwife three times, each midwives need about (1-4) days to complete their three observations. Three correct practices were scored as always in three episodes, two correct practices were rated as sometimes in three episodes, and no correct practice was rated as never in three episodes.

The data gathering occurs during the morning shift from the time (9 am) to (1 pm) and the evening shift from the time (2:30 pm) to (5 pm), however, every day of the week. After the data collection is completed,

it is unloaded into the statistical package for the social science program version (25) in preparation for analysis.

### **3.12. Rating and Scoring:**

In the knowledge part, the researcher has used three-level scales (correct, uncertain, and incorrect) to measure the knowledge of the nurse-midwives regarding preventive measures for TORCH diseases. Scoring of the three levels for correct questions (3=correct, 2=uncertain, and 1=incorrect), and for the incorrect questions (3=incorrect, 2=uncertain, and 1=correct). Nurse-midwives overall knowledge scores were calculated by summing their exam item scores, and then they were categorized based on their total values:

**Poor knowledge= 169-281**

**Moderate knowledge = 282-394**

**Good knowledge = 395-507**

Concerning the part of the **practices**, the researcher has used a three-level Likert scale (always, sometimes, and never) to measure the practices of the nurse-midwives regarding preventive measures for TORCH diseases. Scoring that is used (1) for never, (2) for sometimes, and (3) for always. Nurse-midwives overall practices scores were computed by adding the results for each exam question and then classifying them based on their total score:

**Poor practices= 35-58**

**Moderate practices= 59-82**

**Good practices= 83-105**

### **3.13. Limitation of the Study:**

Problems and difficulties encountered by the researcher in conducting the study are as follows:

1. Corona pandemic was the obstacle during sample collection due to fear and anxiety while dealing with nurse-midwives for fear of infection.
2. Also, one of the difficulties was collecting the sample during the evening shift, because the staff changes every day and the staff differs from the previous day to the next day, and this varies from one place to another inside the hospital.
3. Lack of national studies related to TORCH diseases is one of the difficulties faced during the study.

### 3.14. Statistical Procedure for Data Analysis

The collected data of the study were analyzed using SPSS (Statistical Package of Social Sciences) version 25 and Microsoft Excel (2019):

#### I. Descriptive data analysis:

A. Statistical tables "Frequencies and percent" which are:

$$\% = \frac{\text{Frequency}}{\text{Sample Size}} \times 100$$

#### B. Mean and standard deviation

$$\text{Mean } \bar{x} = \frac{\sum Xi F}{\sum Fi}$$

$\bar{x}$  = The Mean

$\Sigma$  = "The Summation"

$Xi$  = "Each individual raw score"

$Fi$  = The number of Frequency

C. Standard Deviation (SD) was calculated through the use of the following formula (Polit & Beck, 2018).

$$SD = \sqrt{\frac{1}{n-1} \sum_{i=1}^n (Xi - \bar{x})^2}$$

D. Mean of the score (M.S) The average score can be calculated by utilizing the following:

$$M.S = \frac{\sum r_i = 1F_i \times S_i}{\sum r_i = 1F_i} \times 100$$

To calculate cut-off point, it was done by the following formula (Polit & Beck, 2018).

#### For Knowledge Questionnaire

“ $\sum x_i$  = sum of the *1x Incorrect + 2x Uncertain + 3 x Correct* for items”.

- (1) M.s.=1-1.66 is considered *Incorrect responses*.
- (2) M.s. = 1.67-2.33 is considered *Uncertain responses*.
- (3) M.s.  $\geq 2.34$  is considered *Correct responses*.

The overall responses according to the total mean of the score which follows:

***Poor Knowledge= 169-281***

***Moderate Knowledge= 282-394***

***Good Knowledge= 395-507***

#### For Practices Questionnaire

$\sum x_i$  = sum of the "*1x Never + 2x Sometime + 3 x Always*" for items.

- (1) M.s.=1-1.66 is considered *Never responses*.
- (2) M.s. = 1.67-2.33 is considered *Sometime responses*.
- (3) M.s.  $\geq 2.34$  is considered *Always responses*.

The overall responses according to the total mean of the score which follows:

***Poor Practices= 35-58***

***Moderate Practices= 59-82the***

***Good Practices= 83-105***

#### **E. Graphical presentation by using:**

- Pie Chart.
- Bar Chart.

## II. Inferential data analysis:

“These were utilized to accept or reject statistical hypotheses” such as the ones listed below:

1. Reliability Coefficient for the instrument through using Cronbach's Alpha test.

- **Cronbach's alpha:** Internal consistency the degree to which the many components of a multi-component measure are consistent is referred to as reliability (Polit & Beck, 2018).

- Formula for the Cronbach's alpha:

$$\alpha = \frac{K}{K - 1} \left[ 1 - \frac{\sum_{i=1}^K \sigma_{ii}}{\sum_{i=1}^K \sum_{j=1}^K \sigma_{ij}} \right]$$

**K** is the investigate covariance between the items I and j and is the item number questions. It's important to note that the variance of item I is not the same as the standard deviation.

2. **Chi-Squared Test( $\chi^2$ ):** As in crosstab, is used to test hypotheses regarding proportional differences (Polit & Beck, 2018).

$$\chi^2 = \frac{\sum_{all\ i} (O_i - E_i)^2}{E_i}$$

- Chi-Squared= "  $\chi^2$  "
- Sum =  $\sum$

“Where  $O_i$  is the observed frequency of group I”

$E_i$  is the expected frequency.

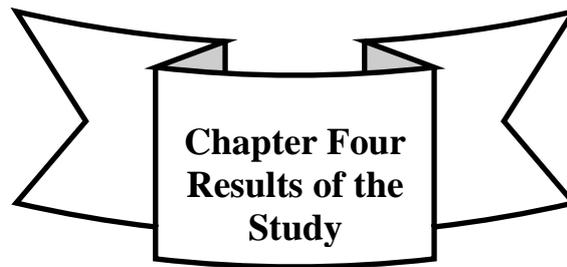
They  $\chi^2_{obs.} < \chi^2_{crit.}$  = insignificantly  
 They  $\chi^2_{obs.} > \chi^2_{crit.}$  = significantly

As compared with df

3. **Spearman's rho Correlation Coefficient:** “A measure for the linear relationship between two variables. The correlation coefficient's values vary from (-1 to 1). The sign of the coefficient indicates the direction of the relationship, while the absolute value indicates the strength of the relationship, with higher absolute values indicating stronger relationships” (Ibrahim, 2017).

**-For the abbreviations of the comparison significant (C.S.), the statistical analysis considered the level of significance when:**

- NS: Non-significant at P probability-value  $> 0.05$ .
- S: Significant at P probability-value  $< 0.05$ .
- HS: Highly significant at P probability-value  $< 0.0$



**Chapter Four  
Results of the  
Study**

This chapter thoroughly introduces the research findings in tables, which refer to the study's objectives, which are as follows:

**Table 4. 1 Distribution of Demographic Variables of the studied group (n=138)**

Variables	Rating	Freq.	%
Age/years (Mean+ S.d= 34.11+8.967)	20-30years old	52	37.7
	31-40years old	25	18.1
	41-50years old	45	32.6
	51 Years and More	16	11.6
	<b>Total</b>	<b>138</b>	<b>100.0</b>
Education Level	Secondary Midwifery School	67	48.6
	Diploma Degree of Midwifery	68	49.3
	College of Nursing and above	3	2.2
	<b>Total</b>	<b>138</b>	<b>100.0</b>
Marital Status	Single	14	10.1
	Married	111	80.4
	Divorced	5	3.6
	Widow	8	5.8
	<b>Total</b>	<b>138</b>	<b>100.0</b>
Workplace	Delivery Room	50	36.2
	Maternity Unit	48	34.8
	Maternal Emergency Unit	30	21.7
	Maternal Operating Room	10	7.2
	<b>Total</b>	<b>138</b>	<b>100.0</b>
Work Shift	Morning Shift	76	55.1
	Evening Shift	62	44.9
	<b>Total</b>	<b>138</b>	<b>100.0</b>
Years of Experience	<5 years	60	43.5
	5-10 years	32	23.2
	11-15years	15	10.9
	≥16 years	31	22.5
	<b>Total</b>	<b>138</b>	<b>100.0</b>
Entered Courses of TORCH diseases	Not Entered Course Training	96	69.6
	One Course Training	11	8.0
	Two Course Training	28	20.3
	More than two Course Training	3	2.2

**Table (4-1)....cont**

	<b>Total</b>	<b>138</b>	<b>100.0</b>
<b>Sources of Knowledge</b>	Educational Institution	28	20.3
	Social Media	11	8.0
	Courses	12	8.7
	Work Place	<b>87</b>	<b>63.0</b>
	<b>Total</b>	<b>138</b>	<b>100.0</b>

(F: (frequency), %: (percentage), n= (138))

**Table (4.1)** this table shows that the mean age and standard deviation (SD) for nurse-midwives in the study was 34.11+8.967; the majority of the sample (37.7%) was reported at the age (21–30) years. The highest percentage (49.3%) of the sample who have a diploma in nursing. The majority of the nurse-midwives (80.4%) were married. The greatest proportion of the study sample (36.2%) works in the delivery room. Most of the study sample (55.1%) were from the morning shift compared with those who are working the evening shift (44.9 %). Most midwives (43.5%) in the study have 1–5 years of experience. The majority of the study sample (69.6%) had no training about TORCH diseases. Most of the nurse-midwives (63%) in the study who acquired information about TORCH diseases from work place.

**Table 4. 2 Nurse-midwives Knowledge Regarding Preventive Measures according to TORCH Diseases**

**Table 4.2. 1 Knowledge Related to Preventive Measures of Toxoplasmosis Diseases. (n=138)**

List	Toxoplasmosis items	Rating	Freq.	%	M.s. ± S.d.	Ass.
<b>Knowledge Regarding Infective Organisms</b>						
1	*Bacterial Infection.	Correct	25	18.1	1.66±0.707	Poor
		Uncertain	67	48.6		
		Incorrect	46	33.3		
2	Toxoplasmosis gondii is a protozoan parasite.	Correct	69	50.0	2.31±0.650	Moderate
		Uncertain	56	40.6		
		Incorrect	13	9.4		
<b>Mode of Transmission</b>						
3	Contacts with cat feces.	Correct	73	52.9	2.21±0.875	Moderate
		Uncertain	56	40.6		
		Incorrect	9	6.5		
4	Eat undercooked meat.	Correct	66	47.8	2.20±0.811	Moderate
		Uncertain	56	40.6		
		Incorrect	16	11.6		
5	Unwashed hands.	Correct	54	39.1	2.32±0.802	Moderate
		Uncertain	40	29.0		
		Incorrect	44	31.9		
6	*Droplet Spread.	Correct	102	73.9	1.76±0.776	Moderate
		Uncertain	29	21.0		
		Incorrect	7	5.1		
7	Placental transitions from infected mother to fetus.	Correct	48	34.8	2.30±0.815	Moderate
		Uncertain	31	22.5		
		Incorrect	59	42.8		
<b>Preventive Measures</b>						
8	Avoid eating raw meat.	Correct	58	42.0	2.26±0.858	Moderate
		Uncertain	40	29.0		
		Incorrect	40	29.0		
9	Wearing gloves and washing hands when gardening or handling soil.	Correct	95	68.8	2.33±0.865	Moderate
		Uncertain	35	25.4		
		Incorrect	8	5.8		
10	Carefully wash all fruits and vegetables before eating.	Correct	93	67.4	2.13±0.926	Moderate
		Uncertain	37	26.8		
		Incorrect	8	5.8		
11	Wash hands with soap and warm water after meat.	Correct	90	65.2	2.26±0.865	Moderate
		Uncertain	40	29.0		
		Incorrect	8	5.8		
12	*Avoid contact with other infected pregnant women and neonates.	Correct	89	64.5	1.64±0.712	Poor
		Uncertain	41	29.7		
		Incorrect	8	5.8		
<b>Symptoms of Toxoplasmosis</b>						
13	Glandular fever-like flu.	Correct	88	63.8	2.39±0.699	Good
		Uncertain	42	30.4		

		Incorrect	8	5.8		
14	*Loss of appetite.	Correct	91	65.9	1.50±0.618	Poor
		Uncertain	37	26.8		
		Incorrect	10	7.2		
<b>The Complication of Congenital Toxoplasmosis</b>						
15	Consecutive spontaneous abortions.	Correct	69	50.0	2.60±0.730	Poor
		Uncertain	61	44.2		
		Incorrect	8	5.8		
16	Stillbirth.	Correct	52	37.7	2.40±0.751	Good
		Uncertain	39	28.3		
		Incorrect	47	34.1		
17	Ventriculomegaly	Correct	52	37.7	2.10±0.642	Moderate
		Uncertain	39	28.3		
		Incorrect	47	34.1		
18	Microcephaly.	Correct	81	58.7	2.02±0.714	Moderate
		Uncertain	47	34.1		
		Incorrect	10	7.2		
19	Chorioretinitis and cerebral calcification.	Correct	53	38.4	2.14±0.720	Moderate
		Uncertain	70	50.7		
		Incorrect	15	10.9		
20	*Encephalitis and endocrine problems.	Correct	43	31.2	1.7±0.641	Poor
		Uncertain	56	40.6		
		Incorrect	39	28.3		
<b>Treatment of Toxoplasmosis</b>						
21	Spiramycin treatment (3weeks course of 2-3g per day) to reduce the incidence of placental infection.	Correct	77	55.8	2.5±0.530	Moderate
		Uncertain	36	26.1		
		Incorrect	25	18.1		
22	*Penicillin treatment.	Correct	82	59.4	1.77±0.592	Moderate
		Uncertain	49	35.5		
		Incorrect	7	5.1		

(Assessment Level (Poor (M.s= 1-1.66), Moderate (M.s=1.67-2.33), and Good (M.s ≥2.34), \*(incorrect question), M.s: Mean of score, S.d: Standard deviation )

**Table (4.2.1):** Taking into account the statistical analysis of the mean, this table demonstrated that the nurse-midwives' knowledge related to toxoplasmosis was moderate for all items of the scale (M.s = 1.67–2.33) except for items 1–12, 14, 15, and 20), the responses were poor levels of knowledge (M.s = 1.66). In addition to items 13 and 16, the nurse-midwives demonstrated a high level of knowledge (M. s. 2.34).

**Table 4.2. 2 Overall Assessment of Knowledge Related to Preventive Measures of Toxoplasmosis Disease (n=138)**

Weighted	Freq.	%	M ± S.d
Poor	3	2.2	46.42±5.152
Moderate	116	84.1	
Good	19	13.8	
Total	138	100.0	

(M: Mean for total score, S.d: Standard Deviation for total score (Poor= 22-36, Moderate= 37-51, Good= 52-66))

**Table (4.2.2):** The analysis of knowledge related to toxoplasmosis diseases was demonstrated at a mean (46.42) and standard deviation (5.152); and according to the study criteria, the nurses-midwives expressed moderate knowledge (n = 116; %=84.1) related to toxoplasmosis.

**Table 4.2. 3 Knowledge Related to Preventive Measures of Chickenpox Disease(n=138)**

List	Chickenpox items	Rating	Freq.	%	M.s. ± S.d.	Ass.
<b>Knowledge Regarding Infective Organism</b>						
1	Varicella zoster virus	Correct	107	77.5	1.49±0.756	Poor
		Uncertain	25	18.1		
		Incorrect	6	4.3		
2	*Fungal infection.	Correct	109	79.0	1.35±0.625	Poor
		Uncertain	18	13.0		
		Incorrect	11	8.0		
<b>Mode of Transmission</b>						
3	Droplet spread	Correct	117	84.8	1.51±0.727	Poor
		Uncertain	18	13.0		
		Incorrect	3	2.2		
4	Direct personal contact	Correct	119	86.2	1.48±0.794	Poor
		Uncertain	12	8.7		
		Incorrect	7	5.1		
5	*Unwashed hands.	Correct	110	79.7	1.27±0.601	Poor
		Uncertain	21	15.2		
		Incorrect	7	5.1		
6	Airborne route.	Correct	102	73.9	1.48±0.747	Poor
		Uncertain	31	22.5		
		Incorrect	5	3.6		
<b>Preventive Measures</b>						
7	Avoid contact with other infected pregnant women and neonates.	Correct	111	80.4	1.53±0.838	Poor
		Uncertain	21	15.2		
		Incorrect	6	4.3		
8	Taken varicella zoster immunoglobulin vaccine.	Correct	89	64.5	1.52±0.838	Poor
		Uncertain	38	27.5		
		Incorrect	11	8.0		
9	*Avoid eating raw meat.	Correct	111	80.4	1.42±0.743	Poor
		Uncertain	22	15.9		
		Incorrect	5	3.6		
<b>Symptoms</b>						
10	Chest and breathing problems.	Correct	86	62.3	1.48±0.794	Poor
		Uncertain	13	9.4		
		Incorrect	39	28.3		
11	Headache, drowsiness, vomiting or feeling sick.	Correct	97	70.3	1.44±0.735	Poor
		Uncertain	12	8.7		
		Incorrect	29	21.0		
12	Severe rash.	Correct	92	66.7	1.66±0.890	Poor
		Uncertain	12	8.7		
		Incorrect	34	24.6		
13	Fever	Correct	79	57.2	1.76±0.833	Moderate
		Uncertain	9	6.5		
		Incorrect	50	36.2		
14	*Jaundice.	Correct	78	56.5	1.81±0.873	Moderate
		Uncertain	9	6.5		
		Incorrect	51	37.0		

Characteristics of Fetal Varicella Syndrome						
15	Skin scarring.	Correct	75	54.3	1.97±0.981	Moderate
		Uncertain	16	11.6		
		Incorrect	47	34.1		
16	Eye defects such as chorioretinitis and cataracts.	Correct	86	62.3	1.99±0.962	Moderate
		Uncertain	7	5.1		
		Incorrect	45	32.6		
17	Hypoplasia of the limbs.	Correct	54	39.1	1.83±0.955	Moderate
		Uncertain	28	20.3		
		Incorrect	56	40.6		
18	Microcephaly and cortical atrophy.	Correct	66	47.8	1.98±0.996	Moderate
		Uncertain	14	10.1		
		Incorrect	58	42.0		
19	Mental restriction.	Correct	69	50.0	1.81±0.906	Moderate
		Uncertain	10	7.2		
		Incorrect	59	42.8		
20	*Ventriculomegaly.	Correct	55	39.9	1.37±0.716	Poor
		Uncertain	7	5.1		
		Incorrect	76	55.1		
21	Dysfunction of bowel and bladder sphincter.	Correct	89	64.5	1.55±0.792	Poor
		Uncertain	24	17.4		
		Incorrect	25	18.1		
Maternal Risk during Delivery						
22	Bleeding	Correct	81	58.7	1.57±0.800	Poor
		Uncertain	29	21.0		
		Incorrect	28	20.3		
23	Thrombocytopenia	Correct	84	60.9	1.63±0.802	Poor
		Uncertain	15	10.9		
		Incorrect	39	28.3		
24	Disseminated intravascular coagulation.	Correct	75	54.3	1.79±0.802	Moderate
		Uncertain	10	7.2		
		Incorrect	53	38.4		
25	Hepatitis.	Correct	70	50.7	1.70±0.76	Moderate
		Uncertain	9	6.5		
		Incorrect	59	42.8		
26	*Uterine inversion.	Correct	48	34.8	1.59±0.751	Poor
		Uncertain	10	7.2		
		Incorrect	80	58.0		
Treatment of Chickenpox						
27	Oral acyclovir 800mg five times per day for 7 days.	Correct	56	40.6	1.86±0.808	Moderate
		Uncertain	5	3.6		
		Incorrect	77	55.8		
28	*Varicella-zoster immunoglobulin if significant exposure occurred.	Correct	84	60.9	1.98±0.754	Moderate
		Uncertain	8	5.8		
		Incorrect	46	33.3		

(Assessment Level (Poor (M.s= 1-1.66), Moderate (M.s=1.67-2.33), and Good (M.s ≥2.34), \*(incorrect question))

**Table (4.2.3):** This table demonstrated that the sample knowledge related to chickenpox were expressed a poor level of knowledge

at all items of the scale (M.s. =1-1.66) except, items number (13, 14, 15, 16, 17, 18, 19, 24, 25, 27, and 28) the responses were the moderate level of knowledge (M.s.=1.67-2.33).

**Table 4.2. 4 Overall Assessment of Knowledge Related to Preventive Measures of Chickenpox Disease(n=138)**

Weighted	Freq.	%	M ± S.d
Poor	83	60.1	45.94±8.817
Moderate	50	36.2	
Good	5	3.6	
<i>Total</i>	138	100.0	

(M: Mean for total score, S.d: Standard Deviation for total score (Poor= 28-46, Moderate= 47-65, Good= 66-84))

**Table (4.2.4):** The analysis of knowledge related to chickenpox diseases was demonstrated at the mean (**45.94**) and standard deviation (**8.817**); and according to the study criteria, the nurses-midwives expressed poor knowledge ( $n=83$ ; %=60.1) as shown in (Appendix E).

**Table 4.2. 5 Knowledge Related to Preventive Measures of Syphilis Disease(n=138)**

List	Syphilis Items	Rating	Freq.	%	M.s. ± S.d.	Ass.
<b>Knowledge Regarding Infective Organisms</b>						
1	Syphilis is a bacterial infection caused by Treponema pallidum.	Correct	43	31.2	2.18±0.881	Moderate
		Uncertain	27	19.6		
		incorrect	68	49.3		
2	*Viral infection.	Correct	92	66.7	1.46±0.716	Poor
		Uncertain	28	20.3		
		incorrect	18	13.0		
<b>Mode of Transmission</b>						
3	Sexually transmitted infection	Correct	58	42.0	2.06±0.952	Moderate
		Uncertain	13	9.4		
		Incorrect	67	48.6		
4	Transplacental transmission	Correct	82	59.4	1.63±0.836	Poor
		Uncertain	24	17.4		
		Incorrect	32	23.2		
5	*Direct personal contact.	Correct	73	52.9	1.73±0.850	Moderate
		Uncertain	29	21.0		
		Incorrect	36	26.1		
<b>Symptoms of Syphilis</b>						
6	Painless genital ulcer on the cervix.	Correct	65	47.1	1.92±0.928	Moderate
		Uncertain	19	13.8		
		Incorrect	54	39.1		
7	Secondary syphilis causes a maculopapular rash or lesion.	Correct	78	56.5	1.67±0.838	Moderate
		Uncertain	27	19.6		
		Incorrect	33	23.9		
8	*Leucorrhea.	Correct	60	43.5	1.93±0.897	Moderate
		Uncertain	27	19.6		
		Incorrect	51	37.0		
<b>Effect of Syphilis on Pregnant Women</b>						
9	Cardiovascular syphilis	Correct	50	36.2	1.98±0.845	Moderate
		Uncertain	40	29.0		
		Incorrect	48	34.8		
10	Neurosyphilis.	Correct	57	41.3	1.88±0.837	Moderate
		Uncertain	40	29.0		
		Incorrect	41	29.7		
11	Intrauterine death.	Correct	55	39.9	2.03±0.915	Moderate
		Uncertain	23	16.7		
		Incorrect	60	43.5		
12	Miscarriage.	Correct	66	47.8	1.97±0.966	Moderate
		Uncertain	10	7.2		
		Incorrect	62	44.9		
13	*Bleeding during pregnancy.	Correct	71	51.4	1.79±0.889	Moderate
		Uncertain	24	17.4		
		Incorrect	43	31.2		

Effect of Syphilis on Fetus						
14	Fetal growth restriction	Correct	46	33.3	2.21±0.915	Moderate
		Uncertain	17	12.3		
		Incorrect	75	54.3		
15	Fetal hydrops.	Correct	56	40.6	2.02±0.919	Moderate
		Uncertain	22	15.9		
		Incorrect	60	43.5		
16	Congenital syphilis may cause disability.	Correct	60	43.5	1.97±0.919	Moderate
		Uncertain	22	15.9		
		Incorrect	56	40.6		
17	Stillbirth.	Correct	63	45.7	1.90±0.903	Moderate
		Uncertain	25	18.1		
		Incorrect	50	36.2		
18	*Skin scarring.	Correct	69	50.0	1.66±0.748	Poor
		Uncertain	46	33.3		
		Incorrect	23	16.7		
19	*Mental restriction.	Correct	61	44.2	1.74±0.755	Moderate
		Uncertain	51	37.0		
		Incorrect	26	18.8		
Management of Syphilis						
20	Test for any other sexually transmitted diseases.	Correct	59	42.8	1.84±0.821	Moderate
		Uncertain	42	30.4		
		Incorrect	37	26.8		
21	Penicillin treatment to prevent congenital syphilis and treat syphilis in pregnancy.	Correct	46	33.3	2.07±0.859	Moderate
		Uncertain	36	26.1		
		Incorrect	56	40.6		
22	Treated the infected neonate.	Correct	62	44.9	1.87±0.875	Moderate
		Uncertain	31	22.5		
		Incorrect	45	32.6		
23	Investigate and treat the partner.	Correct	50	36.2	2.07±0.896	Moderate
		Uncertain	27	19.6		
		Incorrect	61	44.2		
24	*Acyclovir drug intravenous injection.	Correct	68	49.3	1.82±0.887	Moderate
		Uncertain	26	18.8		
		Incorrect	44	31.9		

(Assessment Level (Poor (M. s= 1-1.66), Moderate (M.s =1.67-2.33), and Good (M.s ≥2.34), \*(Incorrect question))

**Table (4.2.5):** According to the statistically cut off point, this table illustrated that the sample knowledge related to syphilis was expressed at a moderate level of knowledge at all items of the scale (M.s. = 1.67–2.33) except for the item's numbers 2 and 18, where the responses were poor (M.s. = 1–1.66).

**Table 4.2. 6 Overall Assessment of Knowledge Related to Preventive Measures of Syphilis Disease(n=138)**

Weighted	Freq.	%	M ± S.d
Poor	35	25.4	45.50±8.081
Moderate	95	68.8	
Good	8	5.8	
<b>Total</b>	<b>138</b>	<b>100.0</b>	

*M: Mean for total score, S.d: Standard Deviation for total score  
(Poor= 24-40, Moderate= 41-56, Good= 57-72)*

**Table (4.2.6):** The analysis of knowledge related to syphilis diseases was demonstrated at (mean=45.50) and (standard deviation=8.081); and according to the study criteria, the nurses-midwives expressed moderate knowledge (n=95; %=68.8) as shown in (Appendix E).

