

How to Cite:

AL-Jaleel, M. M. A., Humade, S. H., & Shakoor, J. A. (2022). Evaluation of nurse-midwives practices related to the preventive measures for TORCH diseases in maternity teaching hospitals in Babylon Province/Iraq. *International Journal of Health Sciences*, 6(S2), 9856–9867. <https://doi.org/10.53730/ijhs.v6nS2.7570>

Evaluation of nurse-midwives practices related to the preventive measures for TORCH diseases in maternity teaching hospitals in Babylon Province/Iraq

Marwa Mohammed A. AL-Jaleel

PhD student at College of Nursing, University of Babylon

Corresponding author email: marwa.m.abed.aljaleel9019@gmail.com

Saadya Hadi Humade

Prof.Dr. College of Nursing, University of Al-Mustaqbal

Email: saadya.hadi@mustaqbal-college.edu.iq

Jenan Akbar Shakoor

Assist. Prof. Dr. College of Nursing, University of Kikuk

Abstract---Background: 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, hepatitis B), Rubella, Cytomegalovirus, and herpes simplex virus (TORCH) diseases. Objectives: to evaluate nurse-midwives' practices and to find out the relationship between nurse-midwives' practices and demographic characteristics. A descriptive design study was conducted on (138) nurse-midwives in maternity teaching hospitals in Babylon province using observation checklist questionnaires. The data were analyzed by using descriptive statistics (frequency and percentage). A chi-square test was used to analyze categorical variables. The P-value was determined using a P-value of 0.05 to determine statistical significance. The majority of the sample (37.7%) was reported to be between the ages of (21 and 30) years. The majority of the study participants (69.6%) had no prior knowledge of TORCH diseases. The level of knowledge regarding TORCH disease prevention measures was low (63% of nurse-midwives). A significant relationship between nurse-midwives' practices of TORCH diseases and their years of experience and training sessions at a p-value of (0.05). The study concludes that the nurse-midwives' practices toward TORCH diseases were poor, so the study concludes that there was a significant relationship between nurse-midwives' practices and their years of experience.

Keywords---practices, preventive measures, nurse-midwives.

Introduction

Some diseases are more prevalent than others, but they all need to be avoided, just like Toxoplasma infections. Other types of infections (like varicella-zoster virus and hepatitis B) Rubella, Cytomegalovirus, and the Herpes Simplex virus are called (TORCH) diseases (1). Infection with the TORCH virus can have significant effects on a growing fetus, even if it is moderate or asymptomatic in the mother, including intrauterine growth retardation, congenital anomalies, and spontaneous abortion may occur. Toxoplasmosis (T) is a protozoan parasite infection by *Toxoplasma gondii*, and it is the third most 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 (2;3). Toxoplasmosis is ranked fourth among the 24 most dangerous food-borne infections by the Food and Agriculture Organization and the World Health Organization. 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 (4). Toxoplasmosis *gondii* infection in the mother is usually asymptomatic. Some of the symptoms include a mild fever, headaches, myalgias, maculopapular rash, sore throat, lymphadenopathy, and hepatomegaly. Three tests can be done to diagnose toxoplasmosis before the fetus is born if it is suspected. Serological assays to detect the levels of Toxoplasma-specific immunoglobulin G (IgG) and immunoglobulin M (IgM) antibodies in the maternal blood are routinely used to assess immunity to the parasite and any new infection in pregnant women. IgG develops one to two weeks after infection and lasts for the rest of one's life, resulting in immunity in the mother (5). The prevalence of Toxoplasma in Bangladesh was (38.5%). The high rate of disclosure in pregnant women was (75%) stated in Brazil, while the low rate in pregnant women was (5.3%) in Thailand. In Arab countries, the median frequency of IgG was (41.9 %) according to Sudan. In Al- Bahrain, pregnant women had the highest IgG rate (94 %) in Egypt were (2.8%) pregnant women and (44.8%) of pregnant women in Iran. The prevalence of toxoplasmosis was (24.6%) and cytomegalovirus was 1.34% in Turkey (6). Varicella-zoster virus (VZV) is a member of the DNA-containing Herpesviridae family and one of the human herpesviruses (HHVs). Though varicella-zoster is caused by the reactivation of a latent varicella-zoster virus, varicella (chickenpox) is the most common infection caused by the varicella-zoster virus. In immunocompetent persons, it caused typically a mild to moderate disease, although it can lead to significant consequences such as central nerve system (CNS) involvement, pneumonia, subsequent bacterial infections, and death (7). The incidence of varicella-zoster virus (VZV) in Saudi Arabia was 88.5%. In Qatar, according to 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% (7). The Hepatitis B virus (HBV) affects people of all ages