**Table 4.2. 7 Knowledge Related to Preventive Measures of Hepatitis B Disease (n=138)**

List	Hepatitis items	Rating	Freq.	%	M.s. ± S.d.	Ass.
<b>Knowledge Regarding Infective Organisms</b>						
1	Deoxyribonucleic acid virus	Correct	40	29.0	2.15±0.847	Moderate
		Uncertain	36	26.1		
		Incorrect	62	44.9		
2	*Parasite infection.	Correct	20	14.5	2.42±0.733	Good
		Uncertain	39	28.3		
		Incorrect	79	57.2		
<b>Mode of Transmission</b>						
3	Blood	Correct	28	20.3	2.51±0.812	Good
		Uncertain	11	8.0		
		Incorrect	99	71.7		
4	*Transplacental transmission.	Correct	9	6.5	2.62±0.606	Good
		Uncertain	34	24.6		
		Incorrect	95	68.8		
5	Body fluid such as saliva, semen, and vaginal fluid.	Correct	35	25.4	2.33±0.857	Moderate
		Uncertain	22	15.9		
		Incorrect	81	58.7		
6	Drug users who share needles.	Correct	44	31.9	2.11±0.863	Moderate
		Uncertain	34	24.6		
		Incorrect	60	43.5		

Prevention of Hepatitis B						
7	Hepatitis B can be prevented by a vaccine.	Correct	28	20.3	2.57±0.808	Good
		Uncertain	2	1.4		
		Incorrect	108	78.3		
8	Health diet.	Correct	38	27.5	2.32±0.880	Moderate
		Uncertain	17	12.3		
		Incorrect	83	60.1		
9	Regular exercise.	Correct	23	16.7	2.46±0.765	Good
		Uncertain	28	20.3		
		Incorrect	87	63.0		
10	Hand washing.	Correct	42	30.4	2.27±0.902	Moderate
		Uncertain	16	11.6		
		Incorrect	80	58.0		
11	*Avoid contact with infected people.	Correct	18	13.0	2.53±0.716	Good
		Uncertain	28	20.3		
		Incorrect	92	66.7		
Symptoms of Hepatitis B						
12	Cold and flu symptoms (fever, running nose, cough).	Correct	41	29.7	2.07±0.816	Moderate
		Uncertain	46	33.3		
		Incorrect	51	37.0		
13	Nausea and vomiting.	Correct	47	34.1	2.07±0.868	Moderate
		Uncertain	34	24.6		
		Incorrect	57	41.3		
14	Loss of appetite.	Correct	42	30.4	2.26±0.898	Moderate
		Uncertain	18	13.0		
		Incorrect	78	56.5		
15	Jaundice.	Correct	52	37.7	2.15±0.945	Moderate
		Uncertain	12	8.7		
		Incorrect	74	53.6		
16	*Backache.	Correct	25	18.1	2.39±0.778	Good
		Uncertain	33	23.9		
		Incorrect	80	58.0		
Management of Hepatitis B						
17	Pharmacological treatment for hepatitis B	Correct	46	33.3	2.23±0.922	Moderate
		Uncertain	14	10.1		
		Incorrect	78	56.5		
18	Special diet for hepatitis B.	Correct	33	23.9	2.42±0.853	Good
		Uncertain	13	9.4		
		Incorrect	92	66.7		
19	*Given vaccine.	Correct	19	13.8	2.52±0.727	Good
		Uncertain	28	20.3		
		Incorrect	91	65.9		

(Assessment level (Poor (M. s= 1-1.66), Moderate (M. s=1.67-2.33), and Good (M.s ≥2.34), \*(Incorrect question))

**Table (4.2.7):** This table shows that the nurse-midwives knowledge is based on statistical cut-off points related to hepatitis disease was expressed as a good level of knowledge at all items of the scale

(M.s.≥2.34) except, the items number (1, 5, 6, 8, 10, 12, 14, 15, 17) the responses were a moderate level of knowledge (M. s=1.67-2.33).

**Table 4.2. 8 Overall Assessment of Knowledge Preventive Measures of Hepatitis B Disease (n=138)**

Weighted	Freq.	%	M ± S.d
Poor	1	0.7	45.5±5.063
Moderate	68	49.3	
Good	69	50.0	
<b>Total</b>	<b>138</b>	<b>100.0</b>	

(M: Mean for total score, S.d: Standard Deviation for total score (Poor= 19-31, Moderate= 32-44, Good= 45-57))

**Table (4.2.8):** The analysis of knowledge related to hepatitis B diseases was demonstrated at (mean=45.5) and (standard deviation=5.063); and according to the study criteria, the nurses-midwives expressed good knowledge (n=69; %=50.0) as shown in (Appendix E).

**Table 4.2. 9 Knowledge Related to Preventive Measures of Rubella Disease(n=138)**

List	Rubella items	Rating	Freq.	%	M.s. ± S.d.	Ass.
<b>Knowledge Regarding Infective Organisms</b>						
1	Toga virus	Correct	76	55.1	1.48±0.569	Poor
		Uncertain	57	41.3		
		Incorrect	5	3.6		
2	*Bacterial infection.	Correct	10	7.2	2.40±0.623	Good
		Uncertain	62	44.9		
		Incorrect	66	47.8		
<b>Mode of Transmission</b>						
3	Spread by droplet transmission	Correct	68	49.3	1.57±0.625	Poor
		Uncertain	60	43.5		
		Incorrect	10	7.2		
4	*Body fluid such as saliva, semen, and vaginal fluid.	Correct	11	8.0	2.50±0.642	Good
		Uncertain	46	33.3		
		Incorrect	81	58.7		
<b>Preventive Measures</b>						
5	Screening for rubella in pregnancy	Correct	102	73.9	1.29±0.532	Poor
		Uncertain	31	22.5		
		Incorrect	5	3.6		
6	Postpartum vaccination.	Correct	107	77.5	1.26±0.516	Poor

		Uncertain	26	18.8		
		Incorrect	5	3.6		
7	*Eat a healthy diet.	Correct	9	6.5	2.60±0.610	Good
		Uncertain	37	26.8		
		Incorrect	92	66.7		
<b>Symptoms of Rubella</b>						
8	Febrile rash.	Correct	106	76.8	1.26±0.502	Poor
		Uncertain	28	20.3		
		Incorrect	4	2.9		
9	Headache	Correct	99	71.7	1.30±0.507	Poor
		Uncertain	36	26.1		
		Incorrect	3	2.2		
10	Runny nose	Correct	68	49.3	1.58±0.636	Poor
		Uncertain	59	42.8		
		Incorrect	11	8.0		
11	*Jaundice.	Correct	22	15.9	2.22±0.704	Moderate
		Uncertain	63	45.7		
		Incorrect	53	38.4		
12	*Nausea and vomiting.	Correct	74	53.6	1.55±0.661	Poor
		Uncertain	51	37.0		
		Incorrect	13	9.4		
13	Enlarged lymph nodes.	Correct	1	.7	1.44±0.651	Poor
		Uncertain	85	61.6		
		Incorrect	41	29.7		
14	Aching joint pain	Correct	63	45.7	1.60±0.598	Poor
		Uncertain	67	48.6		
		Incorrect	8	5.8		
<b>The Complications of Congenital Rubella</b>						
15	Sensorineural deafness.	Correct	58	42.0	1.66±0.631	Poor
		Uncertain	68	49.3		
		Incorrect	12	8.7		
16	Congenital cataract.	Correct	61	44.2	1.65±0.656	Poor
		Uncertain	63	45.7		
		Incorrect	14	10.1		
17	Blindness	Correct	60	43.5	1.61±0.583	Poor
		Uncertain	71	51.4		
		Incorrect	7	5.1		
18	Encephalitis and endocrine problems	Correct	12	8.7	2.43±0.650	Good
		Uncertain	54	39.1		
		Incorrect	72	52.2		
19	*Consecutive spontaneous abortions.	Correct	58	42.0	1.67±0.641	Moderate
		Uncertain	67	48.6		
		Incorrect	13	9.4		
<b>Management of Rubella</b>						
20	Termination of pregnancy if infection occurs before 16 weeks.	Correct	7	5.1	2.63±0.580	Good
		Uncertain	37	26.8		
		Incorrect	94	68.1		
	Pharmacological treatment for Rubella.	Correct	72	52.2	1.52±0.594	Poor
		Uncertain	59	42.8		
		Incorrect	7	5.1		

(Assessment Level (Poor (M. s= 1-1.66), Moderate (M. s=1.67-2.33), and Good (M.s ≥2.34), \*(Incorrect question))

**Table (4.2.9):** This table showed that the nurse-midwives knowledge was above the statistical cut-off point. related to rubella disease

were expressed poor level of knowledge at all items number (1, 3, 5,6, 8, 9, 10, 12, 13, 14, 15, 16, 17, and 21 (M.s =1-1.66) while, items number (11 and 19) the responses were a moderate level of knowledge (M. s=1.67-2.33). In addition, the items number (2, 4, 7, 18, and 20) the responses were a good level of knowledge (M.s.≥2.34).

**Table 4.2. 10 Overall Assessment of Knowledge Related to Preventive Measures of Rubella Disease(n=138)**

Weighted	Freq.	%	M ± S.d
Poor	45	32.6	37.33±4.147
Moderate	91	65.9	
Good	2	1.4	
<b>Total</b>	<b>138</b>	<b>100.0</b>	

(M: Mean for total score, S.d: Standard Deviation for total score (Poor= 21-35, Moderate= 36-49, Good= 50-63))

**Table (4.2.10):** The analysis of knowledge related to rubella diseases was demonstrated at (mean=37.33) and (standard deviation=54.147); and according to the study criteria, the nurses-midwives expressed moderate knowledge (n=91; %=65.9 %) as shown in (Appendix E).

**Table 4.2. 11 Knowledge Related to Preventive Measures of Cytomegalovirus Disease (n=138)**

List	Cytomegalovirus items	Rating	Freq	%	M.s. ± S.d.	Ass.
<b>Knowledge Regarding Infective Organisms</b>						
1	Deoxyribonucleic acid herpes virus.	Correct	25	18.1	2.15±0.703	Moderate
		Uncertain	67	48.6		
		Incorrect	46	33.3		
2	*Parasite infection.	Correct	69	50.0	1.59±0.657	Poor
		Uncertain	56	40.6		
		Incorrect	13	9.4		
<b>Mode of Transmission</b>						
3	Transmitted by respiratory droplet transmission.	Correct	73	52.9	1.53±0.617	Poor
		Uncertain	56	40.6		
		Incorrect	9	6.5		
4	Sexual intercourse	Correct	66	47.8	1.63±0.682	Poor
		Uncertain	56	40.6		
		Incorrect	16	11.6		
5	Breast milk.	Correct	54	39.1	1.92±0.842	Moderate
		Uncertain	40	29.0		
		Incorrect	44	31.9		
6	*Direct skin contact.	Correct	102	73.9	1.31±0.564	Poor
		Uncertain	29	21.0		
		Incorrect	7	5.1		
<b>Preventive Measures</b>						
7	Avoiding contact with body fluids.	Correct	48	34.8	2.07±0.880	Moderate
		Uncertain	31	22.5		
		Incorrect	59	42.8		
8	*Cytomegalovirus vaccine.	Correct	58	42.0	1.86±0.835	Moderate
		Uncertain	40	29.0		
		Incorrect	40	29.0		
9	*Eat cooked meat.	Correct	95	68.8	1.36±0.592	Poor
		Uncertain	35	25.4		
		Incorrect	8	5.8		
10	Prenatal care is provided on a regular basis, as well as infection prevention advice.	Correct	93	67.4	1.38±0.595	Poor
		Uncertain	37	26.8		
		Incorrect	8	5.8		
11	After handling diapers or being exposed to respiratory secretions, use gloves and wash your hands.	Correct	90	65.2	1.40±0.599	Poor
		Uncertain	40	29.0		
		Incorrect	8	5.8		
12	A toothbrush should not be shared with a little child.	Correct	89	64.5	1.41±0.600	Poor
		Uncertain	41	29.7		
		Incorrect	8	5.8		
13	When kissing a child, avoid coming into contact with their saliva.	Correct	88	63.8	1.42±0.601	Poor
		Uncertain	42	30.4		
		Incorrect	8	5.8		
14	Clean toys and other surfaces that have come into contact with urine or saliva from children.	Correct	91	65.9	1.41±0.624	Poor
		Uncertain	37	26.8		
		Incorrect	10	7.2		
15	Hand hygiene before handling newborns or collecting breast milk.	Correct	69	50.0	1.55±0.604	Poor
		Uncertain	61	44.2		
		Incorrect	8	5.8		

Symptoms of Cytomegalovirus						
16	Mild non-specific flu-like.	Correct	52	37.7	1.96±0.849	Moderate
		Uncertain	39	28.3		
		Incorrect	47	34.1		
17	*Nausea and vomiting.	Correct	71	51.4	1.57±0.649	Poor
		Uncertain	55	39.9		
		Incorrect	12	8.7		
18	Febrile rash.	Correct	81	58.7	1.48±0.630	Poor
		Uncertain	47	34.1		
		Incorrect	10	7.2		
Complications of Cytomegalovirus on Fetus						
19	Growth restriction	Correct	53	38.4	1.72±0.648	Moderate
		Uncertain	70	50.7		
		Incorrect	15	10.9		
20	Microcephaly and intracranial calcification.	Correct	43	31.2	1.97±0.773	Moderate
		Uncertain	56	40.6		
		Incorrect	39	28.3		
21	*Encephalitis and endocrine problems.	Correct	77	55.8	1.62±0.775	Poor
		Uncertain	36	26.1		
		Incorrect	25	18.1		
22	*Sensorineural deafness.	Correct	82	59.4	1.45±0.593	Poor
		Uncertain	49	35.5		
		Incorrect	7	5.1		
23	Ventriculomegaly	Correct	76	55.1	1.50±0.607	Poor
		Uncertain	54	39.1		
		Incorrect	8	5.8		
24	Ascites.	Correct	90	65.2	1.39±0.586	Poor
		Uncertain	41	29.7		
		Incorrect	7	5.1		
25	Blindness.	Correct	71	51.4	1.54±0.605	Poor
		Uncertain	59	42.8		
		Incorrect	8	5.8		
26	Hearing Loss.	Correct	73	52.9	1.50±0.569	Poor
		Uncertain	60	43.5		
		Incorrect	5	3.6		
Effect of Cytomegalovirus on Neonate						
27	Anemic and thrombocytopenic.	Correct	73	52.9	1.51±0.582	Poor
		Uncertain	59	42.8		
		Incorrect	6	4.3		
28	Hepatosplenomegaly.	Correct	67	48.6	1.57±0.613	Poor
		Uncertain	62	44.9		
		Incorrect	9	6.5		
29	Jaundice and purpural rash.	Correct	74	53.6	1.59±0.711	Poor
		Uncertain	46	33.3		
		Incorrect	18	13.0		
30	*Congenital cataract.	Correct	84	60.9	1.51±0.706	Poor
		Uncertain	37	26.8		
		Incorrect	17	12.3		
Management of Congenital Cytomegalovirus						
31	Termination of pregnancy if abnormalities are detected.	Correct	75	54.3	1.52±0.630	Poor
		Uncertain	53	38.4		
		Incorrect	10	7.2		

(Assessment Level (Poor (M.s= 1-1.66), Moderate (M.s=1.67-2.33), and Good (M.s ≥2.34), \*(Incorrect question))

**Table (4.2.11):** In the light of the statistical mean of the score, this table indicates that the nurse-midwives' knowledge related to

cytomegalovirus disease was expressed as a poor level of knowledge at all items of the scale (M.s =1-1.66) except, items number (1, 5, 7, 8, 16, 19, and 20) the responses were the moderate level of knowledge (M.s=1.67-2.33).

**Table 4.2. 12 Overall Assessment of Knowledge related to Preventive Measures of Cytomegalovirus Disease (n=138)**

Weighted	Freq.	%	M ± S.d
Poor	92	66.7	49.55±7.366
Moderate	44	31.9	
Good	2	1.4	
<b>Total</b>	<b>138</b>	<b>100.0</b>	

Mean for total score, S.d: Standard Deviation for total score (Poor= 31-51, Moderate= 52-72, Good= 73-93)

**Table (4.2.12)** The analysis of knowledge related to cytomegalovirus diseases was demonstrated at (mean=49.55) and (standard deviation=7.366); and according to the study criteria, the nurses-midwives expressed poor knowledge ( $n=92$ ; %=**66.7**) as shown in (Appendix E).

**Table 4.2. 13 Knowledge Related to Preventive Measures of Herpes Simplex Virus Disease (n=138)**

List	Herpes Simplex Virus items	Rating	Freq.	%	M.s. ± S.d.	Ass.
<b>Knowledge Regarding Infective Organisms</b>						
1	Herpes simplex is a deoxyribonucleic acid virus.	Correct	38	27.5	2.14±0.824	Moderate
		Uncertain	42	30.4		
		Incorrect	58	42.0		
2	*Fungal infection.	Correct	93	67.4	1.39±0.609	Poor
		Uncertain	36	26.1		
		Incorrect	9	6.5		
<b>Types of Herpes</b>						
3	Herpes simplex virus-1 orolabial infection.	Correct	97	70.3	1.32±0.528	Poor
		Uncertain	37	26.8		
		incorrect	4	2.9		
4	Herpes simplex virus-2 genital infection.	Correct	101	73.2	1.31±0.566	Poor
		Uncertain	30	21.7		
		incorrect	7	5.1		

Mode of Transmission						
5	Direct contact with the infected area.	Correct	101	73.2	1.32±0.581	Poor
		Uncertain	29	21.0		
		Incorrect	8	5.8		
6	Direct physical contact.	Correct	28	20.3	2.26±0.776	Moderate
		Uncertain	46	33.3		
		Incorrect	64	46.4		
7	*Transplacental transmission.	Correct	81	58.7	1.53±0.706	Poor
		Uncertain	40	29.0		
		Incorrect	17	12.3		
8	Presence of trans placental maternal neutralizing antibodies.	Correct	60	43.5	1.72±0.722	Moderate
		Uncertain	56	40.6		
		Incorrect	22	15.9		
9	The use of fetal scalp electrodes.	Correct	85	61.6	1.44±0.604	Poor
		Uncertain	45	32.6		
		Incorrect	8	5.8		
10	Duration of membrane rupture of more than 4 hours.	Correct	68	49.3	1.56±0.603	Poor
		Uncertain	62	44.9		
		Incorrect	8	5.8		
11	Herpes simplex virus in the newborn may occur from contact with open lesions after birth.	Correct	104	75.4	1.29±0.559	Poor
		Uncertain	27	19.6		
		incorrect	7	5.1		
Symptoms of Genital Herpes						
12	*Pelvic pain.	Correct	72	52.2	2.13±0.872	Moderate
		Uncertain	54	39.1		
		Incorrect	12	8.7		
13	Ulcerative lesion on the vulva, vagina and cervix.	Correct	44	31.9		
		Uncertain	31	22.5		
		Incorrect	63	45.7		
14	Urinary retention.	Correct	76	55.1	1.52±0.630	Poor
		Uncertain	52	37.7		
		Incorrect	10	7.2		
15	*Fever.	Correct	66	47.8	1.60±0.634	Poor
		Uncertain	61	44.2		
		Incorrect	11	8.0		
Classification of Neonatal Herpes						
16	Localized to skin, eye, and mouth.	Correct	85	61.6	1.45±0.629	Poor
		Uncertain	43	31.2		
		Incorrect	10	7.2		
17	Local central nervous system diseases such as encephalitis.	Correct	65	47.1	1.73±0.778	Moderate
		Uncertain	45	32.6		
		Incorrect	28	20.3		
18	Disseminated infection.	Correct	91	65.9	1.36±0.541	Poor
		Uncertain	43	31.2		
		Incorrect	4	2.9		
19	*Blindness.	Correct	71	51.4	1.53±0.593	Poor
		Uncertain	60	43.5		
		incorrect	7	5.1		

Management of Neonatal Herpes						
20	Rupture of the membrane should be avoided with first-episode genital herpes.	Correct	64	46.4	1.64±0.670	Poor
		Uncertain	59	42.8		
		Incorrect	15	10.9		
21	Don't use invasive procedures such as fetal scalp electrodes with primary infection.	Correct	58	42.0	1.66±0.631	Poor
		Uncertain	68	49.3		
		incorrect	12	8.7		
22	Cesarean section delivery with first episode's genital herpes.	Correct	48	34.8	1.93±0.794	Moderate
		Uncertain	51	37.0		
		incorrect	39	28.3		
23	Use of acyclovir(400mg) daily.	Correct	88	63.8	1.37±0.515	Poor
		Uncertain	48	34.8		
		incorrect	2	1.4		
24	*Normal birth.	Correct	92	66.7	1.33±0.473	Poor
		Uncertain	46	33.3		
		incorrect	138	100.0		

(Assessment Level (Poor (M.s= 1-1.66), Moderate (M.s=1.67-2.33), and Good (M.s ≥2.34), \*(Incorrect question))

**Table (4.2.13):** In the light of the statistical mean of the score, this table indicates that the nurse-midwives' knowledge related to herpes simplex virus disease was expressed as a poor level of knowledge at all items of the scale (M.s. =1-1.66) except, items number (1, 6, 8, 13, 17, and 22) the responses were the moderate level of knowledge (M.s.=1.67-2.33).

**Table 4.2. 14 Overall Assessment of Knowledge Related to Preventive Measures of Herpes Simplex Virus Disease (n=138)**

Weighted	Freq.	%	M ± S.d
Poor	86	62.3	38.21±7.698
Moderate	50	36.2	
Good	2	1.4	
<b>Total</b>	<b>138</b>	<b>100.0</b>	

*M: Mean for total score, S.d: Standard Deviation for total score (Poor= 24-40, Moderate= 41-56, Good= 57-72)*

**Table (4.2.14):** The analysis of knowledge related to herpes simplex virus diseases was demonstrated at mean=38.21 and standard

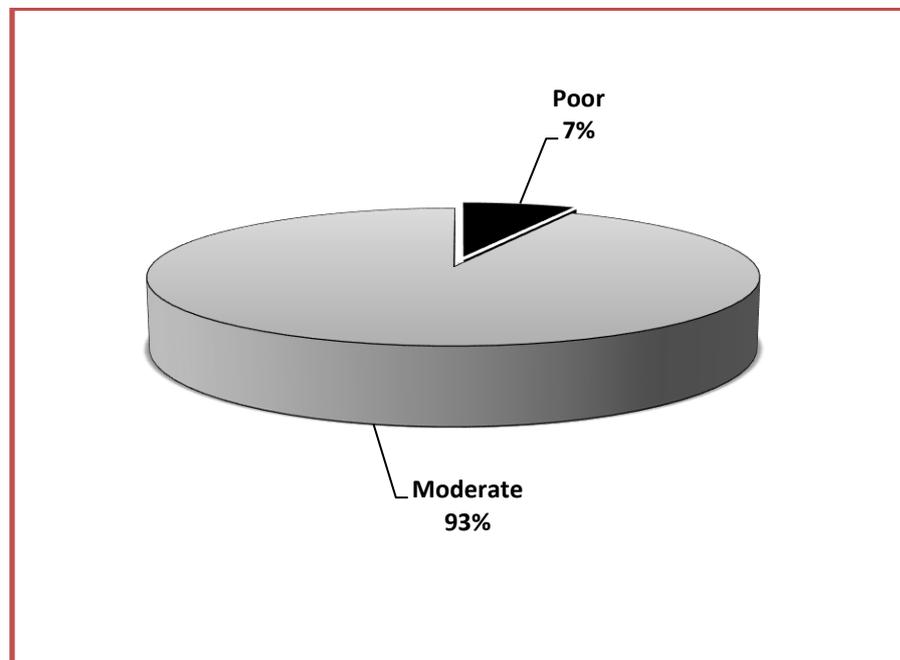
deviation=7.698; and according to the study criteria, the nurses-midwives expressed poor knowledge ( $n=86$ ; %=62.3).

**Table 4.2. 15 Overall Nurses-midwives Knowledge of TORCH Diseases**

Weighted	Freq.	M $\pm$ S.d
Poor	10	307.49 $\pm$ 18.953
Moderate	128	
Total	138	

*M: Mean for total score, S.d: Standard Deviation for total score (Poor= 169-281, Moderate= 282-394, Good= 395-507)*

**Table (4.2.15):** The analysis of knowledge related to TORCH diseases the overall was demonstrated at (mean=307.49) and (standard deviation=18.953); and according to the total mean of the score, the majority of (92.8%) nurses-midwives expressed moderate knowledge as shown in (Fig. 4.1).



**Figure 4.1 Overall Assessment of Nurses-midwives' Knowledge Related to TORCH Diseases**

**Table 4. 3 Nurses-midwives Practices Preventive Measures TORCH Disease****Table 4.3. 1 Practices Related to Hand Hygiene**

List	Hand Hygiene items	Rating	Freq.	%	M.s. ± S.d.	Ass.
1	Clean hands on each entry into the space and on leaving.	Always	39	28.3	2.13±0.830	Moderate
		Sometimes	41	29.7		
		Never	58	42.0		
2	Washing hands before initial contact with each patient.	Always	87	63.0	1.55±0.783	Poor
		Sometimes	26	18.8		
		Never	25	18.1		
3	Washing hands before performing an aseptic procedure.	Always	91	65.9	1.55±0.828	Poor
		Sometimes	17	12.3		
		Never	30	21.7		
4	Washing hands aftercare involves body fluid exposure risks such as wiping a neonate's nose.	Always	96	69.6	1.51±0.821	Poor
		Sometimes	13	9.4		
		Never	29	21.0		
5	Washing hands After contact with a patient as changing diapers.	Always	80	58.0	1.70±0.883	Moderate
		Sometimes	19	13.8		
		Never	39	28.3		
6	Washing hands with soap and warm water after activities such as feeding or bathing achild.	Always	80	58.0	1.76±0.932	Moderate
		Sometimes	11	8.0		
		Never	47	34.1		

(Assessment Level (Poor (M. s= 1-1.66), Moderate (M.s=1.67-2.33), and Good (M.s ≥2.34))

**Table (4.3.1):** In the light of the statistical mean of the score, this table indicates that the nurse-midwives practice related to hand hygiene was uneven between poor to moderate levels of all items of the scale. The items number (1, 5, and 6) the **replies** were moderate (M.s. =1.67-2.33), while, the items number (2, 3, and 4) the responses were poor level (M.s.=1-1.66).

**Table 4.3. 2 Overall Evaluation of Nurses-midwives Practices Concerning Hand Hygiene**

Weighted	Freq.	%	M ± S.d
Poor	76	55.1	9.22±2.479
Moderate	56	40.6	
Good	6	4.3	
<b>Total</b>	<b>138</b>	<b>100.0</b>	

(M: Mean for total score, S.d: Standard Deviation for total score (Poor= 6-10, Moderate= 11-14, Good= 15--18))

**Table (4.3.2):** The analysis of practices concerning hand hygiene was demonstrated at (mean=9.22) and (standard deviation=2.479); and according to the study criteria, the nurses-midwives expressed poor hand hygiene practices ( $n=76$ ; %=55.1).

**Table 4.3. 3 Practices related to Personal Protective Equipment (PPE)**

List	Personal Protective Equipment Items	Rating	Freq.	%	M.s. ± S.d.	Ass.
1	Put gloves on immediately before any procedures such as per vagina are performed.	Always	89	64.5	1.52±0.766	Poor
		Sometimes	26	18.8		
		Never	23	16.7		
2	Change the gloves for every patient, including the mother and her newborn, between care.	Always	101	73.2	1.34±0.623	Poor
		Sometimes	26	18.8		
		Never	11	8.0		
3	Wear gloves when handling the newborn after delivery before bathing or proper removal of body substances from the mother.	Always	78	56.5	1.57±0.733	Poor
		Sometimes	40	29.0		
		Never	20	14.5		
4	Wear gloves for contact with an undiagnosed rash, lesion, or non-intact skin.	Always	94	68.1	1.51±0.803	Poor
		Sometimes	17	12.3		
		Never	27	19.6		
5	Re-use or wash gloves.	Always	106	76.8	1.35±0.691	Poor
		Sometimes	15	10.9		

		Never	17	12.3		
6	Perform hand hygiene after gloves are removed.	Always	89	64.5	1.55±0.802	Poor
		Sometimes	22	15.9		
		Never	27	19.6		
7	Wear a gown when providing care that may contaminate skin or clothing.	Always	94	68.1	1.55±0.854	Poor
		Sometimes	11	8.0		
		Never	33	23.9		
8	Put gown on immediately before the activity for which it is indicated.	Always	91	65.9	1.60±0.883	Poor
		Sometimes	10	7.2		
		Never	37	26.8		
9	Remove gown immediately after the activity for which it is used.	Always	100	72.5	1.44±0.764	Poor
		Sometimes	15	10.9		
		Never	23	16.7		
10	Change gown between care for each mother or newborn.	Always	95	68.8	1.52±0.821	Poor
		Sometimes	14	10.1		
		Never	29	21.0		
11	Wear gowns properly such as appropriately tied at the neck and waist.	Always	96	69.6	1.45±0.745	Poor
		Sometimes	21	15.2		
		Never	21	15.2		
12	Put on facemask immediately before the activity for which it is indicated.	Always	82	59.4	1.69±0.892	Moderate
		Sometimes	16	11.6		
		Never	40	29.0		
13	Change facemask if it becomes wet.	Always	67	48.6	1.76±0.824	Moderate
		Sometimes	37	26.8		
		Never	34	24.6		
14	Touch facemask while being worn.	Always	56	40.6	1.95±0.878	Moderate
		Sometimes	32	23.2		
		Never	50	36.2		
15	Fold facemask or store in a pocket	Always	55	39.9	2.15±0.965	Moderate
		Sometimes	7	5.1		
		Never	76	55.1		
16	Perform hand hygiene after removing the face mask	Always	55	39.9	2.10±0.948	Moderate
		Sometimes	13	9.4		
		Never	70	50.7		
17	Wear goggles.	Always	64	46.4	1.99±0.962	Moderate
		Sometimes	11	8.0		
		Never	63	45.7		

(Assessment Level (Poor (M.s= 1-1.66), Moderate (M.s=1.67-2.33), and Good (M.s  $\geq$ 2.34))

**Table (4.3.3):** This table indicates that the nurse-midwives practice related to personal protective equipment was at a poor level on all items of the scale (M.s =1-1.66) except, items number (12, 13, 14, 15, 16, and 17) the responses were the moderate practice of personal protective equipment (M.s=1.67-2.33).

**Table 4.3. 4 Overall Evaluation of Nurses-midwives Practices Concerning Personal Protective Equipment (PPE)**

Weighted	Freq.	%	M $\pm$ S.d
Poor	90	65.2	27.12 $\pm$ 5.993
Moderate	43	31.2	
Good	5	3.6	
<b>Total</b>	<b>138</b>	<b>100.0</b>	

(M: Mean for total score, S.d: Standard Deviation for total score  
(Poor= 17-28, Moderate= 29-39, Good= 40-51))

**Table (4.3.4):** The analysis of practices concerning personal protective equipment was demonstrated at (**mean=27.12**) and (**standard deviation=5.993**); and according to the study criteria, the nurses-midwives expressed poor practices (**n=90; %=65.2**).

**Table 4.3. 5 Practices Related to Environment Hygiene**

List	Environment Clean items	Rating	Freq	%	M.s. ± S.d.	Ass.
1	Cleaning labor and delivery rooms after each birth.	Always	81	58.7	1.64±0.835	Poor
		Sometimes	25	18.1		
		Never	32	23.2		
2	Clean mother's room	Always	97	70.3	1.45±0.755	Poor
		Sometimes	19	13.8		
		Never	22	15.9		
3	Cleaning transport equipment after each newborn transport.	Always	80	58.0	1.68±0.869	Moderate
		Sometimes	21	15.2		
		Never	37	26.8		
4	Remove parts in contact with contaminated water for cleaning and disinfection	Always	82	59.4	1.69±0.892	Moderate
		Sometimes	16	11.6		
		Never	40	29.0		
5	Drain equipment after each use.	Always	96	69.6	1.51±0.821	Poor
		Sometimes	13	9.4		
		Never	29	21.0		
6	Clean all surfaces and removable parts of the equipment.	Always	84	60.9	1.63±0.853	Poor
		Sometimes	20	14.5		
		Never	34	24.6		
7	Sterilize or disinfect surgical equipment.	Always	98	71.0	1.52±0.847	Poor
		Sometimes	8	5.8		
		Never	32	23.2		
8	Separation of clean and soiled laundry during transportation, sorting, folding, and storage.	Always	96	69.6	1.56±0.879	Poor
		Sometimes	6	4.3		
		Never	36	26.1		
9	Soiled diapers are disposed of immediately into a covered receptacle.	Always	100	72.5	1.47±0.812	Poor
		Sometimes	10	7.2		
		Never	28	20.3		
10	Recapping, bending, or breaking needles.	Always	86	62.3	1.68±0.918	Moderate
		Sometimes	9	6.5		
		Never	43	31.2		
11	Easily reaching into waste or sharps containers.	Always	99	71.7	1.46±0.784	Poor
		Sometimes	14	10.1		
		Never	25	18.1		
12	Providing sharps containers that	Always	87	63.0	1.65±0.893	Poor

	are rigid, and puncture-resistant	Sometimes	12	8.7		
	at or near the point of use.	Never	39	28.3		

(Assessment Level (Poor (M.s= 1-1.66), Moderate (M.s=1.67-2.33), and Good (M.s ≥2.34)

**Table (4.3.5):** In view of statistically significant cut-offs, this table shows that nurse-midwives practice related to environmental hygiene was poor level at all items of the scale (M.s =1-1.66) except, items number (3, 4, and 10) the responses were a moderate practice of environment cleaning (M.s=1.67-2.33).

**Table 4.3. 6 Overall Evaluation of Nurses-midwives Practices Concerning Environment Hygiene**

Weighted	Freq.	%	M ± S.d
Poor	88	63.8	19±6.762
Moderate	35	25.4	
Good	15	10.9	
<b>Total</b>	<b>138</b>	<b>100.0</b>	

(M: Mean for total score, S.d: Standard Deviation for total score  
(Poor= 12-19, Moderate= 20-27, Good= 28-36))

**Table (4.3.6):** The analysis of practices concerning environmental hygiene was demonstrated at (mean=19) and (standard deviation=6.762); and according to the study criteria, the nurses-midwives expressed poor practices (n=88; %=63.8).

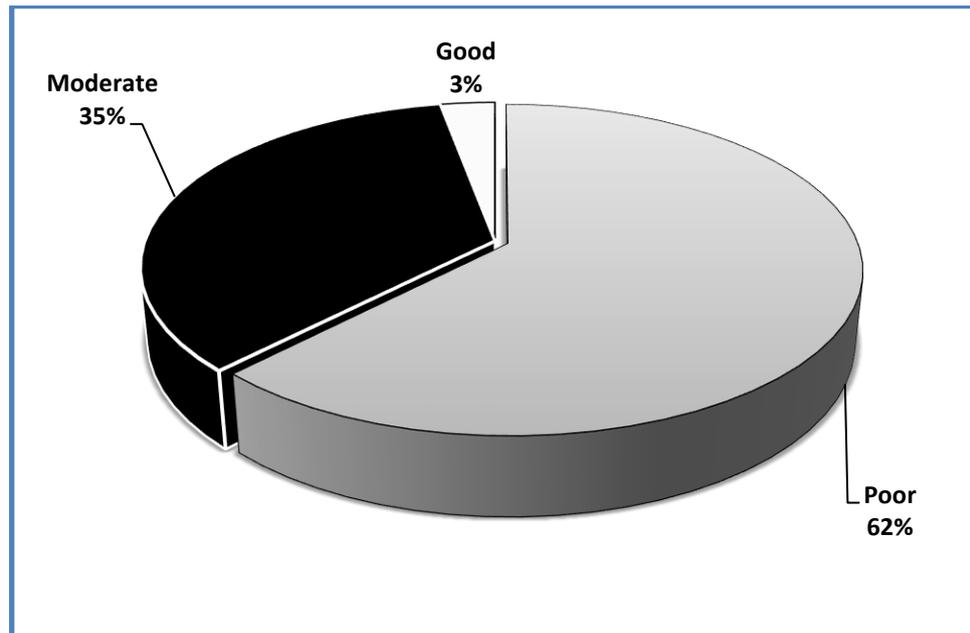
**Table 4.3. 7 Overall Evaluation of Nurses-midwives Practices Concerning Preventive Measures of TORCH Diseases (n=138)**

Weighted	Freq.	M ± S.d
Poor	86	57.35±9.601
Moderate	48	
Good	4	
<b>Total</b>	<b>138</b>	

(M: Mean for total score, S.d: Standard Deviation for total score)

(Poor= 35-58, Moderate= 59-82, Good= 83-105))

**Table (4.3.7):** The analysis of practices concerning preventive measures of TORCH diseases was demonstrated at (**mean=57.35**) and (**standard deviation=9.601**); and according to the total mean of the score, the nurses-midwives expressed poor practices ( $n=86$ ;  $\%=62.3$ ) as shown in (**Fig. 4.2**).



**Figure 4. 2 Overall Evaluation of Nurses-midwives Practices Related to TORCH Diseases**

**Table 4. 4 Association between Nurses-midwives Knowledge and their Demographic Characteristics**

	Rating	Knowledge		Total	d.f	Sig.	
		Poor	Moderate				
Age	20-30years old	3	49	52	3	$\chi^2$ obs.=0869 $\chi^2$ crit.= 7.815 P-value=0.833	NS
	31-40years old	2	23	25			
	41-50years old	3	42	45			
	51 Years and more	2	14	16			
	<b>Total</b>	<b>10</b>	<b>128</b>	<b>138</b>			
Education Level	Rating	Knowledge		Total	d.f	Sig.	
		Poor	Moderate				
	Secondary Midwifery school	1	66	67	2	$\chi^2$ obs.= 7.163 $\chi^2$ crit.= 5.991 P-value=0.028	S
	Diploma Degree of Midwifery	9	59	68			
College of Nursing and above	0	3	3				

	Total	10	128	138	d.f	Sig.		
	Rating	Knowledge		Total		3	$\chi^2$ obs.= 2.633 $\chi^2$ crit.= 7.815 P-value=0.452	NS
		Poor	Moderate					
Marital Status	Single	0	14	14	3	$\chi^2$ obs.= 2.633 $\chi^2$ crit.= 7.815 P-value=0.452	NS	
	Married	8	103	111				
	Divorced	1	4	5				
	Widow	1	7	8				
	<b>Total</b>	<b>10</b>	<b>128</b>	<b>138</b>				
	<b>Total</b>	<b>10</b>	<b>128</b>	<b>138</b>				
Workplace	Rating	Knowledge		Total	d.f	Sig.		
		Poor	Moderate			3	$\chi^2$ obs.=2.225 $\chi^2$ crit.= 7.815 P-value=0.527	NS
	Delivery Room	4	46	50				
	Maternity Unit	5	43	48				
	Maternal Emergency	1	29	30				
	Maternal Operating	0	10	10				
<b>Total</b>	<b>10</b>	<b>128</b>	<b>138</b>					
Work Shift	Rating	Knowledge		Total	d.f	Sig.		
		Poor	Moderate			1	$\chi^2$ obs.=0.106 $\chi^2$ crit.= 3.841 P-value=0.745	NS
	Morning Shift	6	70	76				
	Evening Shift	4	58	62				
<b>Total</b>	<b>10</b>	<b>128</b>	<b>138</b>					
Years of Experience	Rating	Knowledge		Total	d.f	Sig.		
		Poor	Moderate			3	$\chi^2$ obs.= 9.784 $\chi^2$ crit.= 7.815 P-value=0.020	S
	<5 years	9	51	60				
	5-10 years	0	32	32				
	11-15years	0	15	15				
	$\geq$ 16 years	1	30	31				
<b>Total</b>	<b>10</b>	<b>128</b>	<b>138</b>					
Courses Training	Rating	Knowledge		Total	d.f	Sig.		
		Poor	Moderate			3	$\chi^2$ obs.= 24.733 $\chi^2$ crit.= 7.815 P-value=0.001	S
	No trained	1	95	96				
	One session	1	10	11				
	Two sessions	8	20	28				
	More than two sessions	0	3	3				
<b>Total</b>	<b>10</b>	<b>128</b>	<b>138</b>					
Sources of Information	Rating	Knowledge		Total	d.f	Sig.		
		Poor	Moderate			3	$\chi^2$ obs.= 2.270 $\chi^2$ crit.= 7.815 P-value=0.518	NS
	Educational Institution	2	26	28				
	Social Media	2	9	11				
	Courses	1	11	12				
	Work Place	5	82	87				
<b>Total</b>	<b>10</b>	<b>128</b>	<b>138</b>					

(  $\chi^2$  obs. = Chi-square observer,  $\chi^2$  crit. = Chi-square critical, Df= Degree of freedom, P-value= Probability value, HS= high significant, S= significant, and NS= non-significant)

**Table (4.4)** This table indicates that there was no significant association between knowledge of nurses-midwives and their age, marital status, workplace groups, work shift and their sources of information at a p-value  $>0.05$ . While indicates that there was a significant association between

knowledge of nurse-midwives and their educational level, years of experience, and their training sessions at a p-value of 0.05.

**Table 4. 5 Association between Nurses-midwives Practices and their Demographic Characteristics**

Age Groups	Rating	Practices			Total	d.f	Sig.	
		Poor	Moderate	Good				
Age Groups	20-30years old	31	17	4	52	6	$\chi^2$ obs.= 15.196 $\chi^2$ crit.=12.592 P-value=0.019	S
	31-40years old	13	12	0	25			
	41-50years old	35	10	0	45			
	51Years and More	7	9	0	16			
	<b>Total</b>	<b>86</b>	<b>48</b>	<b>4</b>	<b>138</b>			
Education Level	Rating	Practices			Total	d.f	Sig.	
		Poor	Moderate	Good				
	Secondary Midwifery School	42	23	2	67	4	$\chi^2$ obs.= 1.943 $\chi^2$ crit.= 9.488 P-value=0.746	NS
	Diploma degree of Midwifery	41	25	2	68			
	College and above	3	0	0	3			
<b>Total</b>	<b>86</b>	<b>48</b>	<b>4</b>	<b>138</b>				
Marital Status	Rating	Practice			Total	d.f	Sig.	
		Poor	Moderate	Good				
	Single	7	7	0	14	6	$\chi^2$ obs.= 2.531 $\chi^2$ crit.=12.592 P-value=0.865	NS
	Married	71	36	4	111			
	Divorced	3	2	0	5			
	Widow	5	3	0	8			
<b>Total</b>	<b>86</b>	<b>48</b>	<b>4</b>	<b>138</b>				
Workplace	Rating	Practices			Total	d.f	Sig.	
		Poor	Moderate	Good				
	Delivery Room	29	18	3	50	6	$\chi^2$ obs.= 10.662 $\chi^2$ crit.=12.592 P-value=0.099	NS
	Maternity Unit	32	16	0	48			
	Maternal Emergency	22	7	1	30			
	Maternal Operating	3	7	0	10			
<b>Total</b>	<b>86</b>	<b>48</b>	<b>4</b>	<b>138</b>				
Work Shift	Rating	Practices			Total	d.f	Sig.	
		Poor	Moderate	Good				
	Morning Shift	43	31	2	76	2	$\chi^2$ obs.= 2.691 $\chi^2$ crit.= 5.991 P-value=0.260	NS
	Evening Shift	43	17	2	62			
<b>Total</b>	<b>86</b>	<b>48</b>	<b>4</b>	<b>138</b>				
Experience	Rating	Practices			Total	d.f	Sig.	
		Poor	Moderate	Good				
	<5 years	44	16	0	60	6	$\chi^2$ obs.= 18.376 $\chi^2$ crit.=12.592 P-value=0.005	S
	5-10 years	19	13	0	32			
	11-15years	8	7	0	15			
	>16 years	15	12	4	31			
<b>Total</b>	<b>86</b>	<b>48</b>	<b>4</b>	<b>138</b>				
	Rating	Practices			Total	d.f	Sig.	
		Poor	Moderate	Good				
	No trained	63	29	4	96	6	$\chi^2$ obs.= 4.409	
One session	6	5	0	11				

Courses	Two sessions	15	13	0	28		$\chi^2$ crit.=12.592 P-value=0.621	NS
	>2 sessions	2	1	0	3			
	Total	86	48	4	138			
Sources of information	Rating	Practices			Total	d.f	Sig.	
		Poor	Moderate	Good				
	Educational Institution	16	11	1	28	6	$\chi^2$ obs.= 3.458 $\chi^2$ crit.=12.592 P-value=0.750	NS
	Social Media	9	2	0	11			
	Courses	9	3	0	12			
	Work Place	52	32	3	87			
	Total	86	48	4	138			

( $\chi^2$  obs. = Chi-square observer,  $\chi^2$  crit. = Chi-square critical, Df= Degree of freedom, P-value= Probability value, HS= high significant, S= significant, and NS= non-significant)

**Table (4.5):** This table demonstrated that there was a significant relationship between the practice of nurses-midwives and their age groups their years of experience at p-value <0.05, as well table demonstrated that there was no significant relationship between practices of nurse-midwives related for TORCH illness prevention methods and educational level, marital status, workplace, work shift, training sessions, and sources of information at p-value >0.05.

**Table 4. 6 Statistical association between Knowledge and their Practices of Nurses-midwives (n=138)**

Knowledge	Rating	Practices			Total	d.f	Sig.	
		Poor	Moderate	Good				
Poor		5	2	2	9	2	$\chi^2$ obs.= 12.910 $\chi^2$ crit.= 5.991 P-value=0.002	S
Moderate		81	46	2	129			
Total		86	48	4	138			

( $\chi^2$  obs. = Chi-square observer,  $\chi^2$  crit. = Chi-square critical, Df= Degree of freedom, P-value= Probability value, S= significant, HS= high significant, and NS= non-significant)

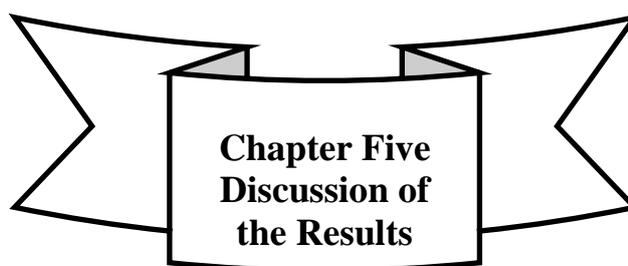
**Table (4.6):** This table revealed a significant association between knowledge and their practices of nurse-midwives related to preventive measures of TORCH diseases at a p-value < 0.05.

**Table 4.7 Correlation between Nurses-midwives Knowledge and Practices (n=138)**

Variables	Spearman's rho correlation	Sig. (2-tailed)	Significance
<b>Knowledge vs. Practices</b>	0.128	0.003	<b>S</b>

*H.S: High significant, S: Significant*

**Table (4.7):** This table indicates that there is a positive significant correlation between knowledge and practices at ( $r=0.128$ ;  $p=0.003$ ).



## 5.1 Socio-demographic Characteristics of the Study Sample

### (Table 4.1):

The current study revealed that more than one-third of the sample was reported at age (21-30) years. These findings inconsistent with the study conducted by (Elnashar *et al.*, 2019) among health care providers in Al Taif area /Saudi Arabia were mentioned that the majority of the sample with aged between (18-29) years old, a study in Al-Karhk maternity hospitals at Baghdad city done by (Hamood & Khairi, 2017) disagree with present result shows that the highest percentage of the sample their age was (20-24) years. Another study in Babylon province done by (Al-Hellaly & Chyad, 2019) that the age of the sample (20-24) years. Most of the midwives with experience refused to participate in the study, and this explains that a large proportion of the sample is between the ages of (21 – 30) years.

Regarding education level, the findings demonstrated that less than half of the sample had an education diploma in nursing. This result is inconsistent with a study done by (Elnashar *et al.*, 2019) in the Al Taif area of Saudi Arabia, which found that more than three quarter of the sample had completed a college education, and another study conducted by (Al-Hellaly & Chyad, 2019) in Babylon province, which found that the majority of the sample had completed secondary education. As well as a study in Al-Karhk maternity hospitals in Baghdad city done by (Hamood & Khairi, 2017) disagree the present results reported that the highest percent of the midwives

are midwifery secondary school graduates. This explains midwives seek to develop themselves by obtaining a diploma in midwifery sciences.

The majority of the sample in the present study was married. These findings are consistent with those of (Andiappan *et al.*, 2014), who found that the almost of the sample in this study was married. The results also consistent with (Moura *et al.*, 2019), who found that vast magority of the sample was married. As well, a study in Al-Karak maternity hospitals at Baghdad city done by (Hamood & Khairi, 2017) agrees with the present study reveals that less than half of midwives is married. So that study disagrees with the present result (Elnashar *et al.*, 2019) in the Al Taif area /Saudi Arabia shows that the most of sample was single.

Concerning the place of work, the results demonstrated that more than one-third of the nurse-midwives were working in the delivery room. This result agreed with a study done in Khartoum; Sudan in two maternityhospitals done by (Mursy & Mohamed, 2019). this study shows that the half of the midwives work in the delivery room, also the present result is incompatible with a study of knowledge regarding toxoplasmosis in Rabat, Morocco done by (Laboudi *et al.*, 2020) this study revealed that more than two fifth of the sample work in the maternal emergency room. As well, a study in Al-Karhk maternity hospitals at Baghdad city done by (Hamood & Khairi, 2017) disagrees with present results showed that the two fifth of the nurse-midwives are working in the ward. The reason why most midwives work in the delivery room is that they have more experience in the delivery room than in other places for maternal nursing care.

Regarding the working shift, the half of sample from the morning shift. This finding disagreed with a study done in the Al Taif area /Saudi Arabia by (Elnashar *et al.*, 2019) this study shows that the most of sample equally present in morning and evening shifts. This explains that the morning shift is more appropriate for nurse-midwives, in addition to the fact that the evening shift is stressful and the working hours are long.

The findings revealed that more than two-fifth of nurse-midwives regarding years of experience between (1-5) years. This finding disagrees with a study done in the Al Taif area /Saudi Arabia by Elnashar et al., (2019) indicated that half of the sample have less than two years of experience, so that another study in Iran done by (Joukar *et al.*, 2017) incompatible with the present study, it appears two fifth of the sample who have more than ten years of experience. As well, a study in Al-Karhk maternity hospitals at Baghdad city done by (Hamood & Khairi, 2017) incompatible with the present results revealed that the two fifth of midwives had experienced less than one year.

More than two third of the sample have no training courses related to TORCH diseases. A study in Al-Karhk maternity hospitals at Baghdad city done by (Hamood & Khairi, 2017) agreed with the present result showed that vast majority of the study sample did not participate in any training course about TORCH diseases, so that the study done by (Devi *et al.*, 2018) they stated that majority of the sample had no training about TORCH diseases. This indicated that more TORCH disease courses are required for midwives.

Concerning the source of information, less than two third of nurse-midwives were acquired information about TORCH diseases from the workplace. This finding disagreed with the study conducted in Iran by (Joukar *et al.*, 2017) shows that three quarter of the sample was acquired information from books and education. This indicates that the practices and dealing with cases of TORCH diseases through work give midwives more information.

## **5.2 Nurse-midwives Knowledge Related to TORCH Diseases (Table (4.2))**

### **5.2.1 Knowledge Related to Toxoplasmosis Diseases (Table (4-2-1)):**

In the present study, knowledge regarding infective organisms showed a poor mean score toward bacterial infection and a moderate mean score toward toxoplasmosis gondii is a protozoan parasite. These results agreed with a study in Imperatriz, Maranhao, Brazil done by (Moura *et al.*, 2019) showed a moderate mean score toward toxoplasmosis as an infectious disease.

Concerning the mode of transmission, the present findings revealed that the mean score toward contacts with cat feces eat, undercooked meat, unwashed hands, droplet spread, and placental transitions from infected mother to fetus was the moderate mean score. These results agreed with a study in Imperatriz, Maranhao, Brazil done by (Moura *et al.*, 2019) showed moderate mean score toward a mode of transmission, another study shows a poor mean score regarding mode of transmission of toxoplasmosis in the Netherlands carried out by (Pereboom *et al.*, 2013).

Regarding preventive measures of toxoplasmosis, the findings showed a moderate mean score concerning avoiding eating raw meat, wearing gloves, and washing hands when gardening or handling soil, before eating, thoroughly washing all fruits and vegetables, and after handling meat, wash hands with soap and warm water. In a study conducted by (Silva *et al.*, 2011), knowledge of toxoplasmosis among nurses who offer prenatal care revealed a lack of knowledge of toxoplasmosis preventative strategies.

In the present study, nurse-midwives knowledge regarding symptoms of toxoplasmosis, the result revealed mean score toward glandular fever-like flu was good. A study conducted by (Moura *et al.*, 2019)

in Imperatriz, Maranhao, Brazil, reinforces this result. Nurse-midwives knowledge concerning congenital toxoplasmosis items, mean score ranging from poor, moderate, and good. This result disagrees with the study done in Imperatriz, Maranhao, Brazil done by (Moura *et al.*, 2019), mean score toward congenital toxoplasmosis was poor. Treatment of toxoplasmosis item was a moderate mean score in the present study.

### **5.2.2. Overall Assessment of Knowledge Related to Preventive Measure of Toxoplasmosis Disease (Table (4-2-2)):**

The present results demonstrated that the majority of nurses-midwives were moderate knowledge related to toxoplasmosis. These findings were inconsistent with a study showing more than half claimed not to know anything about toxoplasmosis done by (Moura *et al.*, 2019) in Brazil, also another study showed inadequate knowledge regarding toxoplasmosis, this study done by (Mahfouz *et al.*, 2018) in Saudi Arabia. So that study in Brazillian city done by (Silva *et al.*, 2011) incompatible with present results showed the high percentage of nurse knowledge toward toxoplasmosis. Most midwives deal with pregnant women who have toxoplasmosis at the workplace or during their work in antenatal clinics, and this explains that the percent of toxoplasmosis is moderate.

### **5.2.3. Knowledge Related to Preventive Measure of Chickenpox Disease (Table 4-2-3):**

The findings showed poor mean score in items of infective organism mode of transmission, preventive measures, and symptoms of chickenpox and moderate mean score in items of characteristics of fetal varicella syndrome, maternal risk during delivery, and treatment of chickenpox.