worldwide, including pregnant women and newborn infants. Hepatitis B virus is a deoxyribonucleic acid (DNA) that causes acute or chronic infection and belongs to the Hepadnaviridae family. HBV can be transmitted through contaminated blood transfusions, unprotected intercourse, and a streak with contaminated sharp tools, 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) (8). Infection with the hepatitis B virus is a life-threatening infection with rates ranging from 0.1 to 20% in different parts of the world. The prevalence of HBV in pregnant women varies across Asia, with the highest rates in Taiwan (> 10%) and Thailand (> 8%) and the lowest in Japan (0.8%), and the majority of nations having rates below 8%. The proportion of HBsAg-positive prenatal women varies significantly by country: (3.3 %) in Zimbabwe, (4.6%) in South Africa, (9.5 %) in Senegal, (16.1%) in Zambia, and (24 %) in southern Tanzania (8). Rubella is a togavirus-caused infectious viral disease that typically goes undiagnosed. However, maternal infection during pregnancy can result in fetal loss or congenital rubella syndrome (CRS). Infection within the first 8 to 10 weeks of gestation causes disorders in up to (90 %) of the living fetus, with numerous abnormalities (6). Pregnant women with Rubella experience high temperatures and malaise in the prodromal stage, followed by a maculopapular 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 arise the following lymphadenopathy, which can continue for up to (15 days) after the rash is gone. Congenital rubella syndrome causes hearing loss, cognitive difficulties, liver and spleen enlargement, congenital heart defects, visual diseases such as glaucoma, and intrauterine growth retardation (9). After maternal infection, the risk of congenital abnormalities is basically limited to the first 16 weeks of pregnancy. Fetal growth limitation appears a consequence beyond 20 weeks of pregnancy. When there is 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, serological investigations can confirm the diagnosis of maternal infection (10). According to the World Health Organization's global estimates, there were more than 110,000 infants born with congenital rubella syndrome (CRS) worldwide (11). The herpes virus cytomegalovirus (CMV) is a member of the herpes family. In adults, the virus causes flu-like symptoms, but in a growing fetus, it can cause hearing loss, seizures, and mental retardation (12). Congenital CMV infections caused by primary maternal infections are more likely 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 delivery, hypotonia, poor feeding, lethargy, sensorineural hearing loss, chorioretinitis, hydrocephalus, convulsions, thrombocytopenia, anemia, and pneumonitis (10). 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. If pregnant women are infected with the rubella virus in the 1st trimester of gestation, congenital rubella syndrome can occur (13). The herpes simplex virus (HSV) is the most commonly transmitted sexually transmitted viral illness

(STD) in the world. 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 the twenty-one-day incubation period. The Primary genital HSV infection is asymptomatic in more than (75 %) of patients. This virus is still a leading cause of death and morbidity among neonates. Prematurity, congenital and neonatal herpes are all possible outcomes of pregnancy (14). 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 is called a genital infection, both are spread through sexual and physical contact. Globally, the prevalence of herpes one type (HSV-1) in humans aged 0-49 years was 3.7 billion (or 67% of the world population) while the prevalence of two types (HSV-2) in humans aged 15-49 years was up to 400 million (or 11.3% of the world population) (15). According to the Nursing and Midwifery Programmed at the World Health Organization, nurse-midwives play a central role in health service delivery – promotion, prevention, treatment, and rehabilitation – in areas of great health need where they may be the only frontline providers of health, especially in remote areas... assisting in maximizing the management of TORCH diseases (16).