#### **5.2.4. Overall Assessment of Knowledge Related to Preventive Measure of Chickenpox Disease (Table (4-2-4))**

The findings revealed that more than half of nurses-midwives were poor knowledge related to chickenpox. The nurse-midwives participating in the study were not familiar with chickenpox diseases because this disease rarely occurs in pregnant women. A study in Singapore incontinence with present result conducted by Weisheng (Ho *et al.*, 2012) who reported that good knowledge of sample.

#### **5.2.5. Knowledge Related to Preventive Measure of Syphilis Disease (Table (4-2-5)):**

The findings of the present study showed that the knowledge items of syphilis regarding infective organism, mode of transmission, symptoms of syphilis, the effect of syphilis on pregnant women, the effect of syphilis on the fetus, the effect of syphilis on the fetus were moderate mean score. This result disagrees with a study in Teresina, Brazil done by (Rodrigues & Domingues, 2017) study of knowledge and practices of health care providers, showed that knowledge items of syphilis were poor. So that another study of syphilis done by (Santos *et al.*, 2017) in Brazil among obstetricians and nurses carried out in maternity hospitals in Teresina shows good knowledge items of syphilis.

#### **5.2.6. Overall Assessment of Knowledge Related to Preventive Measure of Syphilis Disease Table (4-2-6):**

The findings showed more than two third of nurses-midwives were a moderate level of knowledge related to syphilis disease. These results disagreed with a study in Teresina, Brazil done by (Rodrigues & Domingues, 2017) study of knowledge and practices of health care providers was reported poor knowledge. The moderate level of knowledge of nurse-midwives with regard to syphilis indicated that during work in the

delivery room or in the maternal emergency ward, they deal with pregnant women who have syphilis.

### **5.2.7. Knowledge Related to Preventive Measure of Hepatitis B Disease Table (4-2-7):**

The present results revealed that the mean score of knowledge regarding infective organisms was good and moderate, this consistent with a study done by (Mursy & Mohamed, 2019) study of knowledge and practice of hepatitis B among midwives in Khartoum, Sudan reveals that mean score of infective organisms was good. As well as the present results showed good and a moderate mean score of knowledge item toward a mode of transmission, prevention of hepatitis B, symptoms of hepatitis B, and management of hepatitis B, this disagreement and with a cross-sectional study illustrate poor and a good mean score of knowledge regarding transmission, prevention, and treatment of hepatitis B done by (Joukar *et al.*, 2017) in Iran.

### **5.2.8. Overall Assessment of Knowledge Related to Preventive Measure of Hepatitis B Disease (Table (4-2-8)):**

The present findings illustrated that half of nurses-midwives were good knowledge related to hepatitis B disease. This result disagreement with study in (Mursy & Mohamed, 2019) in Khartoum, Sudan illustrates more than half of nurse's knowledge regarding hepatitis B. Less than half percent of the sample had knowledge in a study done by (Joukar *et al.*, 2017) in Iran so that this result incompatible with the present study. Hepatitis B virus is the most common disease that a midwife encounters during her work in the delivery room, so she has an excellent background in hepatitis B.

### **5.2.9. Knowledge Related to Preventive Measure of Rubella Disease (Table (4-2-9)):**

In this study, the mean score for knowledge of the infective organism, mode of transmission, preventive measures, symptoms of rubella, a complication of congenital rubella, and rubella management was between poor and good. This contrasts with (Abbas & Hasan's, 2016) rubella study in Baghdad, Iraq, which found a moderate mean score for the infective organism, moderate and poor mean score for symptoms of rubella and mode of transmission, and poor mean score regarding the effect of rubella on pregnancy outcome and toward the effect of rubella on new-born.

### **5.2.10 Overall Assessment of Knowledge Related to Preventive Measure of Rubella Disease (Table (4-2-10)):**

The findings illustrated that less than two third of nurses-midwives were moderate knowledge related to rubella disease. These results agreed with a study in Egypt conducted by (Ibrahim *et al.*, 2018) reveals that more than two third of the sample were moderate knowledge. The moderate level of rubella indicated that most nurse-midwives have little knowledge about rubella, and most of them do not know that it causes birth defects when it occurs in the first trimester of pregnancy.

### **5.2.11 Knowledge Related to Preventive Measure of Cytomegalovirus Disease (Table (4-2-11)):**

In the present results, the mean score of knowledge regarding of infective organism, mode of transmission, and preventive measures were ranged from poor to moderate, while most items in symptoms of cytomegalovirus, a complication of cytomegalovirus on fetus, the effect of cytomegalovirus on neonate and management of congenital cytomegalovirus were poor mean score. These findings inconsistent with a study conducted in Gevneva, Switzerland by (Wilame *et al.*, 2015) illustrate

that the mean score of infective organisms was good and moderate mean score in items of hygiene preventive measure, while in other study done by (Diener *et al.*, 2020) show moderate mean score in items of transmission route and complication of cytomegalovirus on the fetus.

#### **5.2.12. Overall Assessment of Knowledge Related to Preventive Measure of Cytomegalovirus Disease (Table (4-2-12)):**

The findings showed that two third of nurses-midwives were poor knowledge related to cytomegalovirus disease. These findings agreed with a study done by (Jeon *et al.*, 2006) in Birmingham and Chicago illustrate that (22%) there was a lack of knowledge of the cytomegalovirus, another study of midwife's knowledge regarding cytomegalovirus agreement with this result done by (Pereboom *et al.*, 2014) who reported that majority of the sample had poor level of knowledge. The poor level of Cytomegalovirus indicates that the midwives do not have a scientific background on Cytomegalovirus, and this is evident by dealing with them during sample collection.

#### **5.2.13. Knowledge Related to Preventive Measure of Herpes Simplex Virus Disease (Table (4-2-13)):**

The present findings regarding herpes simplex virus revealed that most items toward knowledge regarding infective organism, types of herpes, mode of transmission, symptoms of genital herpes, classification of neonatal herpes, and management of neonatal herpes were poor mean score. These results disagreed with a study done in rural southwest Virginia by (Hover & Bertke, 2017), show the good mean score, while another study among midwives about sexually transmittable infections in Iran done by (Pourmarzi & Sharami, 2017) consistent with present findings show poor mean score regarding herpes simplex virus.

#### **5.2.14. Overall Assessment of Knowledge Related to Preventive Measure of Herpes Simplex Viruses Disease**

##### **Table (4-2-14):**

The findings reported that less than two third of nurses-midwives were poor knowledge related to herpes simplex virus disease. A study in rural southwest Virginia done by (Hover & Bertke, 2017) disagreed with the present results reveal that level of knowledge was three quarter of the sample. Genital herpes is completely unknown to nurse-midwives, and they do not even know what its clinical symptoms of genital herpes are, and this is through the low level of their knowledge about genital herpes.

#### **5.2.15. Overall, Knowledge of Nurses-midwives towards Preventive Measure of TORCH Diseases (Table (4-2-15)):**

The findings demonstrated that the overall knowledge toward TORCH diseases was moderate knowledge .These findings were inconsistent with a study of TORCH diseases in India done by (Rjakumari & Soli, 2015) showed that more than three quarters of the sample had inadequate knowledge. Also, another study of knowledge TORCH diseases in Villupuram District done by (Latha *et al.*, 2020) agreed with present results reveal that three quarter of the sample had adequate knowledge. These findings disagree with a study of TORCH in Gurugram, India done by (Devi *et al.*, 2018) shows that the majority of the sample had poor knowledge. This explains the difference in cultures and awareness of nurse-midwives from one country to another.

Moderate level of knowledge related to the preventive measures of TORCH diseases; this is an answer to the research question as mentioned in chapter one (introduction).

### **5.3. Nurses-midwives Practice Preventive Measures TORCH Disease**

(Table (4-3.1): The present findings revealed that the nurse-midwives practice related to hand hygiene was uneven between poor to a moderate level at all items. A cross-sectional descriptive study done by (Salem, 2019) in Saudi Arabia disagreement with present results reveals that more items of hand hygiene were poor level.

(Table (4-3-2): The findings showed that more than half (55.1%) of nurses-midwives were a poor level of practice related to hand hygiene. This inadequate hand hygiene practice could be due to forgetfulness, a lack of knowledge of rules, a lack of time, a heavy workload, skin discomfort from hand hygiene agents or latex gloves, and a low risk of TORCH infection from patients. A study done by (Salem, 2019) in Saudi Arabia disagreed with the present results were reported a poor level of midwives' practices toward hand hygiene.

(Table (4-3.3): The results revealed that the nurse-midwives practice related to personal protective equipment was the poor level of at all items. A cross-sectional descriptive study done by (Salem, 2019) in Saudi Arabia disagrees with present results reveal that more items of personal protective equipment were poor level.

(Table (4-3-4): The results showed that less than two third of nurses-midwives were a poor level of practice related to personal protective equipment. Many nurse-midwives may feel gloves, face masks, and gowns prevent their skillful performance of duties particularly in conditions that call for direct intervention, as well as most personal protective equipment unavailable within the workplace.

(Table (4-3.5): The results showed that the nurse-midwives practice related to environmental hygiene was poor level at all items, therefore in Table (4-3-6) the findings were demonstrated that the less than

two-thirds of nurses-midwives were the poor level of practice related to environment Hygiene. A cross-sectional descriptive study done by (Salem, 2019) in Saudi Arabia disagreed with the present results who stated that more items of environment cleanliness were good level.

### **5.3.1 Overall Evaluation of Nurses-midwives Practice Concerning Preventive Measures of TORCH Diseases (Table (4-3-7)):**

The present results were revealed that less than two third of the nurse-midwives had poor practices as reported, the poor level of practices is an answer to the research question, what is the level of practices for nurse-midwives as mentioned in the chapter one (introduction). The results were in agreement with (Salem, 2019) who reported that most nurse-midwives had poor practice. This poor level of practice is due to the lack of monitoring authorities over their work, in addition to the lack of medical equipment in the workplace.

### **5.4. Relationship between Nurses-midwives Knowledge and their Demographic Characteristics (Table (4.4)):**

The results were demonstrated that a non-significant relationship between knowledge and age of nurse-midwives ( $p\text{-value} < 0.05$ ). As evidenced by the lack of a relationship between midwifery knowledge and age, knowledge is unaffected by age. A descriptive design study done by (Latha *et al.*, 2020) in Villupuram district/ India agreement with present results which state that non-significant relationship between knowledge and age of the sample, another study done by (Elnashar *et al.*, 2019) in Saudi Arabia supported the present findings that stated a significant relationship between knowledge and age of the sample so that this result agree with a study conducted by (Pereboom *et al.*, 2013) who stated that highly significant between knowledge and age of the sample.

As well the results showed that a relationship between knowledge and level of education of nurse-midwives were significant at (p-

value  $<0.01$ ). That is means rejecting the null hypothesis and accepting the alternative hypothesis as mentioned in chapter one (introduction). This great difference in the educational level of midwives and its impact on the extent of increased knowledge, and is evident through the existence of a relationship between the knowledge and educational level of midwives, in addition, however, the educational level of nurse-midwives is very important in knowing the risk when dealing with pregnant women who have a TORCH disease. A descriptive design study done by (Latha *et al.*, 2020) in Villupuram district/India disagreement with the present results which state that non-significant relationship between knowledge and level of education of the sample, another study done by (Elnashar *et al.*, 2019) in Saudi Arabia which supported the present findings that stated a significant relationship between knowledge and level of education of the sample, as well as this finding reinforced by a study conducted by (Pereboom *et al.*, 2013) they stated that highly significant relationship between knowledge and level of education of the sample at p-value ( $< 0.05$ )

Concerning marital status, there is a non-significant relationship between knowledge and marital status of the study sample (p-value  $>0.05$ ). The knowledge of midwives does not depend on their marital status. (Elnashar *et al.*, 2019) in Saudi Arabia disagree with the current findings, stating that marital status had no significant relationship with knowledge.

The present results were illustrated that there is no significant relationship between knowledge and workplace of the study sample (p-value  $>0.05$ ). Nurse-midwives knowledge is unaffected by where they work in the hospital, as they will have it regardless of whatever department they work in. (Hammod & Khairi, 2017) conducted a descriptive-analytic study design among nurse-midwives in Baghdad, Iraq, which concluded that there was no significant relationship between knowledge and workplace of nurse-midwives. Another study disagreement

with the present results conducted by (Mursy & Mohamed, 2019) who stated that a relationship between the workplace and level of knowledge was significant.

Regarding the work shift of the nurse-midwives, there is a non-significant relationship between knowledge and work shift of the sample ( $p\text{-value} > 0.05$ ). The information provided by the midwives on the evening shift is identical to that provided on the morning shift because the majority of them worked on the morning shift before being transferred to the evening shift. A study agreement with present results conducted by (Elnashar et al., 2019) who reported that no significant relationship between knowledge and working shift of nurse-midwives,

The findings were demonstrated that there is a significant relationship among knowledge and years of experience of nurse-midwives ( $p\text{-value} < 0.05$ ). That is, as discussed in chapter one (introduction), rejecting the null hypothesis and accepting the alternative hypothesis (introduction). Years of experience enhance the level of knowledge of nurse-midwives, in addition, years of experience enable the midwives to decide whether to act in the absence of a specialist obstetrician physician. This is based on disagreement and is not supported by a study conducted among nurse-midwives by (Mursy & Mohamed, 2019), which found no significant relationship between nurse-midwives, not knowledge and experience, and a study conducted in Iran by (Joukar *et al.*, 2017), which found no significant relationship between nurse-midwives knowledge and years of experience.

The present results were illustrated that there is a significant relationship between knowledge and training courses of nurse-midwives about TORCH diseases ( $p\text{-value} < 0.05$ ). Education courses about TORCHs diseases and how to prevent them play a key role in enhancing knowledge for nurse-midwives, whether inside or outside the hospital. These findings are inconsistent with a study conducted by (Hamood and Khairi,

2017), which found no significant relationship between TORCH illness knowledge and training courses.

The findings were illustrated that there is no significant relationship among knowledge of nurse midwives and source of information of TORCH diseases ( $p\text{-value} > 0.01$ ). Various sources of information play a major role in acquiring knowledge for midwives to prevent TORCH diseases but in this case, no relationship affected on level of knowledge. These findings agreed with a study done by (Joukar et al., 2017) in Iran which stated that no significant relationship between nurse-midwives knowledge and source of information of TORCH diseases.

### **5.5 Association between Nurses-midwives Practice and their Demographic Characteristics (Table (4.5)):**

The results were illustrated that there is a significant association between practices and the age of the sample ( $p\text{-value} < 0.05$ ). The increase in age has an impact on the practices, and research suggests that a large percentage of the sample is made up of young nurse-midwives. A study done by (Pereboom *et al.*, 2013) disagreement with the present result who stated that no significant relationship between practices and age of the sample at  $p\text{-value}$  more than (0.05), the results of the present study consistent with a study among nurses done by (Salem, 2019) who stated that significant association between practices and age of the nurse at  $p\text{-value} < 0.05$ .

The present findings illustrated that there is a no-significant association between practices and the level of education of the sample ( $p\text{-value} > 0.05$ ). As stated in chapter one(introduction), this entails accepted the null hypothesis and rejected the alternative hypothesis. (Pereboom *et al.*, 2013) conducted a study that confirmed the current findings, stating that there was no significant association between practices and the sample's level of education at a  $p\text{-value}$  greater than 0.05. The findings of this study differ from those of (Salem, 2019), who found a

significant association between nurse practices and amount of education at a p-value of 0.05 in a survey of nurses.

The results were demonstrated that there is no significant association between practices and marital status of the study ( $p\text{-value} > 0.05$ ). A study by (Gebrecherkos *et al.*, 2020), which found a highly significant association between practices and married status of the sample at a p. value less than 0.05, contradicts this conclusion. (Al-Abd *et al.*, 2020) established no significant association between practices and the married status of the sample at a p-value  $> 0.05$ , which agrees with the current result.

Regarding the workplace of nurse-midwives, the results were demonstrated that there is no significant association between practices and the workplace of nurse-midwives ( $p\text{-value} > 0.05$ ). The workplace in the hospital has little effect on nurse-midwives' practices in terms of TORCH illness prevention. The findings of the present study disagreement with a study between nurses done by (Salem, 2019) who reported a significant association between practices and place of work of the sample at p value  $< 0.05$ .

Concerning the work shift of nurse-midwives, the findings were demonstrated that there is a no-significant association between nurse-midwives' practices and work shift ( $p\text{-value} > 0.05$ ), from this we concluded that working in the morning shift or the evening shift does not affect the improvement of practices towards methods of preventing TORCH disease. A study in Brazil agreement with present findings conducted by (Rodrigues & Domingues, 2017) stated that no significant association between practices and work shift

The findings were illustrated that there is a significant association between practices and midwives' years of experience ( $p\text{-value} < 0.05$ ). Rejecting the null hypothesis and accepting the alternative hypothesis, as mentioned in chapter one (introduction), means that practices are influenced by the number of years of experience. The result of the present

study agreement with a study among nurses conducted by (Salem, 2019) who stated a significant association between practices and years' experience of the nurse at  $p < 0.05$ . Another study disagreement with the present finding done by (Mursy & Mohamed, 2019) reported that no significant association between practices and experience of the sample.

The findings were illustrated that there is no significant association between practices and training courses about TORCH diseases ( $p\text{-value} < 0.05$ ). Accepting the null hypothesis while rejecting the alternative hypothesis is what this entails, practices are improving by increasing training sessions on how to prevent TORCH diseases. The result of the present study disagreed with a study among nurses conducted by (Salem, 2019) who stated a significant association between practices and training courses of the nurse at a  $p < 0.05$ . The present findings are in agreement with those of a study done by (Santos *et al.*, 2017), which found no significant association between the sample's practices and training courses.

The present results were illustrated that there is a no-significant association between practices and source of knowledge of TORCH diseases ( $p\text{-value} > 0.05$ ). That is, accepted the null hypothesis and rejected the alternative hypothesis, which suggests that sources of information about TORCH disorders, whether from the workplace or elsewhere, have no effect on midwives' practices regarding prevention methods for these diseases. A study agreement with the present result conducted by (Salem, 2019) who stated that no significant association between practices and source of information.

### **5.6. Association between Practice and Knowledge of Nurses-midwives (Table (4-6)):**

The results were showed that a association between nurse-midwives knowledge and practices was significant at a  $p$ -value less than (0.05), rejected the "null hypothesis" that there is no significant

association between practices and their knowledge of nurse-midwives, so the observed chi-square is more than the critical chi-square, so the “alternative hypothesis” was accepted. This means that the more nurse-midwives know about TORCH diseases, the more they become aware of the practices of preventing measures of these diseases in the work. The present results disagree with a study among nurses done by (Salem, 2019) who reported that no significant association between the knowledge and practices of nurses, careless to the importance of infection prevention and good health practices, the result could be misinterpreted, while a study supported this result done by (Andiappan *et al.*, 2014) stated that significant association between knowledge and practices.

### **5.7. Correlation between Nurses-midwives Knowledge and Practices Table (4-7):**

The study results were illustrated a positive significant correlation between knowledge and practices. This means that the increase in knowledge leads to an increase the practices and this is clear from the positive relationship between them.

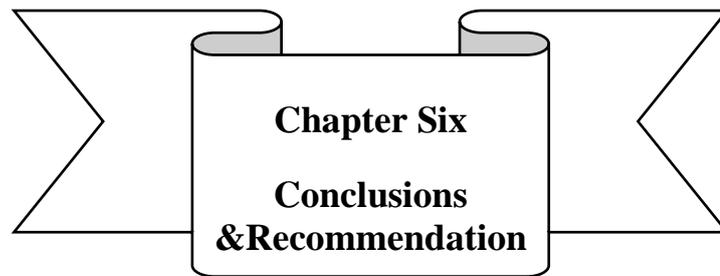
#### **The point of researcher’s view:**

The researcher choices to study about TORCH diseases because they are very common, causing morbidity and mortality for pregnant women, and nurse-midwives need to know about these diseases and how to use preventive measures when dealing with pregnant women while working in the delivery room, in the maternal emergency ward, and other places of work in the hospital, and how, through their knowledge of TORCH diseases, they play an important role in educating pregnant women on how to prevent and treat them in case of infection.

The knowledge of nurse-midwives on toxoplasmosis, as well as the lack of information offered to pregnant women throughout prenatal primary care, were assessed and reflected in this study. The

necessity of good nurse consultation was also underlined. As a result, there is a growing demand for tests, educational activities, and other vital components in illness prevention.

Unfortunately, it was discovered that several nurse-midwives were unaware of the parasite infection and hence failed to provide enough information to antenatal mothers. As a result, nurse-midwives must be educated on toxoplasmosis knowledge and practice. The researcher thought these gaps were because of the lack of knowledge and practice in the curriculum. And they must, of course, attend the private clinics.



## **6.1 Conclusions:**

The following conclusions are drawn from the current study's data analysis, discussion, and critical interpretation of such findings:

1. The study concluded that the nurses' midwives' knowledge of toxoplasmosis, syphilis, and rubella diseases were moderate. While expressing knowledge related to chickenpox, cytomegalovirus, and herpes simplex virus diseases, nurses-midwives express a poor level of knowledge.
2. After assessing the knowledge and practices toward preventive measures in Babil teaching hospital for maternity and children and Al-amam Al-Sadeq teaching hospital, the findings revealed that there was a moderate level of knowledge and poor level of nurse-midwives' practices regarding preventive measures of TORCH diseases.
3. A significant association was found between knowledge and level of education, training courses in TORCH diseases, and years of experience of nurse-midwives.
4. Furthermore, the study found a significant association between practices and the age and years of experience of nurse-midwives. The study also concludes that there is a significant association between knowledge and practices of nurse-midwives.

## **6.2 Recommendations:**

Based on the study's findings and conclusions, the following recommendations are made:

### **To Ministry of Health need to: -**

1. Collaboration with the Ministry of Education to conduct lectures to secondary school students of both genders to increase knowledge about TORCH diseases.
2. Training courses about preventive measures for TORCH diseases for nurse-midwives as they are one of the main sources for the public to get information about diseases with the most current information.
3. Focusing on the curriculum of nursing and midwifery schools to highlight the TORCH diseases and their severity.
4. Increasing the awareness of pregnant women in obstetrics and gynecology clinics through the mass media about what TORCH diseases are and how they can be avoided.
5. Workshop to best practices guidelines for nurse-midwives on how to deal with TORCH diseases.
6. Training courses about TORCH infection for nurses worked in maternal child care in primary health care center.
7. Further research with the listing of TORCH diseases within the Ministry of Health research list.

## References

القران الكريم (سورة الرعد, الاية 17)

- Alligood, M.R. (2013). *Nursing theory: Utilization and application (Fifth edition.)*. Elsevier Inc. Printed in the United States. P. 9-10, 17, 18, 22.
- Andiappan, H., Nissapatom, V., Sawangjaroen, N., Khaing, SL., Salibay, C.C., Cheung, M.M.M., Dungca, J.Z., Chemoh, W., Teng, C.X., Lau, YL., & Adenan, N.A.M. (2014, June 11). Knowledge and practice on Toxoplasmosis infection in pregnant women from Malaysia, Philippines, and Thailand. *Frontiers in Microbiology, volume 5*, article 29. Doi: 10.3389/fmicb.2014.00291.
- AL-Abd, N.M., Alshakka, M., Alshotarl, S., Shankar, P.R., Ibrahim, M.I.M. (2020, May). Knowledge, attitudes, and practices regarding Rubella infection among preparatory year students: A preliminary exploratory study in Aden, Yemen. *Journal of clinical and diagnostic research, vol-14(5)*. LC01-LC05.DOI: 10.7860/JCDR/2020/44077.13681.
- Amsalu, A., Ferede, G., & Assegu, D. (2018). High seroprevalence of syphilis infection among pregnant women in Yiregalem Hospital Southern Ethiopia. *BMC infectious diseases, 18:109*; <https://doi.org/10.1186/s12879-018-2998-8>.
- Aljumailia, Z.K.M., Alsamaraic, A.M., & Najemea, W.S. (2014, August 10). Cytomegalovirus seroprevalence in women with bad obstetric history in Kirkuk, Iraq. *Journal of infection and public health, 7*, 277—288. <http://dx.doi.org/10.1016/j.jiph.2013.08.006>.
- Al-Rubaye, A., Tariq, Z., & Alrubaiy, L. (2016). Prevalence of hepatitis B seromarkers and hepatitis C antibodies in blood donors in Basra, Iraq. *BMJ Open Gastroenterology, 3*: e000067. doi:10.1136/bmjgast-2015-000067. Published by group.bmj.com.

- AL-Aaraje, H.M.H., & AL-Khilkhali, H.J.B. (2020). Investigation of cytokines and herpes simplex virus in recurrent abortion in pregnant women. *Eurasian Journal of biosciences, Volume 14, Issue 2*, pp.2613-2624.
- Alsamarai, A.M., & Aljimaili, Z.K.M. (2013, October 4). Seroepidemiology of toxoplasmosis, rubella, cytomegalovirus, and herpes simplex virus-2 in women with bad obstetric history. *Our Dermatol Online, 4(4):522-535*. DOI: 10.7241/ourd.20134.135.
- Abbas, I.M., & Hasan, R.T. (2016, February). Assessment of university students' knowledge's concerning German measles and its effect on pregnancy and its outcomes. *Journal of nursing and health science, volume 5, Issue 1 Ver. II. PP 63-68*. www. Iosrjournals.org.
- Al-Turab, M., & Chehadeh, W. (2018, Apr 26). Varicella infection in the middle east: prevalence, complications, and vaccination. *Journal of research in medical sciences: the official journal of Isfahan University of Medical Sciences, 23:19*. doi: 10.4103/jrms.JRMS\_979\_17.
- Al-Hellaly, E.M., & Chyad, R.T. (2019, July 30). Knowledge of Iraqi pregnant women about toxoplasmosis and their practice towards its prevention. *Journal of the University of Babylon for pure and applied sciences, Vol. (27), No. (3)*. 308-315.
- Bakre, H.M. (2016). Serological tests and polymerase chain reaction for detection of *Toxoplasma gondii* infection in women attending for premarital examination. *Zanco journal of medical sciences, Vol. 20, No. (3)*.
- Bibbins-Domingo, K., Grossman, D.C., Curry, S.J., Davidson, K.W., Epling, J.W., & García, F.A. (2016, December 20). Serologic screening for genital herpes infection: us preventive services task force recommendation statement. *Jama, 316 (23): 2525–2530*. doi:10.1001/jama.2016.16776. PMID 27997659.

- Bouthry, E., Picone, O., Hamdi, G., Grangeot-Keros, L., Ayoubi, J.M., & Vauloup-Fellous, C. (2014, September 16). Rubella and pregnancy: diagnosis, management and outcomes. *Prenatal diagnosis*, 34(13), 1246-1253. DOI: 10.1002/pd.4467. [PubMed].
- Bruminhent, J., & Razonable, R.R. (2014, Jun 27). Management of cytomegalovirus infection and disease in liver transplant recipients. *World journal hepatology*, v 6(6). 370–383. DOI: 10.4254/wjh. v6. i6.370.
- Camila Padovani, C., de Oliveira, R.R., Pelloso, S.M. (2018). Syphilis in during pregnancy: association of maternal and perinatal characteristics in a region of southern Brazil. *Revista latino-americana de enfermagem*, 26: e3019.
- Chiopris, G., Veronese, P., Cusenza, F. Procaccianti, M., Perrone, S., Daccò, V., Colombo, C., & Esposito, S. (2020, October 1). Congenital cytomegalovirus infection: Update on diagnosis and treatment. *Microorganisms*, 8, 1516. doi:10.3390/microorganisms8101516.
- Chisanga, C.P. (2017). Knowledge, attitudes, and practices of nurses in infection prevention and control within a tertiary hospital in Zambia (a master thesis). Faculty of Medicine and Health Sciences, Stellenbosch University.
- Chung, M.H., Shin, C.O., & Lee, J. (2018). TORCH (toxoplasmosis, rubella, cytomegalovirus, and herpes simplex virus) screening of small for gestational age and intrauterine growth-restricted neonates: efficacy study in a single Institute in Korea. *Korean journal Pediatrics*, 61(4):114-120.
- Clement, M.E., Okeke, N.L., & Hicks, C.B. (2014, Nov 12). Treatment of syphilis: a systematic review. *Jama*, 312(18):1905-17. DOI: 10.1001/jama.2014.13259. [PubMed PMID: 25387188].

- Crimi, S., Fiorillo, L., Bianchi, A., D'Amico, C., Amoroso, G., Gorassini, F., Mastroieni, R., Marino, S., Scoglio, C., Catalano, F., Campagna, P., Bocchieri, S., De Stefano, R., Fiorillo, M.T., & Cicciù, M. (2019, May 21). Herpes virus, oral clinical signs and Qol: Systematic review of recent data. *Viruses*, *11*, 463; doi:10.3390/v11050463.
- Davies, J., Littlejohn, M., Locarnini, S. A., Whiting, S., Hajkovicz, K., Cowie, B. C., ... & Davis, J. S. (2013, February 22). The molecular epidemiology of hepatitis B in the Indigenous people of northern Australia. *Journal of gastroenterology and hepatology*, *28*(7), 1234-1241. doi:10.1111/jgh.12177. PMID 23432545. S2CID 5208526.
- Davidson, M., London, M., & Ladewig, P. (2019). *Olds' maternal-newborn nursing & women's health across the lifespan (11th Edition.)*. Pearson Education, Inc, Printed in the United States of America. P.486, 487. Retrieved from <https://www.amazon.com/Maternal-Newborn-Nursing-Womens-Health-Lifespan/dp/013520688X>. Accessed on 18 August 2021.
- Davidson, M., London, M., & Ladewig, P. (2015). *Olds' maternal-newborn nursing & women's health across the lifespan (10th Edition.)*. Pearson Education, Inc, Printed in the United States of America. P.488, 492.
- Danielle Carvalho Rodrigues, D.C., & Domingues, R.M.S.M. (2017). Management of syphilis in pregnancy: Knowledge and practices of health care providers and barriers to the control of disease in Teresina, Brazil. *The International journal of health planning and management*, *33*(2), 329-344.
- Darweesh, N.H., Hussein, R.A., Salman, S.T., & Shaker, M. J. (2018). Immunological and molecular study of toxoplasma gondii from aborted women in Diyala / Iraq. *Scientific journal of medical research*, Vol. 2, Issue 6, pp 75-82.

- Döskaya, M., Caner, A., Can, H., Iz, S. G., Gedik, Y., & Döskaya, A. D. (2014). Diagnostic value of a Rec-ELISA using *Toxoplasma gondii* recombinant sporoSAG, BAG1, and GRA1 proteins in murine models infected orally with tissue cysts and oocysts. *PloS one*, 9(9), e108329. DOI: 10.1371/journal.pone.0108329.
- Devi, A.M., Kaur, J., Swami, I., Sehrawat, H., & Sharma, S. (2018, July). Knowledge regarding TORCH infection among women between rural and urban area: a comparative study. *Global Journal for research analysis*, volume-7, issue-7. Print ISSN No 2277 – 8160.
- Davey, M. (2018, October 31). Rubella's elimination from Australia 'shows vaccinations work'. *The Guardian*.
- Diener, M.L., Shi, K., and Park, A.H. (2020, March). A Cross-sectional study of caregiver perceptions of congenital cytomegalovirus infection: knowledge and attitudes about screening. *The journal of pediatrics*, Volume 218. www.jpeds.com.
- Ella, R.E., Samson-Akpan, P.E., & Akpabio, I.I. (2016). Knowledge and practice for prevention of hepatitis B among practicing midwives in the university of Calabar teaching hospital, Calabar Nigeria. *Journal of nursing and health science (IOSR-JNHS)*, Volume 5, Issue 3 Ver. III, PP 94-100.
- Elnashar, M.A., Aref, N.K.H., Ruba G. Qadi, R.G., Al-kabi, A.A., & ALMathami, J.A. (2019, December 1). Awareness and knowledge of congenital infections TORCH among women and health care providers in Al Taif Area Saudi Arabia. *World family medicine*, 17(12): 82-90. DOI: 10.5742/MEWFM.2019.93714.
- Gebrecherkos, T., Girmay, G., Lemma, M., & Negash, M. (2020, January 15). Knowledge, attitude, and practice towards hepatitis B virus among

pregnant women attending antenatal care at the University of Gondar comprehensive specialized hospital, Northwest Ethiopia. *International Journal of hepatology*, Volume 2020, Article ID 5617603, 10 pages: <https://doi.org/10.1155/2020/5617603>.

George, J.B. (2014). *Nursing Theories: The base for professional nursing practice (Sixth Edition.)*. Pearson education limited. P. 67, 69, 70.

Gerlich, W.H. (2013). Medical virology of hepatitis B: how it began and where we are now. *Virology journal*, 10:239. <http://www.virologyj.com/content/10/1/239>.

Gershon, A.A., Breuer, J., Cohen, J.I., Cohrs, R.J., Gershon, M.D., Gilden, D., Grose, C., Hambleton, S., Kennedy, P.G.E., Oxman, M.N., Seward, J.F., & Yamanishi, K. (2015, July 2). Varicella-zoster virus infection. *Nature reviews disease primers*, 1 (1), 1-18. Columbia University College of Physicians and Surgeons, 630 West 168th Street, New York, New York 10032, USA.15016. DOI: 10.1038/nrdp.2015.16.

Grace, RB. C., & Onyeabara, C.N. (2016, May 12). Infection prevention and control lifesaving skills: practice among midwives in the University of Port Harcourt teaching hospital rivers state. *Obstetrics & Gynecology International Journal*, 4(4):145–149. DOI: 10.15406/ogij.2016.04.00119.

Griffiths, P., & Reeves, M. (2021, December). Pathogenesis of human cytomegalovirus in the immunocompromised host. *Nature reviews microbiology*, volume 19. 759-773. <https://doi.org/10.1038/s41579-021-00582-z>.

Grimes, J. A., Smith, L.A., & Fagerberg, K. (2013). *Sexually transmitted disease: an encyclopedia of diseases, prevention, treatment, and issues (1st edition.)*. Santa Barbara, California: Greenwood. p. 583. ISBN 978-1-4408-0134-1. Retrieved from <https://www.amazon.com/Sexually-Transmitted->

Disease-volumes-Encyclopedia/dp/1440801347. Accessed on 18 August 2021.

Hadi, H.S., Kadhim, R.A., & Al-Mammori, R.T.O. (2016). Seroepidemiological Aspects for Toxoplasma Gondii Infection in Women of Qadisiyah Province, Iraq. *International journal of pharmtech research*, Vol.9, No.11, pp 252-259.

Hussein, A.F., Dawood, A.H., Dawood, N.J., & Hussein, R.K. (2019). Seroprevalance of torch infection in pregnant women in Basra city Southern of Iraq. *Journal of global pharma technology*, Vol. 11, Issue 01 (Suppl.), 292-295.

Hover, S.S., & Bertke, A.S. (2017, June 27). Herpes simplex virus 1 and 2 educational assessment of young adults in rural southwest Virginia. In N.M. Sawtell (Ed.). Cincinnati Children's Hospital Medical Center, United States. *PLOS ONE*, 12(6): e0179969. <https://doi.org/10.1371/journal.pone.0179969>.

Hamood, H.I., & Khairi, S.H. (2017, July -August). Determination the outcomes of an instructional program on nurse/ midwife knowledge concerning genital warts in Al-Karhk maternity hospital at Baghdad city. *IOSR Journal of nursing and health science (IOSR-JNHS)* e-ISSN: 2320–1959.p- ISSN: 2320–1940 Volume 6, Issue 4; Ver. V., PP 58-63. [www.iosrjournals.org](http://www.iosrjournals.org).

Hu, Y., Chen, Y., Wang, Y., & Liang, H. (2017, September 24). Knowledge, attitude and practice of pregnant women towards varicella and their children's varicella vaccination: evidence from three Districts in Zhejiang Province, China. *International journal of environmental research and public health*, 14, 1110; doi:10.3390/ijerph14101110.

- Ibrahim, A. N. (2017). Impact of instructional intervention program upon women's biopsychosocial health status candidates' radiation therapy for breast cancer. Department of maternal and neonate nursing, College of Nursing- University of Baghdad.
- Ibrahim, W.H., Khalaf, F.R., Abdel Khalek, E.M. (2018, July 23). Educational program about Rubella among pregnant women attending antenatal clinic in Women's Health Hospital, Assiut University, Egypt. *Journal of nursing education and practice*, Vol. 8, No. 11. DOI: 10.5430/jnep.v8n11p111 URL: <https://doi.org/10.5430/jnep.v8n11p111>.
- Joukar, F., Mansour-Ghanaei, F., Naghipour, M.R., & Hasandokht, T. (2017, February 13). Nurses' knowledge toward Hepatitis B and Hepatitis C in Guilan, Iran. *The Open nursing journal*, volume 11, 34-42. Content list available at: [www.benthamopen.Com/TOYNURSJ/](http://www.benthamopen.Com/TOYNURSJ/).
- Jeon, J., Victor, M., Adler, S.P. Arwady, A., Demmler, G., Fowler, K., Goldfarb, J., Keyserling, H., Massoudi, M., Richards, K., Staras, S.A.S., and Cannon, M.J. (2006, September 13). Knowledge and awareness of congenital cytomegalovirus among women. *Infectious diseases in obstetrics and gynecology*, Volume 2006, Article ID 80383, Pages 1–7. DOI 10.1155/IDOG/2006/80383.
- Jacobsen, A. (2014, February 11). Operation paperclip: The secret intelligence program that brought Nazi scientists to America. p. 6. ISBN 978-0-316-22104-7. Retrieved from <https://www.amazon.com/Operation-Paperclip-Intelligence-Program-Scientists/dp/031622104X>. Accessed on 19 August 2021.
- Jaishankar, D., & Shukla, D. (2016, September). Genital herpes: insights into sexually transmitted infectious disease. *Microbial Cell*, Vol. 3 No. 9. doi: 10.15698/mic2016.09.528.

- Kenny, L.C., & Myers, J.E. (2017). *Obstetrics by ten teachers (20th edition.)*. CRC Press, Taylor & Francis Group. P.P. 331, 333, 334,337, 355-556.
- Khalil, M.A., Obaid, A., & Lafi, S.A. (2020). Incidence of chickenpox in the lacking of universal childhood vaccination during a period 2009-2018 in Anbar province Iraq. *The 8th International Conference on Applied Science and Technology (ICAST 2020)*, AIP Conference Proceedings 2290, 020011.
- Kimberlin, D.W., Lin, C.Y., & Jacobs, R.F. (2001, August). Safety and efficacy of high-dose intravenous acyclovir in the management of neonatal herpes simplex virus infections". *Pediatrics*. 108 (2): 230–38. doi:10.1542/peds.108.2.230. PMID 11483782.
- Konstantinovica, N., Gueganb, H., Stäjnera, T., Belazb, S., & Robert-Gangneux, F. (2019). Treatment of toxoplasmosis: current options and future perspectives. *Food and waterborne parasitology, Volume 15*, e00036. [Elsevier].
- Krishna, B.A., Wills, M.R., & Sinclair, J.H. (2019, October 3). Advances in the treatment of cytomegalovirus. *British medical bulletin, Vol. 131*: 5–17. Published by Oxford University Press. doi: 10.1093/bmb/ldz031.
- Laboudi, M., Hamou, S.A., Mansour, I., Hilmi, I., & Sadak, A. (2020). The first report of the evaluation of the knowledge regarding toxoplasmosis among health professionals in Public Health Centers in Rabat, Morocco. *Tropical medicine and health*, 48(1), 1-8. Available at <https://doi.org/10.1186/s41182-020-00208-9>
- Lambert, N., Strebel, P., Orenstein, W., Icenogle, J., & Poland, G.A. (2015). Rubella. *Lancet*, 385 (9984): 2297–2307. doi:10.1016/S0140-6736(14)60539-0. ISSN 0140-6736. PMC 4514442. PMID 25576992. [PMC free article] [PubMed].

- Latha, P., Karthi, R., R.Karvendhan, R., Kanchana, S., Kanimozhi, M., Jayasankari, M., Kavinila, M., Kowsalya, K., & Kowsalya, S. (2020, December). Assess the knowledge on torch infection among antenatal mothers at selected antenatal clinics in Villupuram District with a view to develop an information booklet regarding TORCH infection. *Galore international journal of health sciences and research, Vol.5; Issue: 4*. Website: [www.gijhsr.com](http://www.gijhsr.com).
- Lazim, H.H., & Kadhim, H.S. (2018). Review of seroprevalence of human cytomegalovirus in Iraq. *Journal of microbiology & experimentation, Volume 6, Issue 2*.
- Lazzarotto, T., Blázquez-Gamero, D., Marie-Luce Delforge, ML., Foulon, I., Luck, S., Modrow, S., & Leruez-Ville, M. (2020). Congenital cytomegalovirus infection: a narrative review of the issues in screening and management from a panel of European experts. *Frontiers in pediatrics, 8:13*. DOI: 10.3389/fped.2020.00013.
- Le Cleach, L., Trinquart, L., Do, G., Maruani, A., Lebrun-Vignes, B., Ravaud, P., & Chosidow, O. (2014, August 3). Oral antiviral therapy for prevention of genital herpes outbreaks in immunocompetent and nonpregnant patients. *Cochrane Database of Systematic Reviews 8 (8): CD009036*. DOI: 10.1002/14651858.CD009036.pub2. PMID 25086573.
- Lee-Ellen, C. C., & Jacquelyn, L. B. (2017). *Pathophysiology (6th Edition.)*. Printed in China. Elsevier Inc, Saunders. P. 768.
- Leung, A. K. C., Hon, K.L., & Leong, K.F. (2015). Rubella (German measles) revisited. *Hong Kong med journal, 25(2):134-141*. [PubMed].
- Leung, K.K.Y., Yeung, A., Leung, A.K.C., & Man, E. (2020, April 2). Congenital infections in Hong Kong: An overview of TORCH. *Hong Kong medical journal, 26:127-38*.

- Liu, Q., Wang, Z. D., Huang, S. Y., & Zhu, X. Q. (2015). Diagnosis of toxoplasmosis and typing of *Toxoplasma gondii*. *Parasites & Vectors*, 8(1), 1-14. DOI: 10.1186/s13071-015-0902-6.
- Mahfouz, M.S., Elmahdy, M., Bahir, A., Mobarki, Y.M., Altalhi, A.A., Barkat, N.A., AlEsaa. H.A., Ageely, A.H., Faqeeh, N.A., Areeshi, N.A., Al-Hassan, S.M. (2019). Knowledge and attitude regarding toxoplasmosis among Jazan university female students. *Saudi journal medicine and medical sciences*, 7: 28-32. Published by Wolters Kluwer-Medknow.
- Malewezi, B., Omer, S.B., Mwangomba, B., & Araru, T. (2016). Protecting health workers from nosocomial hepatitis b infections: a review of strategies and challenges for implementation of hepatitis B vaccination among health workers in Sub-Saharan Africa. *Journal of epidemiology and global health*, 6(4), 229-241.
- Mali, A., & Giri, P. (2018). A Mini review on rubella virus. *Acta Scientific medical sciences*, Volume 2 Issue 9.
- Marangi, L., Mirinaviciute, G., Flem, E., Tomba, G.S., Giorgio Guzzetta, G., de Blasio, B.F., & Manfred, P. (2017). The natural history of varicella-zoster virus infection in Norway: further insights on exogenous boosting and progressive immunity to herpes zoster. *PLOS ONE*. Retrieved from <https://doi.org/10.1371/journal.pone.0176845>.
- Martí-Carreras, J., & Maes, P. (2019, January 2). Human cytomegalovirus genomics and transcriptomics through the lens of next-generation sequencing: revision and future challenges. *Virus Genes*, 55 (2): 138–164. doi:10.1007/s11262-018-1627-3. PMC 6458973. PMID 30604286.
- Mary, J.O., & Groves, M.D. (2016). Genital herpes: A Review. *American family physician*, Volume 93, Number 11.

- Mattei, P.L., Beachkofsky, T.M., Gilson, R.T., & Wisco, O.J. (2012, September 1). Syphilis: a reemerging infection. *American family physician*. [PubMed PMID: 22963062].
- McLean, H.Q., Fiebelkorn, A.P., & Temte, J.L. (2013). Prevention of measles, rubella, congenital rubella syndrome, and mumps, 2013: summary recommendations of the Advisory Committee on Immunization Practices (ACIP). *Recommendations and Reports*, 62:1–34.
- McNeil, J., Donald, G. (2015). Rubella Has Been Eliminated from the Americas, Health Officials Say. *The New York Times*, 7.
- Mercy, M. (2018, September). Effectiveness of STP on knowledge regarding prevention of “torch” infections during pregnancy among antenatal mothers in a selected hospital at Kurnool. *Journal of nursing practice and education*, Vol. 4, Issue 3, pp. 50 – 53. ISSN No. 2395-1974.
- Mishra, P., Banerjee, P., & Gosain, H. (2014). Study of health care associated infections (HAIs). Retrieved from: [https://www.semanticscholar.org/paper/Study-of-Healthcare-Associated-Infections-\(HAIs\)-Mishra-Banerjee/.66fb85e7bc558d0d7c4e8725a1bebd424f13411](https://www.semanticscholar.org/paper/Study-of-Healthcare-Associated-Infections-(HAIs)-Mishra-Banerjee/.66fb85e7bc558d0d7c4e8725a1bebd424f13411). Accessed on 20 October 2021.
- Mohamed, K. (2020). Toxoplasmosis in humans and animals in Saudi Arabia: a systematic review. *The Journal of infection in developing countries*, 14(8):800-811. doi:10.3855/jidc.12648.
- Mohammed, R.A., & Kokaz, M.T. (2019, September 26). Rubella virus seroprevalence and associated factors in pregnant women with and without previous spontaneous abortion. *Medical journal of Babylon*, 16:243-7. Published by Wolters Kluwer – Med know. DOI: 10.4103/MJBL.MJBL\_43\_19.

- Mohammed, R.A., & Kokaz, T. (2020). Rubella virus seroprevalence and associated factors in pregnant women with and without previous spontaneous abortion. *Medical journal of Babylon*, 16:243-7.
- Mose, J.M., Kagira, J.M., Kamau, D.M., Maina, N.W., Ngotho, M., & Karanja, S.M. (2020, July 7). A review on the present advances on studies of toxoplasmosis in Eastern Africa. In P.P. Egeghy (Ed.). Academic Editor. *BioMed research international*, Volume 2020, Article ID 7135268, 12 pages. <https://doi.org/10.1155/2020/7135268>.
- Moura, I.P.S., Ferreira, I.P., Pontes, A.N., Bichara, C.N.C. (2019). Toxoplasmosis knowledge and preventive behavior among pregnant women in the city of Imeratriz, Maranhao, Brazil. *Ciencia & Saude Coletiva*, 24 (10):3933-3946. DOI:10.1590/1413-812320182410.21702017.
- Mursy, S.M.E.M., & Mohamed, S.O.O. (2019). Knowledge, attitude, and practice towards Hepatitis B infection among nurses and midwives in two maternity hospitals in Khartoum, Sudan. *BMC public health*, 19: 1597. <https://doi.org/10.1186/s12889-019-7982-8>.
- Muzeya, F. (2015, June 29). *Knowledge, attitudes and practices of nurse-midwives related to obstetric care at Thaba-Tseka district in Lesotho*. Master degree thesis of public health, university of south Africa.
- Neu, N., Duchon, J., & Zachariah, P. (2015). TORCH infections. *Clinics in perinatology*, 42, 77–103. Elsevier Inc.
- Nnko, S., Changalucha, J., Mosha, J., Bunga, C., Wamoyi, J., Peeling, R., & David Mabey, D. (2016). Perceptions, attitude and uptake of rapid syphilis testing services in antenatal clinics in North-Western Tanzania. *Health policy and planning*, 31(5), 667-673.

Nyatsanza, A.f., & Tipple, B.C. (2016). Syphilis: presentations in general medicine. *Clinical medicine, Vol 16*, No 2: 184–8. Royal College of Physicians 2016.

Obaid, H.M., & Juma, S.A. (2016, May 22). TORCH screening test in pregnant women Kirkuk City. *Al-Mustansiriyah Journal of Science, Vol. 27*, No 5. 17-25.

Oxford Learner's Dictionary. (2021). Definition of Preventive Measures. Retrieved from

<https://www.oxfordlearnersdictionaries.com/definition/english/preventive#:~:text=%E2%80%8Bintended%20to%20try%20to,problems%20or%20difficulties%20from%20happening>. Oxford University Press. Accessed on 20 April, 2021.

Oxford Learner's Dictionary. (2021). Definition of Practices. Retrieved from: <https://www.lexico.com/definition/practice>. Accessed on 18 August, 2021.

Oxford Learner's Dictionary. (2021). Definition of knowledge noun from the Oxford Advanced Learner's Dictionary. Retrieved from <https://www.oxfordlearnersdictionaries.com/definition/english/knowledge>. Oxford University Press. Accessed on 18 August, 2021.

Padovani, C., de Oliveira, R.R., & Pelloso, S.M. (2018). Syphilis in during pregnancy: association of maternal and perinatal characteristics in a region of Southern Brazil. *Rev. Latino-Americana de Enfermagem, 26*: e3019. DOI: 10.1590/1518-8345.2305.3019 [www.eerp.usp.br/rlae](http://www.eerp.usp.br/rlae).

Paraskevis & Dimitrios. (2013, February 7). Dating the origin and dispersal of hepatitis B virus infection in humans and primates. *Hepatology, 57*(3):908-16. doi:10.1002/hep.26079. PMID 22987324. S2CID 2593390.

- Pass, R.F., & Arav-Boger, R. (2018). Maternal and fetal cytomegalovirus infection: diagnosis, management, and prevention. *F1000Research*, 7:255 (doi: 10.12688/f1000research.12517.1).
- Peeling, R.W., Mabey, D., Kamb, M.L., Xiang-Sheng Chen, S., Radolf, J.D., & Benzaken, A.S. (2017). Syphilis. *Nature reviews disease primers*, volume 3. Article Number 17073 | 1.
- Pereboom, M.T.R., Manniën, J., Spelten, E.R., Hutton, E.K., & Schellevis, F.G. (2014, December). Maternal cytomegalovirus infection prevention: the role of Dutch primary care midwives. *Midwifery*, 30(12):1196-201. doi: 10.1016/j.midw.
- Pereboom, M.T.R., Manniën, J., Spelten, E.R., Schellevis, F.G., & Hutton, E.K. (2013). Observational study to assess pregnant women's knowledge and behavior to prevent toxoplasmosis, listeriosis and cytomegalovirus. *BMC pregnancy and childbirth*, 13:98.
- Polit, D.F., & Beck, C.T., (2018). *Essentials of nursing research appraising evidence of nursing practice (ninth edition.)*. Wolters Kluwer Health. Available at <https://lccn.loc.gov/2016043994>. Page 259, 355, 348, 349, 350,
- Poudyal, N., & Khanal, B. (2018, April 23). Seroprevalance of torch infection - A laboratory profile. *International Journal of Biomedical Research*, 09(04): 154-157. Journal DOI: <https://doi.org/10.7439/ijbr>.
- Pourmarzi, D., & Sharami, S.H. (2017, September). Midwives' educational needs and knowledge about sexually transmittable infections in the Islamic Republic of Iran. *Eastern Mediterranean health journal*, Vol. 23, No. 9. <https://doi.org/10.26719/2017.23.9.611>.
- Prasoon, K. R., Srinadh, B., Sunitha, T., Sujatha, M., Deepika, M. L. N., Vijaya Lakshmi, B., & Jyothy, A. (2014, October 29). Seroprevalence and

influence of torch infections in high-risk pregnant women: A large study from South India. *The Journal of Obstetrics and Gynecology of India*, 65(5):301–309. Federation of Obstetric & Gynecological Societies of India.

Punguyire, D., Mahama, E., Letsa, T., Akweongo, P., & Sarfo, B. (2015). Factors associated with syphilis screening uptake among pregnant women in health facilities in Brong Ahafo Region of Ghana. *Maternal health, neonatology, and perinatology*, 1:7.

Rajakumari, A. G., & Soli, T. K. (2015). Assess to evaluate the effectiveness of education Programme regarding Prevention of TORCH infections during pregnancy among Antenatal mothers. *International journal of advanced research*, volume 3, Issue 5, 234-241. Journal homepage: <http://www.journalijar.com>.

Rodrigues, D.C., & Domingues, R.M.S.M. (2017, August 30). Management of syphilis in pregnancy: Knowledge and practices of health care providers and barriers to the control of disease in Teresina, Brazil. *International journal of health planning and management*, 1–16. DOI: 10.1002/hpm.2463.

Royal College of Obstetricians & Gynecologists. (2015). Chickenpox in pregnancy. Green-top Guideline No. 13.

Salem, O.A. (2019, January-February). Knowledge and practices of nurses in infection prevention and control within a tertiary care hospital. *Annals of medical and health sciences research*, Volume 9: Issue 1. 422-425.

Santos, R.R. D., Niquini, R.P., Domingues, R.M.Z.M., Bastos, F.I. (2017, June 23). Knowledge and compliance in practices in diagnosis and treatment of syphilis in maternity hospitals in Teresina - PI, Brazil. *Revista brasileira de ginecologia e obstetricia*, 39:453–463. DOI [https://doi.org/ 10.1055/s-0037-1606245](https://doi.org/10.1055/s-0037-1606245). ISSN 0100-7203.

Sati, D.C., & Arya, R.K.K. (2019). History, manifestation and preventive measures for rubella in India: A review. *International journal of pharmaceutical sciences and research*, Vol. 10(11), 4844-4852.

Sauerbrei, A. (2016, December). Herpes genitalis: Diagnosis, treatment and prevention. *Geburtshilfe frauenheilkd*, 76(12): 1310–1317. doi: 10.1055/s-0042-116494.

Silbert- Flagg, J., & Pillitteri, A. (2018). *Maternal and child health nursing care of the childbearing and childrearing family (eighth edition.)*. Wolters Kluwer, Printed in China. p. 621, 1268, 1269.