Methodology

A descriptive design study was conducted at a maternal teaching hospital from 1st October /2020 to 1st January/ 2022. The setting of the study was carried out in two maternal teaching hospitals in Babylon province. The researcher selected maternal and children's Babylon teaching hospital and Imam Al-Sadiq teaching hospital in Babylon province. With a convenient sampling technique of (138) nurse midwives, the researcher selected (75) from the maternal and children's Babylon teaching hospital and (63) from Al-Sadiq teaching hospital were selected from the maternity ward, emergency room, delivery room, and maternal operating room.

Instrument of the study

After a review of related literature and studies according to the study problem, the researcher developed and constructed the study instrument, then translate it into the Arabic language, and the instrument was presented to an expert in the Arabic language for linguistic correction. The study instrument consists of two parts: Part I Demographic Characteristics include (age, level of education, years of experience, courses of TORCH diseases, and source of information). Part II. nurse- midwives' practices regarding preventive measures for TORCH disease include the following parts: practices regarding hand hygiene practices consist of (6) items, practices regarding wearing personal protective equipment consist of (17) items, and practices regarding environmental clean consist of (12) items. The researcher distributed the instrument to (17) experts who have more than (10) experience in the specialty to ensure the validity of the instrument and to confirm the accuracy of the questionnaires to prepare to be ready for sample collection. The experts have evaluated the instrument, the researcher took the expert's adjustments into consideration, and the final copy of the instrument become organized and appropriate to conduct the study.

Pilot Study

The researcher accomplished the pilot study before the collection of data to determine the reliability of the questionnaires from the period (6th to 30th April/2021) conducted on (20) nurse-midwives at the maternal ward, maternal emergency room, labor and birth room, and maternal operating room.

Reliability of the Questionnaires

Internal consistency reliability was measured by coefficient alpha (Cronbach's Alpha) by the researcher, and the coefficient alpha for practice items was (0.883), which was statistically acceptable.

Ethical Consideration

The Research Ethics committee at the University of Babylon, College of Nursing, discussed the application of the study and approved the study to be conducted on March 6, 2021, so the Research Committee of the Training and Human Development Center agreed to conduct the research on May 10, 2021.

Method of Data Collection

The researcher has started the collection of data from the period 2nd June to 1 August/ 2021. Primary assessment to find out where nurse-midwives working and how much of nurse-midwives' numbers who are working in the delivery room, emergency room, maternal ward, and maternal operating room in each hospital through the time of data gathering. For practices, the replies to the objectives were acquired by the researcher using direct observation as a method of data collection, in which nurses and midwives were seen while at work. The researcher conducted three observations on each nurse. Three correct practices out of three episodes were rated as always, 2-1 correct practices out of three episodes were rated as occasionally, and no correct practices out of three episodes were rated as never. The researcher used a three-level Likert scale (always, some time, and never) to measure the practices of the nurse-midwives regarding preventive measures for TORCH diseases. Scoring that used (1) for never, (2) for some time, and (3) for always. The Research Committee of the Training and Human Development Center agreed to conduct the research. "Frequencies, percent, mean, and standard deviation" are statistical procedures for data analysis using descriptive data analysis. A pie chart and bar chart are used to create a graphical display. Cronbach's alpha test and Chi-squared test (χ^2) are used in inferential data analysis to determine the instrument's reliability coefficient. Crosstab (17): the Statistical Package for the Social Sciences (SPSS) version 25 is used to test hypotheses concerning proportional differences as in crosstab (17). 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 , and HS: Highly significant at P probability value 0.0.

The Results

Table (1): Distribution of the Study Sample According to Demographic Variables (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
	51and older	16	11.6
	Total	138	100.0
Education Level	Secondary Midwifery Education	67	48.6
	Diploma Nursing	68	49.3
	College of Nursing and above	3	2.2
	Total	138	100.0
Years of Experience	<5 years	60	43.5
	5-10 years	32	23.2
	11-15years	15	10.9
	≥16 years	31	22.5
	Total	138	100.0
Entered Courses of TORCH diseases	Not entered courses	96	69.6
	One course	11	8.0
	Two courses	28	20.3
	More than two courses	3	2.2
	Total	138	100.0
Sources of Knowledge	Educational Institution	28	20.3
	Social Media	11	8.0
	Courses	12	8.7
	Work Place	87	63.0
	Total	138	100.0