Silva, L.B., Oliveira, R.DV.C., Silva, M.P., Bueno, W.F., Amendoeira, M.R., & Neves, E.DS. (2011, March 21). Knowledge of toxoplasmosis among doctors and nurses who provide prenatal care in an endemic region. *Infectious diseases in obstetrics and gynecology*, volume 2011, articles ID 750484, 6 pages. Doi:10.115/2011/750484.

Simon, S., & Kevin, S., (2020). "The Pox in Boswell's London: an estimate of the extent of syphilis infection in the metropolis in the 1770. *The Economic history review*, 74 (2): 372–399. doi:10.1111/ehr.13000. ISSN 1468-0289.

Singh, S. (2016, July-December). Congenital toxoplasmosis: Clinical features, outcomes, treatment, and prevention. *Tropical Parasitology*, 6 (2): 113–122. doi: 10.4103/2229-5070.190813. Retrieved from: <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5048697/> accessed on 9 December, 2021.

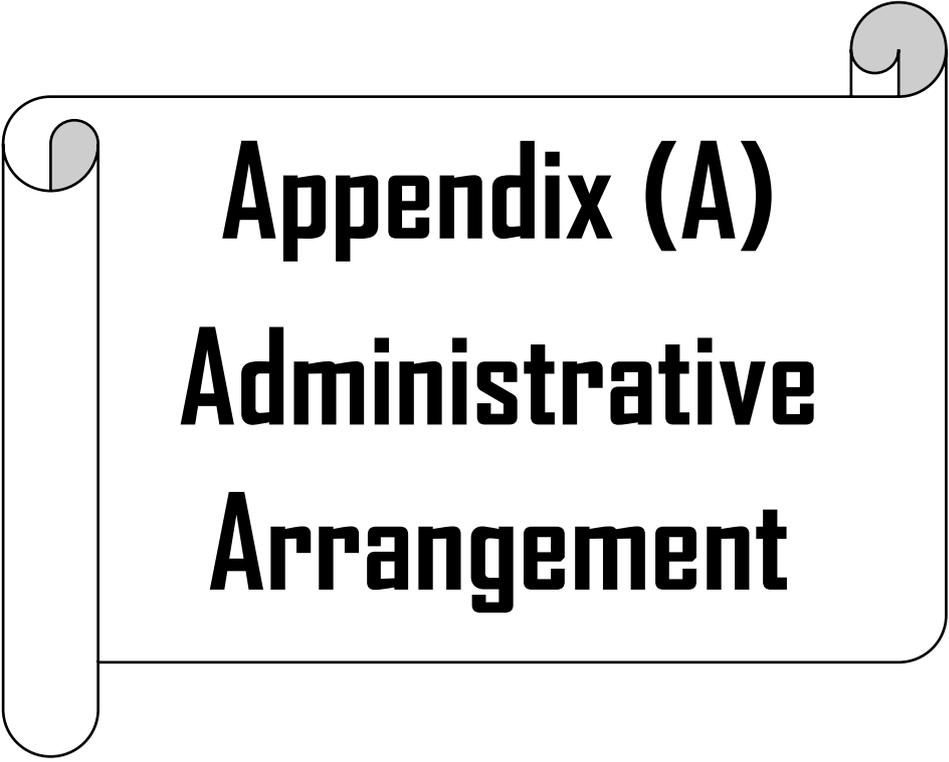
Smith, M.C., & Parker, M. E. (2015). *Nursing theories & nursing practice. (Fourth edition.)*. Davis Company, Printed in the United States of America. Page. 50-51.

- Spicknall <https://pubmed.ncbi.nlm.nih.gov/33492103/> - affiliation-1, I.H., Flagg, E.W., & Torrone, E.A. (2021, April). Estimates of the Prevalence and Incidence of Genital Herpes, United States, 2018. *Sexually transmitted disease*, 1;48(4):260-265. doi: 10.1097/OLQ.0000000000001375.
- Stephenson-Famy, A., & Gardella, C. (2014). Herpes simplex virus infection during pregnancy. *Obstetrics and gynecology clinics of north America*, 41(4):601-614.
- Stoltey, J.E., C & Cohen, S.E. (2015). Syphilis transmission: a review of the current evidence. *HHS Public Access*, 12 (2), 103–109. doi:10.1071/SH14174.
- Tampa & Mircea. (2014). Brief history of syphilis. *Journal of medicine and life*, 7 (1): 4–10. PMC 3956094. PMID 24653750.
- Tastad, K.J., Schleiss, M.R., Lammert, S.M., & Basta, N.E. (2019, August 26). Awareness of congenital cytomegalovirus and acceptance of maternal and newborn screening. In S. Gantt (Ed.). University of British Columbia, Canada. *Plos one*, 14(8): e0221725. <https://doi.org/10.1371/journal.pone.0221725>.
- Tipple, C., & Taylor, G.P. (2015, Feb). Syphilis testing, typing, and treatment follow-up: a new era for an old disease. *Current opinion in infectious diseases*, 28 (1):53-60. DOI: 10.1097/QCO.000000000000124 [PubMed PMID: 25485649].
- Weisheng Ho, E., Ereno, I.L., Ibrahim, M., & Yeo, C.L. (2012). Knowledge, attitudes, and practices regarding chickenpox disease and its prevention in Singapore: comparison between parents and medical students. *Proceeding of Singapore health care*, volume 2, Number 4. P. 257-246.

- Weiss, L. M., & Dubey, J.P. (2015). "Toxoplasmosis: a history of clinical observations". *International journal for parasitology*, 39 (8): 895–901. doi: 10.1016/j.ijpara.2009.02.004. PMC 2704023. PMID 19217908.
- Willame, A., Blanchard-Rohner, G., Combescure, C., Irion, O., Klara Posfay-Barbe, K., and de Tejada, B.M. (2015, September 15). Awareness of cytomegalovirus infection among pregnant women in Geneva, Switzerland: a cross-sectional study. *International journal of environmental research and public health*, 12, 15285–15297. doi:10.3390/ijerph121214982 [www.mdpi.com/journal/ijerph](http://www.mdpi.com/journal/ijerph).
- Wilson, C.B., Nizet, V., Maldonado, Y., Remington, J.S., & Klein, J.O. (2014). *Remington and Klein's infectious diseases of the fetus and newborn infant (8th ed.)*. Philadelphia: Elsevier Saunders; 513, 520-5, 675, 677-9, 685-90, 693-4, 729, 732. Retrieved from <https://www.elsevier.com/books/remington-and-kleins-infectious-diseases-of-the-fetus-and-newborn-infant/wilson/978-0-323-24147-2>. Accessed on 18 August 2021.
- World Health Organization. (2020). Nurses and midwives Critical for infection prevention and control. United Nations. Sustainable Development Goals. Decade of action. (<https://www.un.org/sustainabledevelopment/decade-of-action>, accessed 30 April 2020).
- Wu, X., Hong, F., Lan, L., Zhang, C., Feng, T., & Yang, Y. (2016). Poor awareness of syphilis prevention and treatment knowledge among six different populations in South China. *BMC public health*, 16:287. DOI 10.1186/s12889-016-2966-4. 2-7.

Yadav, R.K., Maity, S., Saha, S. (2014). A Review on torch: groups of congenital infection during pregnancy. *Journal of scientific and innovative research*, 3 (2): 258-264. Available online at: [www.jsirjournal.com](http://www.jsirjournal.com).

Ybañez, R.H.D., Ybañez, A.P., and Nishikawa, Y. (2020). Review on the current trends of toxoplasmosis serodiagnosis in humans. *Frontiers in Cellular and Infection Microbiology*, 10, 204.



**Appendix (A)**  
**Administrative**  
**Arrangement**

## Appendix (A)

University of Babylon  
College of Nursing  
Research Ethics Committee  
Issue No: 38  
Date: 16 /03/2021



جامعة بابل  
كلية التمريض  
لجنة اخلاقيات البحث العلمي

## Approval Letter

To,  
*Marwa Mohammed Abed Aljaleel*

The Research Ethics committee at the University of Babylon, College of Nursing has reviewed and discussed your application to conduct the research study entitled "Knowledge and Practices related to the preventive measures for TORCH Diseases among Nurse-Midwives' in Maternity Hospitals in Babylon Province."

The Following documents have been reviewed and approved:

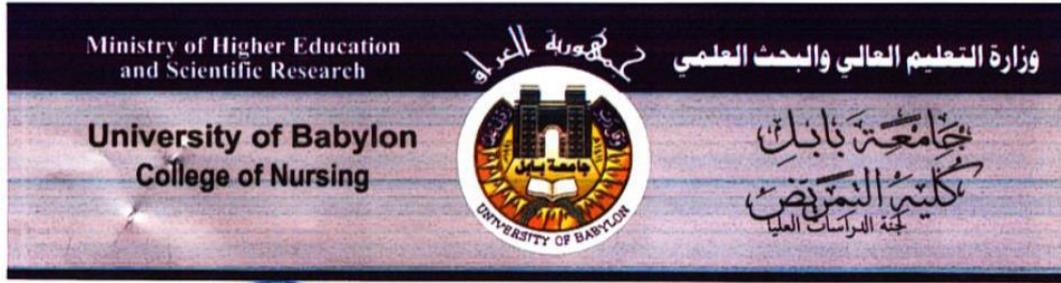
1. Research protocol
2. Research Instrument/s
3. Participant Informed consent

**Committee Decision.**

The committee approves the study to be conducted in the presented form. The Research Ethics committee expects to be informed about any changes occurring during the study, any revision in the protocol and participant informed consent.

*Dr*

Prof. Dr. Salma K. Jihad  
Chair Committee  
College of Nursing  
Research Ethical Committee  
16 /3 /2021



Ref. No. :

Date: /



الى / دائرة صحة بابل / مركز التدريب والتنمية البشرية  
م/ تسهيل مهمة

التاريخ: ٢٠٢١ / ٣ / ١٦  
العدد: ٤٧٤

تحية طبية :

يطيب لنا حسن التواصل معكم ويرجى تفضلكم بتسهيل مهمة طالبة الدكتوراه ( مروره محمد عبد الجليل محمد ) لغرض جمع عينة دراسة الدكتوراه والخاصة بالبحث الموسوم :

المعارف والممارسات المتعلقة بالتدابير الوقائية لامراض التورج بين الممرضات القابلات في مستشفيات التوليد التعليمية في محافظة بابل

Knowledge and Practices Related to the Preventive Measures for TORCH Diseases among Nurse-Midwives' in Maternity Teaching Hospitals in Babylon Province.

مع الاحترام ...

ا.م.د. ماهر خضير هاشم

العميد / كلية

٢٠٢١ / ٣ / ١٦

- صورة عنه الى //
- مكتب السيد العميد للتفضل بالاطلاع مع الاحترام .
- لجنة الدراسات العليا
- المصادر

E-mail:nursing@uobabylon.edu.iq



وطني 07711632208  
المكتب 009647711632208

www.uobabylon.edu.iq



Ref. No. :

Date: /

العدد : ٤٨٧٤  
التاريخ : ١٤/٤/٢٠٢١

الى / دائرة صحة بابل / مركز التدريب والتنمية العلمية

الموضوع / تسهيل مهمة

تحية طيبة :

يطيب لنا حسن التواصل معكم ويرجى تفضلكم بتسهيل مهمة طالبة الدكتوراه ( مروه محمد عبد الجليل محمد ) لغرض جمع عينة دراسة الدكتوراه والخاصة بالبحث الموسوم :

المعارف والممارسات المتعلقة بالتدابير الوقائية لامراض التورج بين الممرضات القابات في مستشفيات التوليد التعليمية في محافظة بابل

**Knowledge and Practices Related to the Preventive Measures for TORCH Diseases among Nurse-Midwives' in Maternity Teaching Hospitals in Babylon Province.**

مع الاحترام ...

ا.م.د. ماهر خضير هاشم  
العميد / وكالة  
٢٠٢١ / ٣ / ١٦

مركز لثة بابل  
الطابق ١٥ / ١٤٦٨  
اجراء العمل مع بقية

الحسين علي حسين  
رئيس مدير شعبة التوعية

خديجة عبد الأمير البريكان  
مديرة الامور القانونية

صورة عنه الى //  
• مكتب السيد العميد للتواصل بالاطلاع مع الاخصائيات  
• لجنة الدراسات العليا  
• المصادر

E-mail:nursing@uobabylon.edu.iq

07711632208  
009647711632208وطني  
المكتب

جمهورية العراق		
Ministry Of Health Babylon Health Directorate Email:- Babel_Healthmoh@yahoo.com Tel:282628 or 282621		وزارة الصحة والبيئة دائرة صحة محافظة بابل المدير العام مركز التدريب والتنمية البشرية وحدة ادارة البحوث
		العدد : ٢٧٢ التاريخ: ٢٠٢١ / ٢ / ١٧

إلى / مستشفى الأمام الصادق (ع)  
 مستشفى بابل للنسائية والأطفال

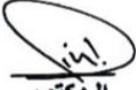
/ تسهيل مهمة

تحية طيبة ...  
 إشارة إلى كتاب جامعة بابل / كلية التمريض / لجنة الدراسات العليا ذي العدد ٨٧٤ في  
 ٢٠٢١ / ٣ / ١٧  
 ترفق لكم ربطا استمارات الموافقة المبدئية لمشروع البحث العائد للباحثة طالبة الدراسات العليا  
 دكتوراه ( مروة محمد عبد الجليل محمد ) .  
 للتفضل بالاطلاع وتسهيل مهمة الموما إليها من خلال توقيع وختم استمارات اجراء البحث المرفقة  
 في مؤسساتكم وحسب الضوابط والإمكانيات لاستحصال الموافقة المبدئية ليتسنى لنا اجراء اللازم  
 على أن لا تتحمل مؤسساتكم أية تبعات مادية وقانونية ... مع الاحترام

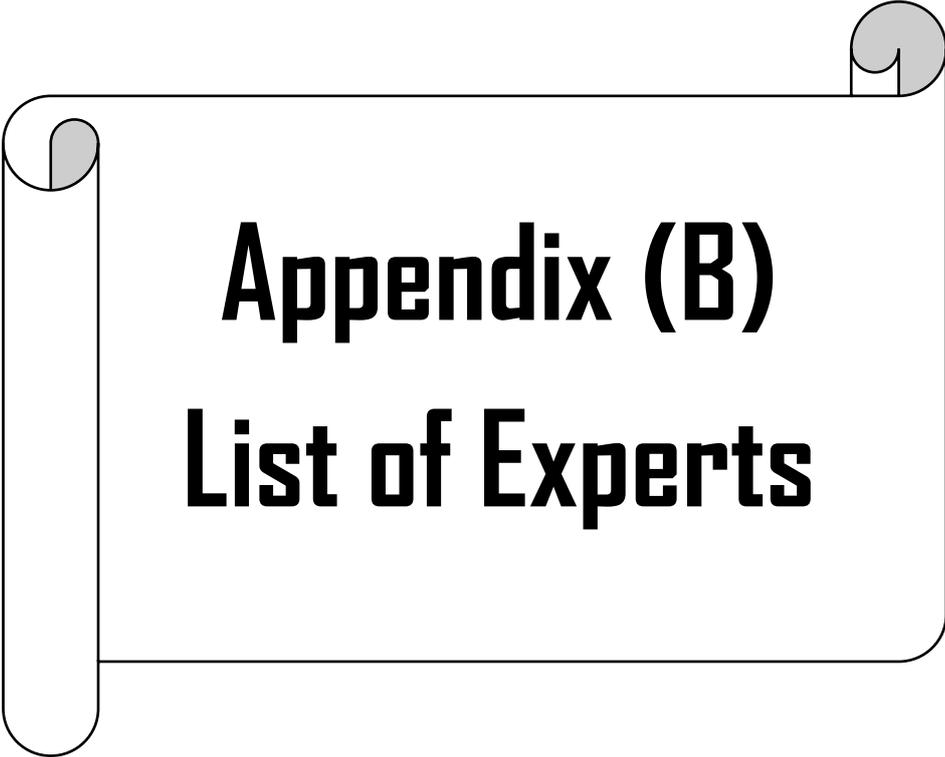
المرفقات :  
 استمارة عدد ٢ /

  
 الدكتور  
 محمد عبد الله عجرش  
 مدير مركز التدريب والتنمية البشرية  
 ٢٠٢١ / /

نسخة منه إلى :  
 • مركز التدريب والتنمية البشرية / وحدة ادارة البحوث مع الأوليات ...

جمهورية العراق		
Ministry Of Health Babylon Health Directorate Email:- Babel_Healthmoh@yahoo.com Tel:282628 or 282621		وزارة الصحة والبيئة دائرة صحة محافظة بابل المدير العام مركز التدريب والتنمية البشرية وحدة ادارة البحوث العدد : ٤٤٢ التاريخ: ٢٠٢١ / ٢ / ١٧
إلى / مستشفى الأمام الصادق (ع) مستشفى بابل للنسائية والأطفال		
/ تسهيل مهمة		
تحية طيبة ... إشارة إلى كتاب جامعة بابل / كلية التمريض / لجنة الدراسات العليا ذي العدد ٨٧٤ في ٢٠٢١ / ٣ / ١٧ نرفق لكم ربطا استمارات الموافقة المبذنية لمشروع البحث العائد للباحثة طالبة الدراسات العليا دكتوراه ( مروة محمد عبد الجليل محمد ) . للتفضل بالاطلاع وتسهيل مهمة الموما إليها من خلال توقيع وختم استمارات اجراء البحث المرفقة في مؤسساتكم وحسب الضوابط والإمكانات لاستحصال الموافقة المبذنية ليتسنى لنا اجراء اللازم على أن لا تتحمل مؤسساتكم أية تبعات مادية وقانونية .... مع الاحترام		
المرفقات : استمارة عدد ٢ /		
 الدكتور محمد عبد الله عجرش مدير مركز التدريب والتنمية البشرية ٢٠٢١ / /		
نسخة منه إلى : • مركز التدريب والتنمية البشرية / وحدة ادارة البحوث مع الأوليات ...		

جمهورية العراق		
<b>Ministry Of Health</b> <b>Babylon Health Directorate</b> Email:- <b>Babel_Healthmoh@yahoo.com</b> Tel:282628 or 282621		وزارة الصحة والبيئة دائرة صحة محافظة بابل المدير العام مركز التدريب والتنمية البشرية لجنة البحوث
وزارة الصحة دائرة صحة بابل مركز التدريب والتنمية البشرية	استمارة رقم ٢ رقم القرار ٢ تاريخ القرار ٢٠٢١/٥/١٠	
<b>قرار لجنة البحوث</b> تحية طيبة ...		
<p>درست لجنة البحوث في دائرة صحة بابل مشروع البحث ذي الرقم ٣ في ٢٠٢١/٥/٩          المعنونة ( المعارف والممارسات المتعلقة بالتدابير الوقائية لأمراض التورج بين          الممرضات القابلات في مستشفيات التوليد التعليمية في بابل ) والمقدم من الباحثة          ( مروة محمد عبد الجليل ) إلى وحدة إدارة البحوث والمعرفي مركز التدريب والتنمية          البشرية في دائرة صحة بابل بتاريخ ٢٠٢١/٥/٩ وقررت :</p> <p>قبول مشروع البحث أعلاه كونه مستوفيا للمعايير المعتمدة في وزارة الصحة والخاصة          بتنفيذ البحوث ولا مانع من تنفيذه في مؤسسات الدائرة .          مع الاحترام</p>		
 الدكتور / محمد عبد الله عجرش رئيس لجنة البحوث ٢٠٢١ /		
نسخة منه إلى : مكتب المدير العام / مركز التدريب والتنمية البشرية / وحدة إدارة البحوث ... مع الأوليات.		

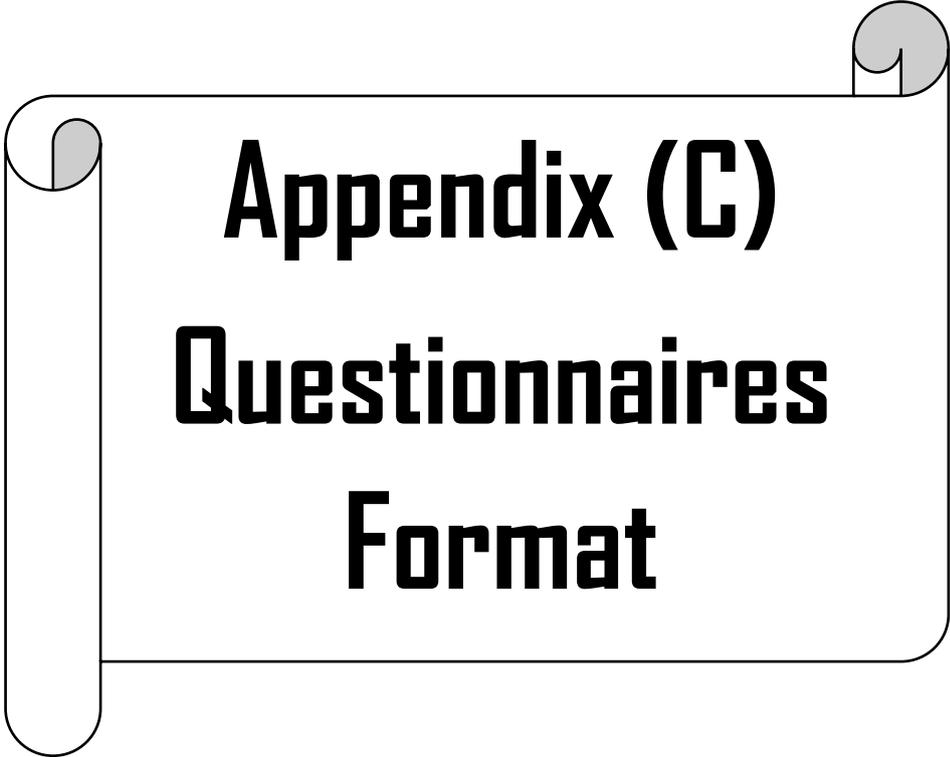


**Appendix (B)**  
**List of Experts**

## Appendix (B)

## List of Experts

ت	أسم الخبير	اللقب العلمي	مكان العمل	التخصص	سنوات الخبرة
1.	أ.د. ربعة محسن علي	أستاذ	جامعة بغداد- كلية التمريض	تمريض صحة الام والوليد	45
2.	أ.د. منى عبد الوهاب خليل	أستاذ	جامعة البيان- كلية التمريض	تمريض صحة الأسرة والمجتمع	43
3.	أ.د. أمين عجيل الياصري	أستاذ	جامعة بابل- كلية التمريض	تمريض صحة الأسرة والمجتمع	38
4.	أ.د. سلمى كاظم جهاد الإبراهيمي	أستاذ	جامعة بابل- كلية التمريض	تمريض صحة الأسرة والمجتمع	36
5.	أ.د. شكرية شدهان جواد العكلي	أستاذ	جامعة الفرات الاوسط التقنية	تمريض صحة الام والوليد	30
6.	أ.د. حسين جاسم محمد الابراهيمى	أستاذ	جامعة بابل- كلية التمريض	تمريض صحة الأسرة والمجتمع	29
7.	أ.د. بشرى جابر عمران الربيعي	أستاذ	جامعة بابل- كلية الطب	طب نسائية وتوليد	25
8.	أ.د. أسماء كاظم كاطع	أستاذ	جامعة بابل- كلية الطب	طب نسائية وتوليد	21
9.	أ.د. سها جاسم حمود وتوت	أستاذ	جامعة بابل- كلية الطب	طب نسائية وتوليد	20
10.	أ.د. تغريد صلاح القزويني	أستاذ	جامعة القادسية- كلية التمريض	طب نسائية وتوليد	20
11.	أ.د. سهيلة فاضل محمد الشيخ	استاذ	جامعة بابل- كلية الطب	طب نسائية وتوليد	18
12.	أ.م.د. اواز عزيز سعيد	استاذ مساعد	جامعة هولير الطبية- كلية التمريض	تمريض صحة الام والوليد	20
13.	أ.م.د. بان عامر موسى	أستاذ مساعد	جامعة بابل- كلية الطب	طب نسائية وتوليد	18
14.	أ.م.د. حنان خضير حسين كاظم	أستاذ مساعد	جامعة بابل- كلية الطب	طب نسائية وتوليد	10
15.	د. وفاء احمد	مدرس	جامعة بابل- كلية التمريض	تمريض صحة الام والوليد	30
16.	د. سهيلة محمد علي	مدرس	جامعة كركوك- كلية التمريض	تمريض صحة الام والوليد	29
17.	أ.م.د. ماهر خضير	أستاذ مساعد	جامعة بابل- كلية التمريض	اللغة العربية	15



**Appendix (C)**  
**Questionnaires**  
**Format**

## Appendix (C)

## Inform consent

عزیزتی المررضة

تحية طيبة.....

الاستمارة التي بين ايديكم تخص اطروحة دكتوراه تحت عنوان ( المعارف والممارسات المتعلقة بالتدابير الوقائية لأمراض التورج بين المررضات القابات في مستشفيات التوليد التعليمية في محافظة بابل ) لذا نرجو منكم التفضل بالإجابة على كل فقراتها ,شاكرين تعاونكم .علما بأن المعلومات ستعامل بسرية وتستعمل لأغراض البحث فقط..

ملاحظة :ضع أشاره صح ( ✓ )في المربع المناسب

رقم الورقة.....

اسم المستشفى.....

تاريخ المقابلة.....

طالبة الدكتوراه  
مروة محمد عبد الجليل  
تمريض صحة الام والوليد  
جامعة بابل/ كلية التمريض

## Questionnaires in Arabic

## الجزء الاول : المعلومات الديموغرافية

1. العمر  سنة
2. المستوى التعليمي
- 2.1 مدرسة اعدادية قبالة
- 2.2 درجة دبلوم في القبالة
- 2.3 كلية التمريض واعلى
3. الحالة الزوجية
- 3.1 عزباء
- 3.2 متزوجة
- 3.3 مطلقة
- 3.4 ارملة
4. مكان العمل
- 4.1 صالة الولادة
- 4.2 الردهة النسائية
- 4.3 ردهة طوارئ النسائية
- 4.4 غرفة عمليات النسائية
5. وردية العمل
- 5.1 دوام صباحي
- 5.2 دوام مسائي
6. سنوات الخبرة
- 6.1 1-5 سنوات
- 6.2 6-10 سنوات
- 6.3 11-15 سنوات
- 6.4 16 واكثر
7. هل لديكي دورات عن امراض التورج؟
- نعم  لا
- إذا كانت الإجابة بنعم ، فعدد الدورات ----- و المدة -----
8. مصدر المعلومات
- 8.1 مؤسسة تعليمية
- 8.2 الدورات
- 8.3 وسائل التواصل الاجتماعي
- 8.4 مكان العمل

## الجزء الثاني معارف الممرضات القابلات فيما يتعلق بالإجراءات الوقائية لأمراض التورج

ت	اقسام المعارف	صحيح	غير متأكد	غير صحيح
<b>المعارف فيما يتعلق بداء المقوسات</b>				
<b>المعارف فيما يتعلق بمسبب العدوى</b>				
1.	عدوى بكتيرية.			
2.	داء المقوسات هو طفيلي أولي.			
<b>طرق العدوى</b>				
1.	لمس براز القطط.			
2.	تناول اللحوم غير المطبوخة جيداً.			
3.	اليدين الغير مغسولة.			
4.	عن طريق الرذاذ.			
5.	انتقالات المشيمة من الأم المصابة إلى الجنين.			
<b>إجراءات وقائية</b>				
1.	تجنب تناول اللحوم غير المطبوخة.			
2.	ارتداء الكفوف وغسل اليدين عند البستنة أو التعامل مع التربة.			
3.	غسل جميع الفواكه والخضروات بعناية قبل تناولها.			
4.	غسل اليدين بالصابون والماء الدافئ بعد التعامل مع اللحوم.			
5.	تجنب الاتصال بالنساء الحوامل الأخريات المصابات والمواليد الجدد			
<b>اعراض داء المقوسات</b>				
1.	الحمى الغدية.			
2.	فقدان الشهية.			
<b>مضاعفات داء المقوسات الخلقي</b>				
1.	الإجهاض التلقائي المتتالي.			
2.	ولادة طفل ميت.			
3.	تضخم البطين.			
4.	صغر الرأس.			
5.	التهاب المشيمة والشبكية والتكلس الدماغى.			
6.	التهاب الدماغ ومشاكل الغدد الصماء.			
<b>علاج داء المقوسات</b>				
1.	علاج سبيراميسين (لمدة 3 أسابيع من 2-3 جم في اليوم) لتقليل الإصابة بعدوى المشيمة.			
2.	علاج البنسلين.			

المعارف المتعلقة بجذري الماء			
غير صحيح	غير متأكد	صحيح	المعارف فيما يتعلق بالجراثيم المعدية
			1. فيروس الحماق النطاقي.
			2. عدوى فطرية.
طرق الانتقال			
			1. عن طريق الرذاذ.
			2. الاتصال الشخصي المباشر.
			3. اليدين الغير مغسولة.
			4. فيروس ينقل بالهواء.
الاجراءات الوقائية			
			1. تجنب الاتصال بالنساء الحوامل الأخريات المصابات والمواليد الجدد.
			2. الاجسام المناعية المضادة للحماق النطاقي إذا حدث تعرض كبير.
			3. تجنب تناول اللحوم النيئة.
اعراض جذري الماء			
			1. مشاكل في الصدر والتنفس.
			2. صداع أو حمول و قيء أو الشعور بالغثيان.
			3. طفح جلدي شديد.
			4. حمى.
			5. اليرقان.
خصائص متلازمة الحماق الجنينية			
			1. تندب الجلد.
			2. عيوب العين مثل التهاب المشيمية والشبكية وإعتام عدسة العين.
			3. نقص تنسج الاطراف.
			4. صغر الرأس والضمور القشري.
			5. التخلف العقلي.
			6. تضخم البطين.
			7. خلل في الأمعاء والعضلة العاصرة للمثانة.
مخاطر الأمهات أثناء الولادة			
			1. نزيف
			2. نقص الصفائح الدموية
			3. تخثر منتشر داخل الأوعية.
			4. التهاب الكبد.
			5. انقلاب الرحم.
علاج جذري الماء			
			1. أسيكوفير 800 مجم خمس مرات يومياً لمدة 7 أيام.
			2. الغلوبولين المناعي للحماق النطاقي إذا حدث تعرض كبير.

المعارف المتعلقة بمرض الزهري			
غير صحيح	غير متأكدة	صحيح	المعارف فيما يتعلق بالجراثيم المعدية
			1. مرض الزهري هو عدوى بكتيرية تسببها اللولبية الشاحبة.
			2. عدوى فيروسية
طرق الانتقال			
			1. العدوى المنقولة جنسياً.
			2. الانتقال عبر المشيمة.
			3. الأتصال الشخصي مباشر
اعراض مرض الزهري			
			1. الزهري الأولي يسبب قرحة تناسلية غير مؤلمة في عنق الرحم.
			2. الزهري الثانوي يسبب طفح جلدي حطاطي أو آفة.
			3. افرازات الدم.
تأثير مرض الزهري على النساء الحوامل			
			1. الزهري القلبي الوعائي
			2. الزهري العصبي.
			3. موت الجنين داخل الرحم.
			4. إجهاض.
			5. نزيف أثناء الحمل.
تأثير مرض الزهري على الجنين			
			1. تقييد نمو الجنين.
			2. ماء الجنين.
			3. قد يسبب مرض الزهري الخلقي الإعاقة.
			4. ولادة طفل ميت.
			5. تندب الجلد.
			6. التقييد العقلي.
إدارة مرض الزهري			
			1. فحص أي أمراض أخرى تنتقل عن طريق الاتصال الجنسي.
			2. علاج البنسلين للوقاية من مرض الزهري الخلقي وعلاج الزهري أثناء الحمل.
			3. علاج الوليد المصاب.
			4. فحص وعلاج الشريك.
			5. حقن دواء الأسيكلوفير في الوريد.

المعارف المتعلقة بالتهاب الكبد			
غير صحيح	غير متأكد	صحيح	المعارف فيما يتعلق بالجراثيم المعدية
			1. فيروس الحمض النووي.
			2. *عدوى طفيلية.
طرق الانتقال			
			1. الدم.
			2. *التهاب الكبد ينتقل خلال الاتصال الشخصي.
			3. سوائل الجسم مثل اللعاب والمني والسوائل المهبلية.
			4. متعاطو المخدرات الذين يتشاركون الإبر.
الوقاية من التهاب الكبد			
			1. يمكن الوقاية من التهاب الكبد بي عن طريق اللقاح.
			2. نظام غذائي صحي.
			3. الرياضة المنتظمة.
			4. غسل اليدين.
			5. تجنب الاتصال بالأشخاص المصابين.
أعراض التهاب الكبد			
			1. أعراض البرد والانفلونزا (الحمى ، سيلان الأنف ، السعال).
			2. التقيؤ و الغثيان.
			3. فقدان الشهية.
			4. اليرقان.
			5. الأم الظهر.
علاج التهاب الكبد			
			1. العلاج الدوائي لالتهاب الكبد
			2. نظام غذائي خاص لالتهاب الكبد.
			3. اعطاء لقاح.

المعارف فيما يتعلق بالحصبة الألمانية			
غير صحيح	غير متأكد	صحيح	المعارف فيما يتعلق بالجراثيم المعدية
			1. توجا فيروس.
			2. عدوى بكتيرية.
طرق الانتقال			
			1. ينتشر عن طريق انتقال القطرات
			2. سوائل الجسم مثل اللعاب والمني والسوائل المهبلية.
إجراءات وقائية			
			1. فحص الحصبة الألمانية أثناء الحمل
			2. التطعيم بعد الولادة.
			3. تناول نظامًا غذائيًا صحيًا.
اعراض الحصبة الألمانية			
			1. الطفح الجلدي الحموي.
			2. صداع الراس
			3. سيلان الأنف
			4. اليرقان.
			5. تضخم الغدة الليمفاوية.
			6. آلام المفاصل
مضاعفات الحصبة الألمانية الخلقية			
			1. الصمم الحسي العصبي.
			2. إعتام عدسة العين الخلقى.
			3. العمى
			4. التهاب الدماغ و مشاكل الغدد الصماء.
			5. الإجهاض التلقائي المتتالي.
إدارة الحصبة الألمانية			
			1. إنهاء الحمل إذا حدثت العدوى قبل 16 أسبوعًا.
			2. العلاج الدوائي للحصبة الألمانية.

المعارف فيما يتعلق بالفيروس المضخم للخلايا			
غير صحيح	غير متأكد	صحيح	المعارف المتعلقة بالجراثيم المعدية
			1. فيروس هربس الحمض النووي.
			2. *عدوى طفيلية.
طرق الانتقال			
			1. ينتقل عن طريق انتقال الرذاذ التنفسي.
			2. الاتصال الجنسي
			3. حليب الثدي.
			4. * اللمس المباشر للجلد.
الاجراءات الوقائية			
			1. تجنب ملامسة سوائل الجسم من الآخرين.
			2. *لقاح الفيروس المضخم للخلايا.
			3. *تناول اللحوم المطبوخة.
			4. يتم تقديم رعاية ما قبل الولادة على أساس منتظم ، بالإضافة إلى نصائح للوقاية من العدوى.
			5. بعد التعامل مع الحفاضات أو التعرض لإفرازات الجهاز التنفسي ، استخدم القفازات و اغسلي يديك .
			6. لا ينبغي مشاركة فرشاة الأسنان مع طفل صغير.
			7. عند تقبيل الطفل ، تجنب ملامسة لعبه.
			8. نظف الألعاب والأسطح الأخرى التي لامست البول أو اللعاب من الأطفال.
			9. نظافة اليدين قبل التعامل مع الأطفال حديثي الولادة أو جمع حليب الأم.
أعراض الفيروس المضخم للخلايا			
			1. انفلونزا خفيفة غير نوعية.
			2. *تقيؤ و غثيان.
			3. الطفح الجلدي الحموي.
مضاعفات الفيروس المضخم للخلايا على الجنين			
			1. تقييد النمو
			2. صغر الرأس والتكلس داخل الجمجمة.
			3. *التهاب الدماغ ومشاكل الغدد الصماء.
			4. *الصمم الحسي العصبي.
			5. تضخم البطين
			6. استسقاء
			7. العمى.
			8. فقدان السمع.
تأثير الفيروس المضخم للخلايا على حديثي الولادة			
			1. فقر الدم ونقص الصفائح.
			2. تضخم الكبد والطحال.
			3. اليرقان والطفح الجلدي.
			4. الساد الخلقي.

إدارة الفيروس المضخم للخلايا الخلقي			
إنهاء الحمل إذا تم اكتشاف تشوهات.			

المعارف فيما يتعلق فيروس الهربس البسيط			
غير صحيح	غير متأكد	صحيح	المعارف فيما يتعلق بالجراثيم المعدية
			1. الهربس البسيط هو فيروس الحمض النووي
			2. *عدوى فطرية.
أنواع الهربس			
			1. عدوى فيروس الهربس الفموي -1.
			2. عدوى فيروس الهربس التناسلي -2.
طرق الانتقال			
			1. الاتصال المباشر بالمنطقة المصابة.
			2. الاتصال الجسدي المباشر.
			3. *الانتقال عبر المشيمة.
			4. وجود أجسام مضادة معادلة للأم عبر المشيمة.
			5. استخدام أقطاب فروة رأس الجنين وطريقة الولادة.
			6. قد يحدث فيروس الهربس البسيط عند الوليد من ملامسة الآفات المفتوحة بعد الولادة.
			7. مدة تمزق الغشاء أكثر من 4 ساعات.
أعراض الهربس التناسلي			
			1. *الم في الحوض.
			2. آفة تقرحية على الفرج والمهبل وعنق الرحم.
			3. احتباس البول.
			4. *حمى.
تصنيف الهربس الوليدي			
			1. موضعية في الجلد والعين والفم.
			2. مرض الجهاز العصبي المركزي الموضعي مثل التهاب الدماغ.
			3. عدوى منتشرة.
			4. *العمى.
إدارة الهربس الوليدي			
			1. يجب تجنب تمزق الغشاء مع الهربس التناسلي في الفترة الأولى.
			2. لا تستعمل الإجراءات الغازية مثل أقطاب فروة رأس الجنين المصابة بعدوى أولية.
			3. الولادة القيصرية مع النوبات الأولى من الهربس التناسلي.
			4. استعمال السايكلوفير (400 مجم) يومياً.
			5. *الولادة الطبيعية.

## الجزء الثالث ممارسات الممرضات القابلات فيما يتعلق بأمراض التورج

ت	الممارسات	دائما	احيانا	ابدا
<b>ممارسات نظافة اليدين</b>				
1.	تنظيف الأيدي على كل مدخل إلى جناحك وغرفة الولادة وعند مغادرة الفضاء.			
2.	غسل اليدين قبل الاتصال الأولي مع كل مريض.			
3.	غسل اليدين قبل إجراء عملية التعقيم.			
4.	غسل اليدين بعد الرعاية التي تتطلب على مخاطر التعرض لسوائل الجسم مثل مسح أنف حديثي الولادة.			
5.	غسل اليدين بعد ملامسة المريض أو بيئته مثل تغيير الحفاضات.			
6.	غسل اليدين بالصابون والماء الدافئ بعد القيام بأنشطة مثل إطعام الطفل أو الاستحمام.			
<b>ارتداء معدات الحماية الشخصية</b>				
1.	ارتدي الكفوف على الفور قبل انجاز أي إجراءات مثل فحص المهبل.			
2.	قم بتغيير القفازات بين الرعاية لكل مريض ، بما في ذلك الأم وحديثي الولادة.			
3.	ارتد الكفوف عند التعامل مع المولود الجديد بعد الولادة قبل الاستحمام أو الإزالة الكافية لمواد جسم الأم.			
4.	ارتد الكفوف عند ملامسة الطفح الجلدي غير المشخص أو التقرح أو الجلد غير السليم.			
5.	إعادة استعمال أو غسل الكفوف.			
6.	تنظيف اليدين بعد نزع الكفوف.			
7.	ارتد الرداء عند تقديم الرعاية التي قد تلوث الجلد أو الملابس.			
8.	ارتد الرداء مباشرة قبل النشاط المشار إليه.			
9.	أقم بإزالة الرداء مباشرة بعد النشاط الذي تم استخدامه من أجله.			
10.	أقم بتغيير الرداء بين فترة الرعاية لكل أم أو مولود جديد.			
11.	ارتد الرداء بشكل صحيح مثل ربط العنق والخصر بشكل مناسب.			
12.	ارتد قناع الوجه مباشرة قبل النشاط المشار إليه.			
13.	قم بتغيير قناع الوجه إذا أصبح مبتلاً.			
14.	المس قناع الوجه أثناء ارتدائه.			
15.	طوي قناع الوجه أو تخزينه في الجيب			
16.	قم بتنظيف اليدين بعد إزالة قناع الوجه			
17.	ارتداء نظارات واقية.			

ابدا	احيانا	دائما	النظافة البيئية
			1. تنظيف غرف المخاض والولادة بعد كل ولادة.
			2. تنظيف غرفة الأم
			3. تنظيف معدات النقل بعد كل عملية نقل للمواليد الجدد.
			4. قم بإزالة الأجزاء الملامسة للمياه الملوثة للتنظيف والتطهير
			5. تصريف المعدات بعد كل استخدام.
			6. نظف جميع الأسطح والأجزاء القابلة للفك من الجهاز.
			7. تعقيم وتطهير الآلات الجراحية
			8. الفصل بين الغسيل النظيف والمتسخ أثناء النقل والفرز والطي والتخزين.
			9. يتم التخلص من الحفاضات المتسخة فوراً في وعاء مغطى.
			10. إعادة تركيب الإبر أو ثنيها أو كسرهما.
			11. الوصول إلى حاويات النفايات أو الأدوات الحادة.
			12. توفير أوعية حادة صلبة ومقاومة للثقب عند نقطة الاستخدام أو بالقرب منها.

---

**Questionnaires in English****Part I Demographic Characteristics**

1. Age  years

2. Educational level

2.1 Midwifery Secondary School

2.2 Diploma Degree of Midwifery

2.3 College of Nursing and above

3. Marital Status

3.1 Single

3.2 Married

3.3 Divorced

3.4 Widow

4. Place of Work

4.1 Delivery Room

4.2 Maternity Unit

4.3 Maternal Emergency Ward

4.4 maternal Operating Room

5. Working Shift

5.1 Morning Shift

5.2 Evening Shift

6. Years of Experience

6.1 1-5 years

6.2 6-10 years

6.3 11-15years

6.4 16& more

7. Do you have courses on TORCH diseases?

yes  No

If yes, the number of courses ----- & duration-----

8. Source of Information:

- Educational Institution
- Courses
- Social Media
- Work Place

**Part II Nurse- Midwives' Knowledge Regarding Preventive Measures TORCH Disease**

No.	Knowledge Items	Correct	Uncertain	Incorrect
<b>Knowledge Regarding Toxoplasmosis(T)</b>				
<b>Knowledge Regarding Infective Organisms</b>				
1	*Bacterial Infection.			
2.	Toxoplasmosis gondii is a protozoan parasite.			
<b>Mode of Transmission</b>				
3.	Contact with cat feces.			
4.	Eat undercooked meat.			
5.	Unwashed hands.			
6.	*Droplet Spread.			
7.	Placental transitions from infected mother to fetus.			
<b>Preventive Measures</b>				
8.	Avoid eating raw meat.			
9.	Wearing gloves and washing hands when gardening or handling soil.			
10.	Carefully wash all fruits and vegetables before eating.			
11.	Wash hands with soap and warm water after meat.			
12.	*Avoid contact with other infected pregnant women and neonates.			
<b>Symptoms of Toxoplasmosis</b>				
13	Glandular fever-like flu.			
14	*Loss of appetite.			
<b>The complications of Congenital Toxoplasmosis</b>				
15.	Consecutive spontaneous abortions.			
16	Stillbirth.			
17	Ventriculomegaly			
18	Microcephaly.			
19	Chorioretinitis and cerebral calcification.			
20	*Encephalitis and endocrine problems.			
<b>Treatment of Toxoplasmosis</b>				
21.	Spiramycin treatment (3weeks course of 2-3g per day) to reduce the incidence of placental infection.			
22.	*Penicillin treatment.			

<b>Knowledge Regarding Chickenpox(O)</b>				
<b>Knowledge Regarding Infective Organisms</b>		<b>Correct</b>	<b>Uncertain</b>	<b>Incorrect</b>
1.	Varicella zoster virus			
2.	*Fungal infection.			
<b>Mode of Transmission</b>				
3.	Droplet spread			
4.	Direct personal contact			
5.	*Unwashed hands.			
6.	Airborne route.			
<b>Preventive Measures</b>				
7.	Avoid contact with other infected pregnant women and neonates.			
8.	Taken varicella zoster immunoglobulin vaccine.			
9.	*Avoid eating raw meat.			
<b>Symptoms</b>				
10.	Chest and breathing problems.			
11.	Headache, drowsiness, vomiting or feeling sick.			
12.	Severe rash.			
13.	Fever			
14.	*Jaundice.			
<b>Characteristics of Fetal Varicella Syndrome</b>				
15.	Skin scarring.			
16.	Eye defects such as chorioretinitis and cataracts.			
17.	Hypoplasia of the limbs.			
18.	Microcephaly and cortical atrophy.			
19.	Mental restriction.			
20.	*Ventriculomegaly.			
21.	Dysfunction of bowel and bladder sphincter.			
<b>Maternal Risk during Delivery</b>				
22.	Bleeding			
23.	thrombocytopenia			
24.	Disseminated intravascular coagulation.			
25.	Hepatitis.			
26.	*Uterine inversion.			
<b>Treatment of Chickenpox</b>				
27.	Oral acyclovir 800mg five times per day for 7 days.			
28.	*Varicella-zoster immunoglobulin if significant exposure occurred.			

<b>Knowledge Regarding Syphilis(O)</b>				
<b>Knowledge Regarding Infective Organisms</b>		<b>Correct</b>	<b>Uncertain</b>	<b>Incorrect</b>
1.	Syphilis is a bacterial infection caused by <i>Treponema pallidum</i> .			
2.	*Viral infection.			
<b>Mode of Transmission</b>				
3.	Sexually transmitted infection			
4.	Transplacental transmission			
5.	*Direct personal contact.			
<b>Symptoms of Syphilis</b>				
6.	Painless genital ulcer on the cervix.			
7.	Secondary syphilis causes a maculopapular rash or lesion.			
8.	*Leucorrhea.			
<b>Effect of Syphilis on Pregnant Women</b>				
9.	Cardiovascular syphilis			
10.	Neurosyphilis.			
11.	Intrauterine death.			
12.	Miscarriage.			
13.	*Bleeding during pregnancy.			
<b>Effect of Syphilis on Fetus</b>				
14.	Fetal growth restriction			
15.	Fetal hydrops.			
16.	Congenital syphilis may cause disability.			
17.	Stillbirth.			
18.	*Skin scarring.			
19.	*Mental restriction.			
<b>Management of Syphilis</b>				
20.	Test for any other sexually transmitted diseases.			
21.	Penicillin treatment to prevent congenital syphilis and treat syphilis in pregnancy.			
22.	Treated the infected neonate.			
23.	Investigate and treat the partner.			
24.	*Acyclovir drug intravenous injection.			

<b>Knowledge Regarding Hepatitis B( O)</b>				
<b>Knowledge Regarding Infective Organisms</b>		<b>Correct</b>	<b>Uncertain</b>	<b>Incorrect</b>
1.	Deoxyribonucleic acid virus			
2.	*Parasite infection.			
<b>Mode of Transmission</b>				
3.	Blood			
4.	* Hepatitis B can be speared through personal contact.			
5.	Body fluid such as saliva, semen, and vaginal fluid.			
6.	Drug users who share needles.			
<b>Prevention of Hepatitis B</b>				
7.	Hepatitis B can be prevented by a vaccine.			
8.	Health diet.			
9.	Regular exercise.			
10.	Hand washing.			
11.	*Avoid contact with infected people.			
<b>Symptoms of Hepatitis B</b>				
12.	Cold and flu symptoms (fever, running nose, cough).			
13.	Nausea and vomiting.			
14.	Loss of appetite.			
15.	Jaundice.			
16.	*Backache.			
<b>Management of Hepatitis B</b>				
17.	Pharmacological treatment for hepatitis B			
18.	Special diet for hepatitis B.			
19.	*Given vaccine.			

<b>Knowledge Regarding Rubella( R)</b>				
<b>Knowledge Regarding Infective Organisms</b>		<b>Correct</b>	<b>Uncertain</b>	<b>Incorrect</b>
1.	Toga virus			
2.	*Bacterial infection.			
<b>Mode of Transmission</b>				
3.	Spread by droplet transmission			
4.	*Body fluid such as saliva, semen, and vaginal fluid.			
<b>Preventive Measures</b>				
5.	Screening for rubella in pregnancy			
6.	Postpartum vaccination.			
7.	*Eat a healthy diet.			
<b>Symptoms of Rubella</b>				
8.	Febrile rash.			
9.	Headache			
10.	Runny nose			
11.	*Jaundice.			
12.	*Nausea and vomiting.			
13.	Enlarged lymph nodes.			
14.	Aching joint pain			
<b>Complications of Congenital Rubella</b>				
15.	Sensorineural deafness.			
16.	Congenital cataract.			
17.	Blindness			
18.	Encephalitis and endocrine problems			
19.	*Consecutive spontaneous abortions.			
<b>Management of Rubella</b>				
20.	Termination of pregnancy if infection occurs before 16 weeks.			
21.	*Pharmacological treatment for Rubella.			

<b>Knowledge Regarding Cytomegalovirus(C)</b>				
<b>Knowledge Regarding Infective Organisms</b>		<b>Correct</b>	<b>Uncertain</b>	<b>Incorrect</b>
1.	Deoxyribonucleic acid herpes virus.			
2.	*Parasite infection.			
<b>Mode of Transmission</b>				
3.	Transmitted by respiratory droplet transmission.			
4.	Sexual intercourse			
5.	Breast milk.			
6.	*Direct skin contact.			
<b>Preventive Measures</b>				
7.	Avoiding contact with body fluids.			
8.	*Cytomegalovirus vaccine.			
9.	*Eat cooked meat.			
10.	Prenatal care is provided on a regular basis, as well as infection prevention advice.			
11.	After handling diapers or being exposed to respiratory secretions, use gloves and wash your hands.			
12.	A toothbrush should not be shared with a little child.			
13.	When kissing a child, avoid coming into contact with their saliva.			
14.	Clean toys and other surfaces that have come into contact with urine or saliva from children.			
15.	Hand hygiene before handling newborns or collecting breast milk.			
<b>Symptoms of Cytomegalovirus</b>				
16.	Mild non-specific flu-like.			
17.	*Nausea and vomiting.			
18.	Febrile rash.			
<b>Complications of Cytomegalovirus on Fetus</b>				
19.	Growth restriction			
20.	Microcephaly and intracranial calcification.			
21.	*Encephalitis and endocrine problems.			
22.	*Sensorineural deafness.			
23.	Ventriculomegaly			
24.	Ascites.			
25.	Blindness.			
26.	Hearing Loss.			

<b>Effect of Cytomegalovirus on Neonate</b>			
27.	Anemic and thrombocytopenic.		
28.	Hepatosplenomegaly.		
29.	Jaundice and purpural rash.		
30.	*Congenital cataract.		
<b>Management of Congenital Cytomegalovirus</b>			
31.	Termination of pregnancy if abnormalities are detected.		

<b>Knowledge Regarding Herpes Simplex Virus(H)</b>				
<b>Knowledge Regarding Infective Organisms</b>		<b>Correct</b>	<b>Uncertain</b>	<b>Incorrect</b>
1.	Herpes simplex is a deoxyribonucleic acid virus.			
2.	*Fungal infection.			
<b>Types of Herpes</b>				
3.	Herpes simplex virus-1orolabial infection.			
4.	Herpes simplex virus-2genital infection.			
<b>Mode of Transmission</b>				
5.	Direct contact with the infected area.			
6.	Direct physical contact.			
7.	*Transplacental transmission.			
8.	Presence of trans placental maternal neutralizing antibodies.			
9.	The use of fetal scalp electrodes.			
10.	Duration of membrane rupture of more than 4 hours.			
11.	Herpes simplex virus in the newborn may occur from contact with open lesions after birth.			
<b>Symptoms of Genital Herpes</b>				
12.	*Pelvic pain.			
13.	Ulcerative lesion on the vulva, vagina and cervix.			
14.	Urinary retention.			
15.	*Fever.			
<b>Classification of Neonatal Herpes</b>				
16.	Localized to skin, eye, and mouth.			
17.	Local central nervous system diseases such as encephalitis.			
18.	Disseminated infection.			
19.	*Blindness.			

Management of Neonatal Herpes				
20.	Rupture of the membrane should be avoided with the first-episode of genital herpes.			
21.	Don't use invasive procedures such as fetal scalp electrodes with primary infection.			
22.	Cesarean section delivery with first episode's genital herpes.			
22.	Use of acyclovir(400mg) daily.			
23.	*Normal birth.			

### Part III Nurse- Midwives' Practices Regarding Preventive Measures TORCH Disease

Items	Practices Items	Always	Sometimes	Never
	<b>Hand Hygiene Practices</b>			
1.	Clean hands on each entry into the space and on leaving.			
2.	Washing hands before initial contact with each patient.			
3.	Washing hands before performing an aseptic procedure.			
4.	Washing hands aftercare involving body fluid exposure risk such as wiping a neonate's nose.			
5.	Washing hands After contact with a patient as changing diapers.			
6.	Washing hands with soap and warm water after activities such as feeding or bathing child.			