(Table 1) this table illustrates the observed frequencies and percentages of socio-demographic variables: The mean age and standard deviation (SD) for Nurse-midwives in the study were (34.11+8.967), with the bulk of the sample (37.7%) being between the ages of 21 and 30, and the lowest proportion (11.6%) being over 51. The highest percentage (49.3%) of the sample who have a diploma in nursing is followed by those who have graduated from secondary midwifery (48.6%) and followed by those who have graduated from a college of nursing (2.2%). Most midwives (43.5%) in the study have 1–5 years of experience, followed by those who have 5–10 years (32.2%), followed by those who have more than 16 years (22.5%), and followed by those who have 11–15 years (10.9%). The majority of the study sample (69.6%) had no training about TORCH diseases, followed by those who had two sessions of training (n = 28; 20.3%), followed by those who had one session of training (n = 11; 8%), and followed by those who had more than two sessions (n = 3; 2.2%). Most of the nurse-midwives (63%) in the study who acquired information about TORCH diseases from work acquired it from work, followed by those who are in education institutions (20.3%), followed by those who are in courses (8.7%), and followed by those who are on social media.

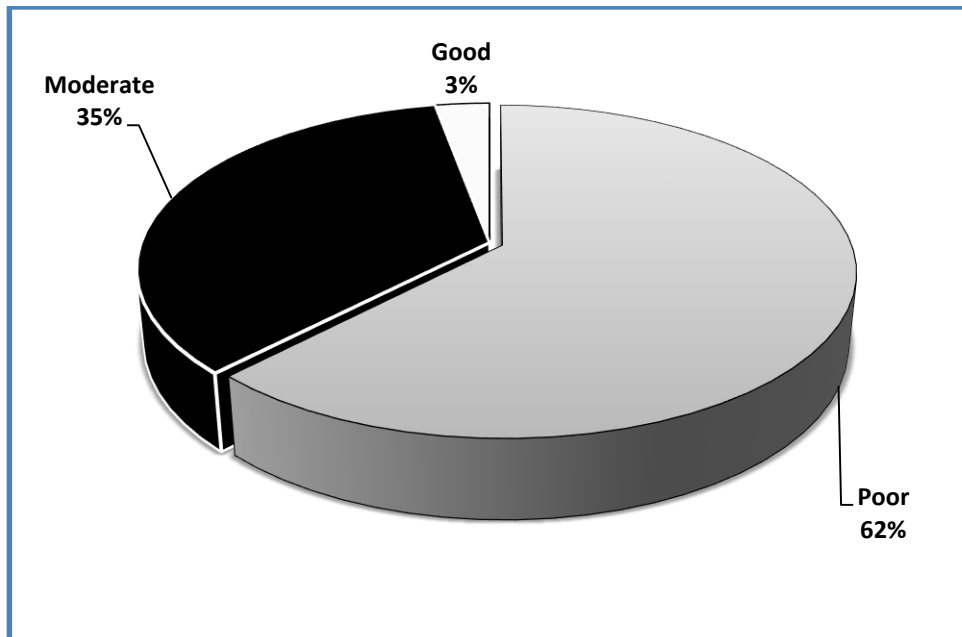


Figure (1): Overall evaluation of Nurses-midwives Practices related to TORCH Diseases

Figure (1) shows that the highest percent of the sample was poor practices.

Table (2): Relationship between Nurses-midwives' practices and their Demographic Characteristics

	Rating	Practices			Total	d.f	Sig.	
		Poor	Moderate	Good				
Age Groups	20-30years old	31	17	4	52	6	χ^2 obs.= 15.196 χ^2 crit.=12.592 P-value=0.019	S
	31-40years old	13	12	0	25			
	41-50years old	35	10	0	45			
	51and older	7	9	0	16			
	Total	86	48	4	138			
Education Level	Rating	Practices			Total	d.f	Sig.	
		Poor	Moderate	Good				
	Secondary Midwifery	42	23	2	67	4	χ^2 obs.= 1.943 χ^2 crit.= 9.488 P-value=0.746	NS
	Diploma Nursing	41	25	2	68			
	College and above	3	0	0	3			
Total	86	48	4	138				
Experience	Rating	Practices			Total	d.f	Sig.	
		Poor	Moderate	Good				
	<5 years	44	16	0	60	6	χ^2 obs.= 18.376 χ^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				
Total	86	48	4	138				

	Rating	Practices			Total	d.f	Sig.		
		Poor	Moderate	Good					
Courses	No trained	63	29	4	96	6	χ^2 obs.= 4.409 χ^2 crit.=12.592 P-value=0.621	NS	
	One session	6	5	0	11				
	Two sessions	15	13	0	28				
	>2 sessions	2	1	0	3				
	Total	86	48	4	138				
Sources	Rating	Practices			Total	d.f	Sig.		
		Poor	Moderate	Good					
	Educational Institution	16	11	1	28		6	χ^2 obs.= 3.458 χ^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					

" χ^2 obs.= Chi-square observer, χ^2 crit. = Chi-square critical, Df= Degree of freedom, P-value= Probability value, S= significant, NS= non significant, S= significant, HS= high significant"

Table (2) illustrates a significant relationship between practices and age and years of experience of nurse-midwives.

Discussion

The present study reveals that more than one-third (37.7%) of the sample was reported at age (21–30) years, and the mean age and standard deviation (SD) was (34.11+8.967). These findings disagree with the study done by Elnashar et al. (2019). Hamood and Khairi (2017) conducted a study in Al-Karhk maternity hospitals in Baghdad city and found that the highest percentage (19%) of the sample's age was (20–24) years. Another study in Babylon province done by Al-Hellaly & Chyad (2019) found that the age of the sample was 20–24 years old. Most of the midwives with experience refused to participate in the study, and this explains why the large proportion of the sample is between the ages of 21 and 30 years. Regarding education level, the findings reveal that less than half of the sample (49.3%) had an education diploma in nursing. This result contradicts a study conducted by Elnashar et al., (2019) in Al Taif, Saudi Arabia, which found that three-quarters of the sample (76.8%) had completed a college education, while another study conducted by Al-Hellaly & Chyad, (2019) in Babylon province found that the majority of the sample had completed secondary education. As well in a study in Al-Karhk maternity hospitals in Baghdad city done by Hamood & Khairi (2017), the present results reported that the highest percent of the midwives are midwifery secondary school graduates. This explains why midwives seek to develop themselves by obtaining a diploma in midwifery sciences. The findings reveal that more than two-fifths (43.5%) of nurse-midwives experienced between 1 and 5 years of experience. This finding disagrees with a study done in the Al Taif area/Saudi Arabia by Elnashar et al., (2019) (25) which indicates that more than half of the sample (59.1%) have less than two years of experience. Another study in Iran done by Joukar et al., (2017) is incompatible with the present study. It appears that two-fifths (41.4%)

of the sample have more than ten years of experience. As well as, a study in Al-Karhk maternity hospitals in Baghdad city done by Hamood & Khairi (2017), incompatible with the present result, reveals that two fifths (42%) of midwives had the experience of less than one year. More than two-thirds of the sample (69.6%) has no training courses related to TORCH diseases. A study in Al-Karhk maternity hospitals in Baghdad city done by Hamood & Khairi (2017) agrees with the present result showing that the vast majority (96%) of the study sample did not participate in any training course on TORCH diseases, so the study done by Devi et al. (2018) stated that the majority of the sample (83%) had no training about TORCH diseases. This means that midwives need more courses about TORCH diseases. Concerning the source of information, less than two-thirds of nurse-midwives (63%) acquired information on TORCH diseases from their workplace. This result disagrees with the study done in Iran by Joukar et al. (2017), which shows that three-quarters of the sample (71.7%) acquired information from books.

Figure (1) According to the current findings, less than two-thirds of nurse-midwives (62.3 %) practiced ineffectively. The findings agreed with a study conducted by Salem (2019) stated that the majority of nurse-midwives practiced ineffectively. 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.