	<b>Wearing Personal Protective Equipment</b>	<b>Always</b>	<b>Sometimes</b>	<b>Never</b>
1.	Put gloves on immediately before any procedures such as per vagina are performed.			
2.	Change the gloves for every patient, including the mother and her newborn, between cares.			
3.	Wear gloves when handling the newborn after delivery before bathing or proper removal of body substances from the mother.			
4.	Wear gloves for contact with an undiagnosed rash, lesion, or non-intact skin.			
5.	Re-use or wash gloves.			
6.	Perform hand hygiene after gloves are removed.			
7.	Wear a gown when providing care that may contaminate skin or clothing.			
8.	Put gown on immediately before the activity for which it is indicated.			
9.	Remove gown immediately after the activity for which it is used.			
10.	Change gown between care for each mother or newborn.			
11.	Wear gowns properly such as appropriately tied at the neck and waist.			
12.	Put on facemask immediately before the activity for which it is indicated.			
13.	Change facemask if it becomes wet.			
14.	Touch facemask while being worn.			
15.	Fold facemask or store in a pocket			
16.	Perform hand hygiene after removing the face mask			
17.	Wear goggles.			

	<b>Environment Hygiene</b>	<b>Always</b>	<b>Sometimes</b>	<b>Never</b>
<b>1.</b>	Cleaning labor and delivery rooms after each birth.			
<b>2.</b>	Clean mother's room			
<b>3.</b>	Cleaning transport equipment after each newborn transport.			
<b>4.</b>	Remove parts in contact with contaminated water for cleaning and disinfection			
<b>5.</b>	Drain equipment after each use.			
<b>6.</b>	Clean all surfaces and removable parts of the equipment.			
<b>7.</b>	Sterilize or disinfect surgical equipment.			
<b>8.</b>	Separation of clean and soiled laundry during transportation, sorting, folding, and storage.			
<b>9.</b>	Soiled diapers are disposed of immediately into a covered receptacle.			
<b>10.</b>	Recapping, bending, or breaking needles.			
<b>11.</b>	Easily reaching into waste or sharps containers.			
<b>12.</b>	Providing sharps containers that are rigid, and puncture-resistant at or near the point of use.			



**Appendix (D)**  
**Linguistic Expert**

## Appendix D

Ministry of Higher Education and Scientific Research  
University of Babylon  
college of Basic Education

جمهورية العراق  
جامعة بابل  
كلية التربية الاساسية

Ref. No.:

Date: / /

كلية التربية الاساسية  
شعبة الموارد البشرية  
الصادرة



عدد: ٥١١٨

تاريخ: ٢٠٢٢/٥/١٨

الدراسات العليا

د. ميس فليح حسن  
٢٠٢٢/٥/١٨

الى / جامعة بابل / كلية التمريض / وحدة الدراسات العليا

م / تقويم لغوي

نهديكم أطيب التحيات ...

كتابكم ذو العدد ١٦٧٣ في ٢١/٤/٢٠٢٢، نعيد اليكم اطروحة طالبة الدراسات العليا /  
الدكتوراه ( مروه محمد عبد الجليل محمد ) والموسومة ب ( المعارف والممارسات المتعلقة بالتدابير  
الوقائية لامراض التورج بين الممرضات القابلات في مستشفيات التوليد التعليمية في  
محافظة بابل ) بعد تقويمها لغوياً واسلوبياً من ( م. د. ميس فليح حسن ) وهي صالحة للمناقشة بعد  
الاخذ بالملاحظات المثبتة على متنها.

للتفضل بالتسلم ... مع الاحترام

// المرافقات //

أ. د. فراس سليم حياوي  
٢٠٢٢/٥/١٨

معاون العميد للشؤون العلمية  
٢٠٢٢/٥/١٨

٢٠٢٢/٥/١٨

اطروحة دكتوراه  
إقرار المقوم اللغوي  
د. ميس فليح حسن  
٢٠٢٢/٥/١٨

// نسخة منه الى //

- مكتب السيد العميد المحترم ... للتفضل بالاطلاع مع الاحترام.
- د. ميس فليح حسن ... للعلم لطفاً.
- الشؤون العلمية
- الصادرة



ذكرى

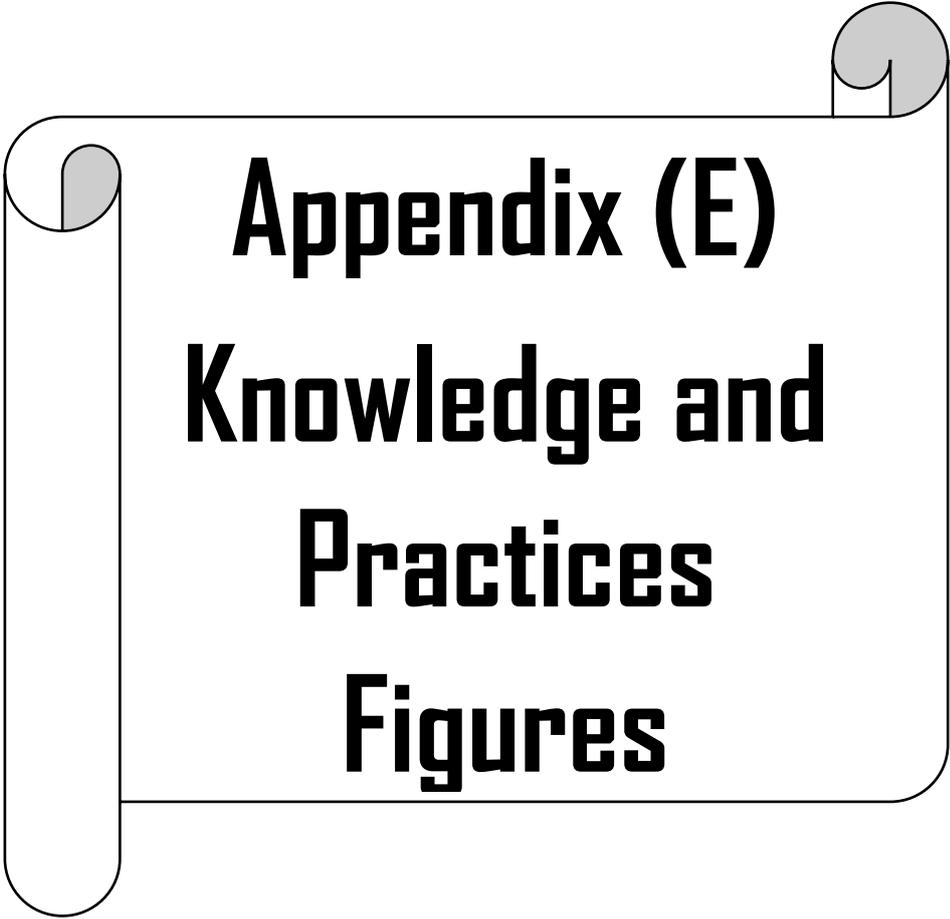
basic@uobabylon.edu.iq

وطني ٠٧٢٣٠٠٣٥٧٤٤  
امنية ٠٧٦٠١٢٨٨٥٦٦

مكتب العميد ١١٨٤  
المعاون العلمي ١١٨٨  
المعاون الاداري ١١٨٩

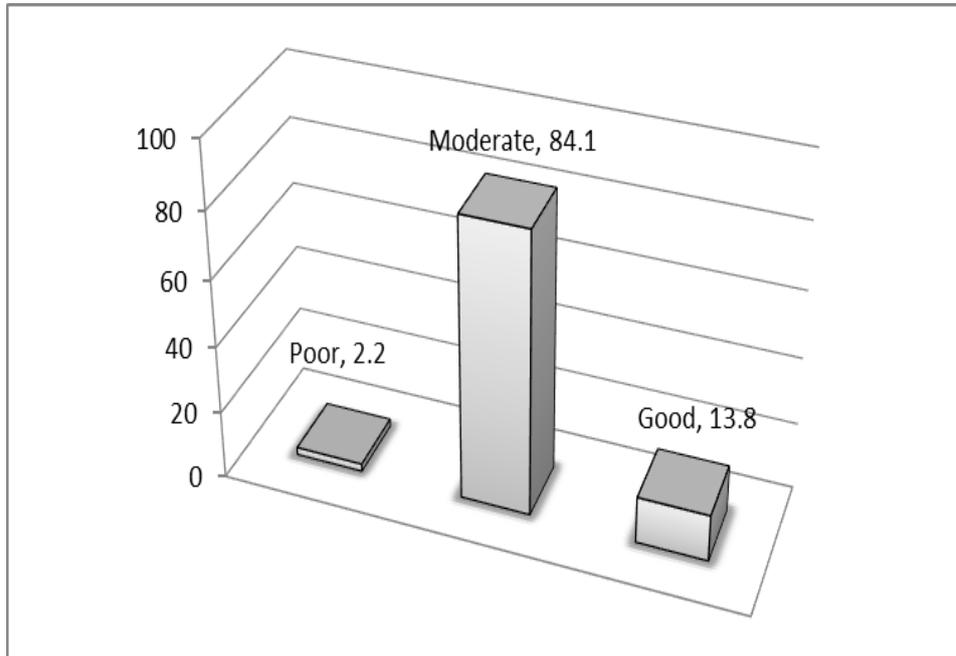
العراق - بابل - جامعة بابل

بغداد - الجامعة ٠٠٩٦٤٧٢٣٠٠٣٥٧٤٤

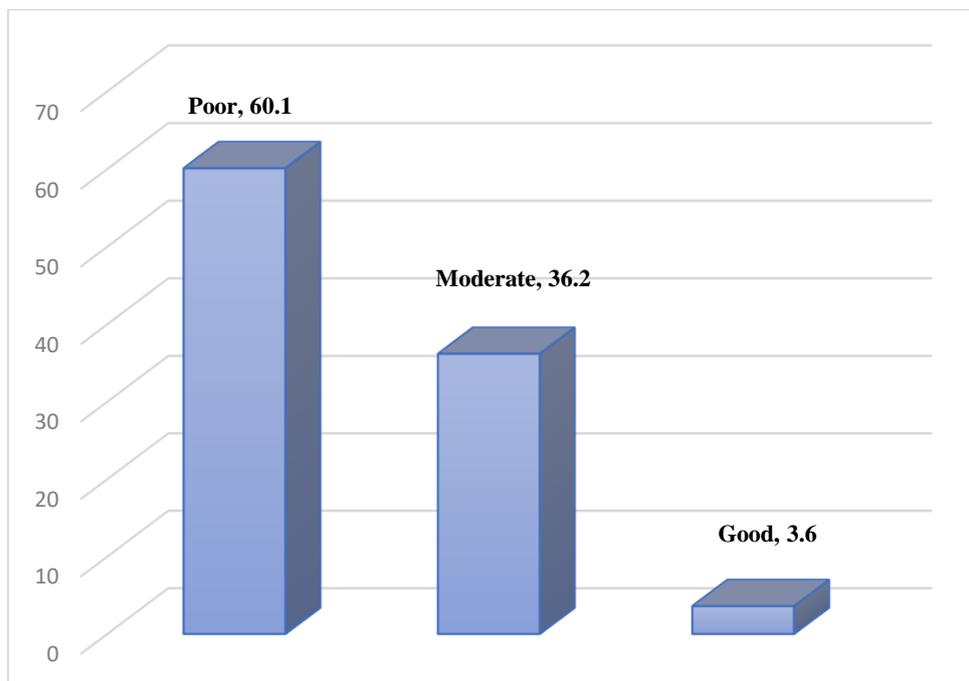


**Appendix (E)**  
**Knowledge and**  
**Practices**  
**Figures**

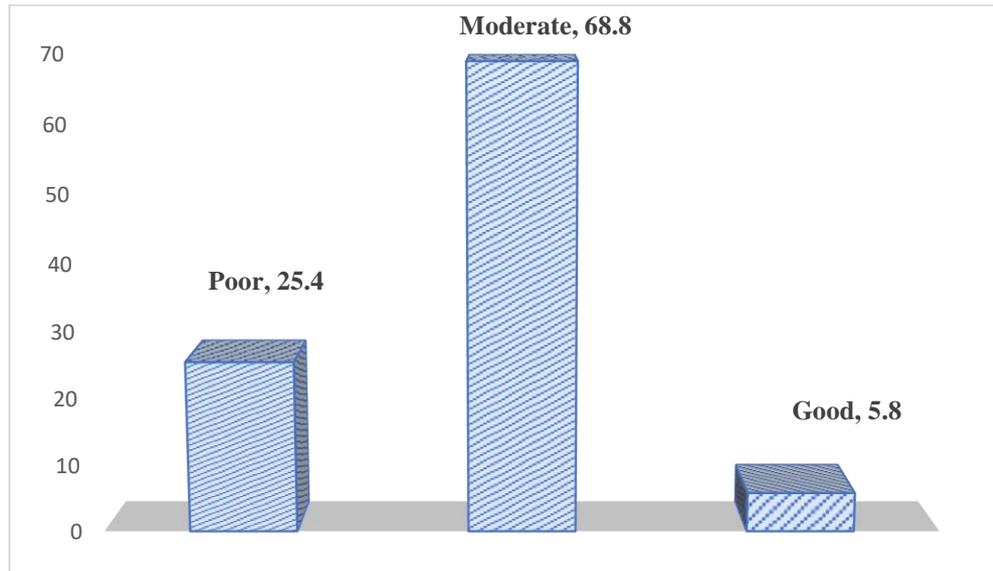
**Figure**



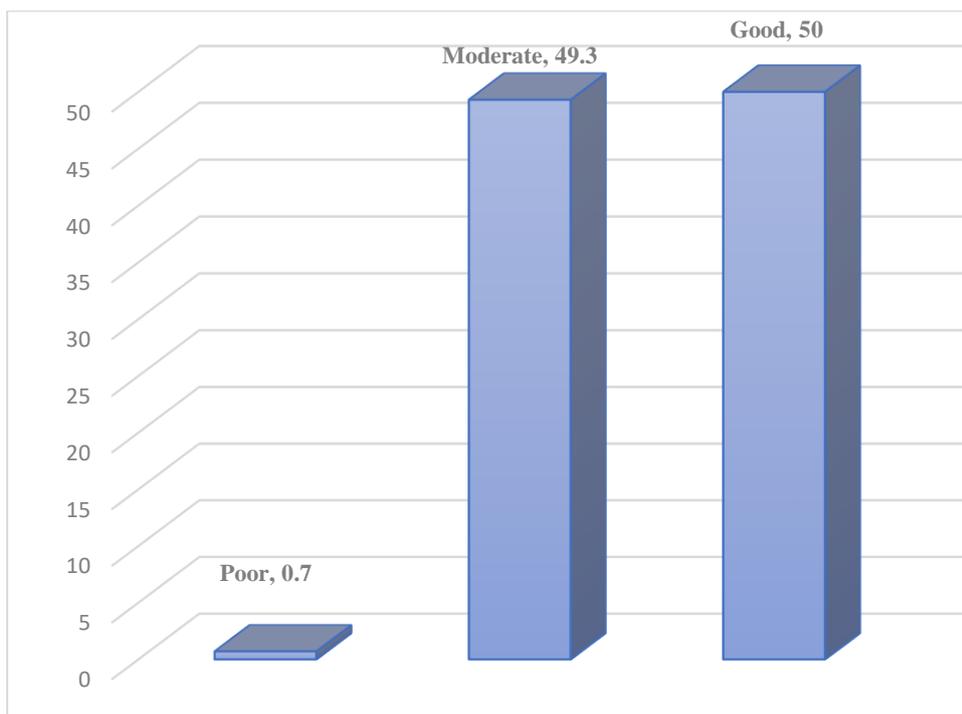
*Figure 3 Overall Assessment of Knowledge Related to Toxoplasmosis Disease*



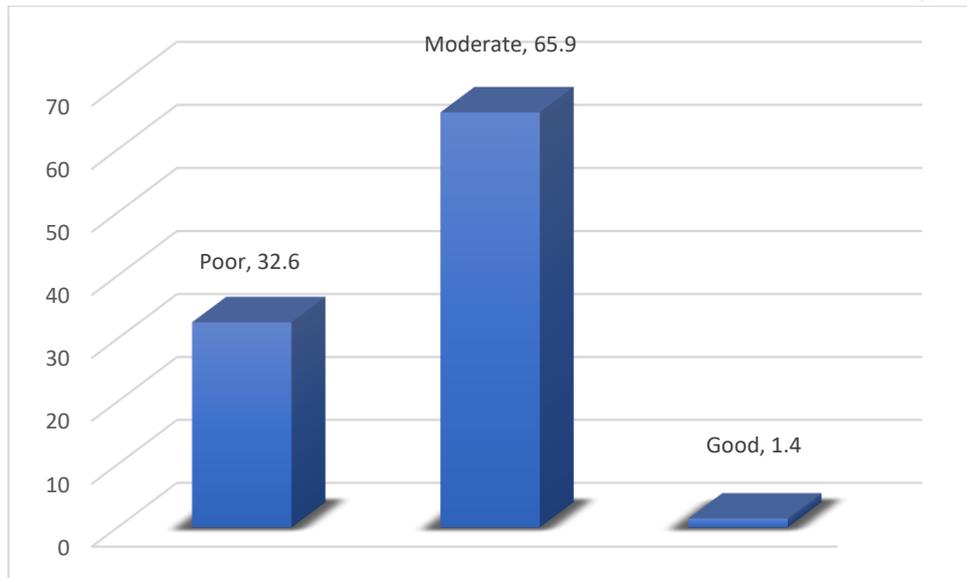
*Figure 4 Overall Assessment of Knowledge Related to Chickenpox Disease*



*Figure 5 Overall Assessment of Knowledge related to Syphilis Disease*



*Figure 6 Overall Assessment of Knowledge Related to Hepatitis B Disease*



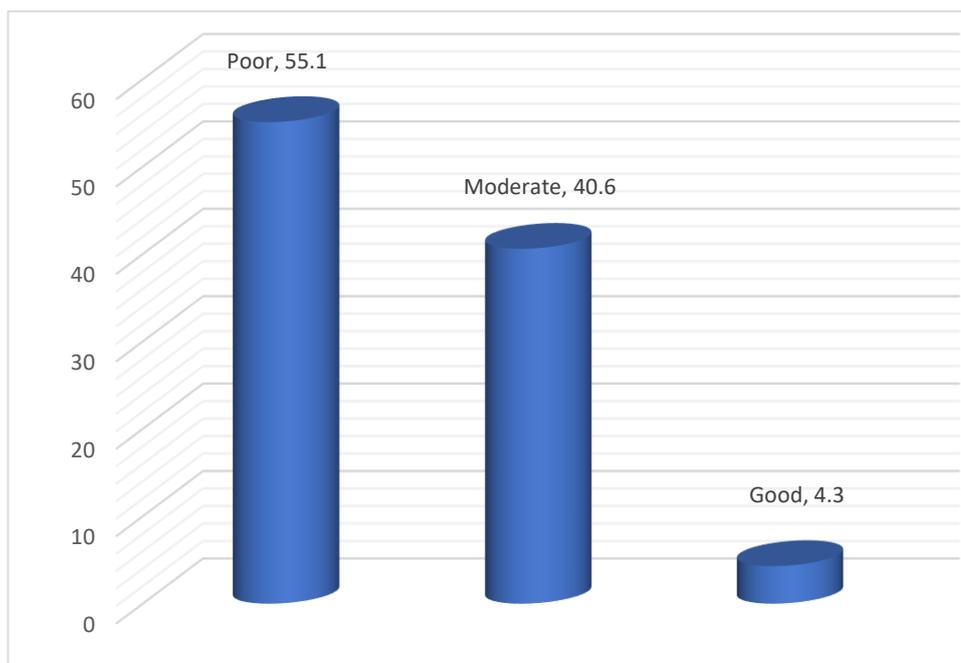
*Figure 7 Overall Assessment of Knowledge Related to Rubella Disease*



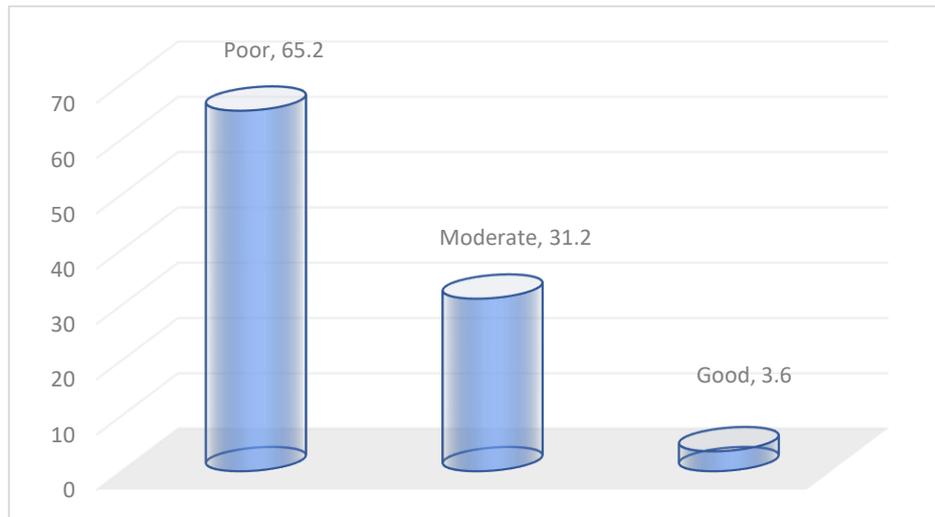
*Figure 8 Overall Assessment of Knowledge Related to Cytomegalovirus Disease*



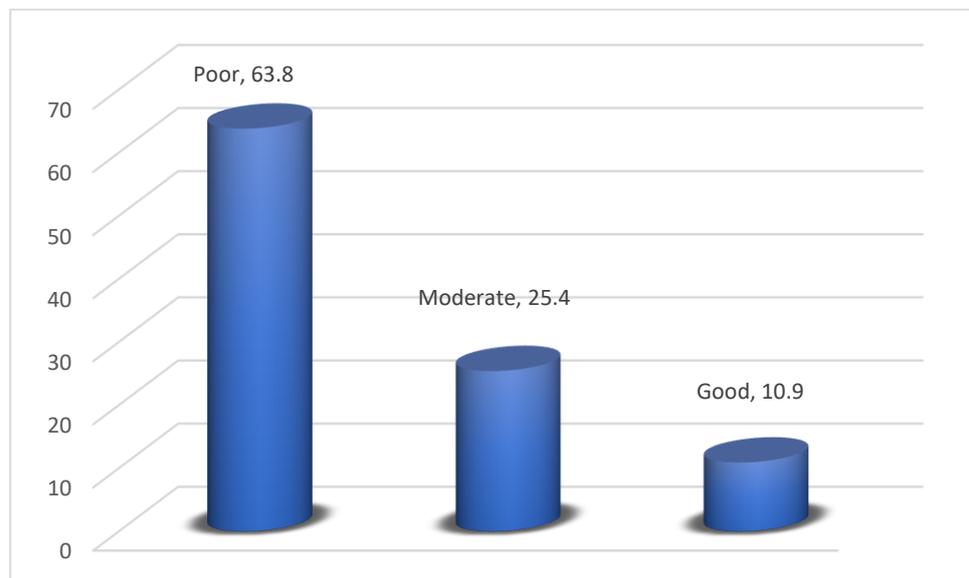
*Figure 9 Overall Assessment of Knowledge Related to Herpes Simplex Virus*



*Figure 8 Overall Assessment of Nurses-midwives Practices Related to Hand Hygiene*



***Figure( 9) Overall Assessment of Nurses-midwives Practices Related to Personal Protective Equipment***



***Figure (10) Overall Assessment of Nurses-midwives Practices Related to Environment hygiene***



جمهورية العراق  
وزارة التعليم العالي والبحث العلمي  
جامعة بابل  
كلية التمريض

**المعارف والممارسات المتعلقة بالتدابير الوقائية لامراض  
التورج بين الممرضات القابلات في مستشفيات التوليد  
التعليمية في محافظة بابل**

اطروحة مقدمة من قبل

**مروه محمد عبد الجليل**

الى مجلس كلية التمريض، جامعة بابل كجزء من متطلبات نيل  
درجة الدكتوراه فلسفة في علوم التمريض

باشراف

**أ.د. سعدية هادي حميدي**

**أ.م.د. جنان أكبر شكور**

## المستخلص

عدوى التورج يمكن أن تعبر المشيمة وتضر بالجنين في الرحم أو تنتقل إلى حديث الولادة أثناء فترة ما قبل الولادة ، مما يؤدي إلى إصابة حديثي الولادة. مختصر أمراض التورج يتضمن داء المقوسات ، أخرى(فيروس الحماق النطاقي ، الزهري ، و التهاب الكبد بي ) ، الحصبة، الفيروس المضخم للخلايا ، فيروس الهربس البسيط.

اجريت دراسة مقطعية وصفية مقطعية من الأول من تشرين الثاني/2020 الى الثالث من ابريل/2022 . شملت الدراسة (138) ممرضة قابلة في مستشفيات التوليد التعليمية في محافظة بابل. كانت عينة الدراسة عينة مناسبة (ملائمة) غير احتمالية. اختارت الباحثة (75) من مستشفى بابل التعليمي للنسائية والأطفال و (63) من مستشفى الامام الصادق التعليمي وتم اختيارهم من الردهة النسائية، غرفة الطوارئ ، صالة الولادة ، وغرفة عمليات الولادة. تم تحديد صلاحية الاستبيان من خلال توزيعها على (17) خبيراً. أجريت الدراسة التجريبية على (20) ممرضة قابلة لتحديد مصداقية الاستبيان. تم تحليل البيانات من خلال الإحصاء الوصفي والاستنتاجي.

كان أكثر من ثلث القابلات الممرضات في سن 21-30 عامًا ، وكان أقل من نصف القابلات حاصلات على دبلوم في القبالة. أوضحت الدراسة الحالية أن غالبية القابلات لديهن معارف متوسطة فيما يتعلق بداء المقوسات. كانت غالبية القابلات لديهن معارف متوسطة بشأن التدابير الوقائية المتعلقة بأمراض التورج ، في حين أن أقل من الثلث لديهن ممارسات ضعيفة. كشفت الدراسة الحالية أن هناك علاقة ذات دلالة إحصائية بين معارف القابلات ومستوى تعليمهن وسنوات خبرتهن عند قيمة  $0.05 <$  البي . وكذلك أظهرت نتائج الدراسة أن هناك علاقة ذات دلالة إحصائية بين ممارسات القابلات وفئاتهن العمرية ، وسنوات خبرتهن عند قيمة البي  $0.05 <$ . وكذلك أوضحت الدراسة أن هناك علاقة ذات دلالة إحصائية بين معارف القابلات وممارساتهن عند قيمة البي  $0.05 <$ . استنتجت الدراسة إلى أن هناك مستوى ضعيف لممارسات القابلات فيما يتعلق بالتدابير الوقائية لأمراض التورج. كذلك كانت هناك علاقة ذات دلالة إحصائية بين المعارف والدورات التدريبية للقابلات. بالإضافة إلى ذلك ، استنتجت الدراسة إلى وجود علاقة ذات دلالة إحصائية بين ممارسات القابلات وسنوات خبرة.

أوصت الدراسة بعقد دورات تدريبية حول التدابير الوقائية لأمراض التورج للقابلات لأنهن أحد المصادر الرئيسية للمعلومات عن الأمراض. وكذلك أوصت الدراسة بعمل ورش عمل لإرشادات أفضل للممارسات للقابلات حول كيفية التعامل مع أمراض التورج.