Table (2): The findings revealed that there is a statistically significant relationship between practices and the age of the sample (p -value of 0.05). The increase in age has an effect on the practices, and research suggests that a large percentage of the sample is made up of young nurse-midwives. The results of this study agree with a study among nurses conducted by Salem (2019), who stated that there is a significant relationship between practices and the age of the nurse at a p -value of 0.05. Pereboom et al. (2013) disagreed with the present result, stating that there is no significant relationship between practices and the age of the sample at a p -value greater than 0.05. The current data revealed that there is no statistically significant relationship between practices and the level of education of the sample (p -value $>$ 0.05). Pereboom et al. (2013) found no significant relationship between practices and the level of education of the sample at a (p -value greater than 0.05), which agrees with the current findings. The findings of this study differ from those of Salem (2019), who found a significant relationship between nurse-midwives' practices and the level of education at a p -value of 0.05 in a survey of nurses. The results showed that there is a significant relationship between practices and the years of experience of midwives (p -value 0.05). This suggests that the number of years of experience has an impact on practices. The findings of this study correspond with those of Salem (2019), who found a significant relationship between nurse practices and years of experience with a p -value of 0.05 in a survey of nurses. Another study disagreed with the present finding done by Mursy & Mohamed, (2019) and reported that no significant relationship between practices and experience of the sample. The results illustrate that there is no significant relationship between practices and training courses about TORCH diseases (p -value $<$ 0.05). Practices are improving by increasing training sessions on how to prevent TORCH diseases. The findings of this study differ from those of Salem (2019), who found

a significant relationship between the practices of the sample and training courses at a p-value of 0.05 in a survey of nurses. The current findings are consistent with those of a study conducted by Santos et al. (2017), which found no significant relationship between the practices of the sample and training courses. The current findings reveal that there is no statistically significant relationship between practices regarding TORCH diseases and source of information (p-value > 0.05). This suggests that midwives' practices regarding TORCH illness prevention strategies are unaffected by sources of information about these diseases, whether from the workplace or elsewhere. A study conducted by Salem (2019) agreed with the current result, stating that there is no significant relationship between practices and information sources.

Conclusion

The study concludes that the nurse-midwives' practices towards preventive measures for TORCH diseases were poor. there is a significant relationship between nurse-midwives' practices and age and years of experience at a p-value 0.05.

Acknowledgments

I would like to express my thanks to the Ministry of Health, and Ministry of Higher Education and Scientific Research. Our sincere thanks go to the University of Babylon, College of Nursing. My sincere thanks to Prof. Dr. Amean A.Yasir, Ph.D. Dean of College of Nursing/ Babylon University.. Sincerely thanks and appreciation to my first supervisor Prof. Dr. Saadya Hadi Humade and to my second supervisor Assist. Prof. Dr. Jenan Akbar Shakoor. Sincerely thanks to the nurse-midwives in Al-Sadiq” teaching hospital, and maternal and children’s Babylon teaching hospital who consented to participate in this study.

Competing interests

The authors declare that they have no competing interests.

References

1. Mercy, M. (2018). Effectiveness of STP on Knowledge regarding prevention of “torch” infections during pregnancy among antenatal mothers in a selected hospital at Kurnool. *Journal of neuroscience, psychology, and economics*, Vol. 4, Issue 3, pp. 50 – 53.
2. 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.
3. 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.
4. 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>.
5. 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.
 6. 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.
 7. 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.
 8. 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>.
 9. Ibrahim, W.H., Khalaf, F.R., & Abdel Khalek, E.M. (2018). 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.
 10. Leung, A. K. C., Hon, K.L., & Leong, K.F. (2015). Rubella (German measles) revisited. *Hong Kong med journal*, 25(2):134-141. [PubMed].
 11. 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.
 12. 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.
 13. 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: 10.5742MEWFM.2019.93714.
 14. Prasoona, 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.

15. 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.
16. 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).
17. Hamood, H.I., & Khairi, S.H. (2017, July -August). Determination the outcomes of 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.
18. Al-Hellaly, E.M., & Chyad, R.T. (2019, July 30). Knowledge of Iraqi pregnant woman about toxoplasmosis and their practice towards its prevention. *Journal of university of Babylon for pure and applied sciences, Vol. (27), No. (3)*. 308-315.
19. Devi, A.M., Kaur, J., Swami, I., Sehrawat, H., & Sharma, S. (2018, July). Knowledge regarding torch infection among women between rural and urban area: comparative study. *Global journal for research analysis, volume-7, issue-7*. Print ISSN No 2277 – 8160.
20. 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.
21. 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.
22. 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>.
23. 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>. ISSN 0100-7203.