

## **1.1 Introduction:**

Abortion is termination of pregnancy before viability of the fetus i.e. before 28 weeks (in Britain) and before 20 weeks, or if the fetal weight is less than 500gm (in USA and Australia). When the abortion occurs spontaneously the term "miscarriage" is often used <sup>[1]</sup>.

Etiology of miscarriage : chromosomal abnormalities , blighted ovum , maternal infections , trauma external to abdomen , endocrine causes ( diabetes mellitus , hyperthyroidism , and progesterone deficiency ) , drug and environmental causes (quinine , arsenic, lead ...) , maternal anoxia and malnutrition , over distention of the uterus , immunological causes (i.e. systemic lupus erythematosus ) , aging sperm or ovum , uterine defects (i.e. septum , sub mucous myomas ...) , nervous psychological conditions , over fatigue , and idiopathic <sup>[1]</sup>.

Viral infections in pregnancy are major causes of maternal and fetal morbidity and mortality. Infections can develop in the neonate transplacentally, prenatally (from vaginal secretions or blood), or postnatal (from breast milk or other sources). The clinical manifestations of neonatal infections vary depending on the viral agent and gestational age at exposure. The risk of infection is usually inversely related to gestational age at acquisition, some resulting in a congenital malformation syndrome .Infections known to produce congenital defects have been described with the acronym TORCH (Toxoplasma, others, rubella, cytomegalovirus {CMV}, herpes). The "others" category has rapidly expanded to include several viruses known to cause neonatal disease <sup>[2]</sup>.

Traditionally the only viral infections of concern during pregnancy were those caused by rubella virus, CMV, and herpes simplex virus (HSV). Other viruses now known to cause congenital infections include parvovirus, B19 (B19V), varicella-zoster virus (VZV), West Nile virus, measles virus, enterovirus, human immunodeficiency virus (HIV), and Zika virus <sup>[2]</sup>.

Rubella (German measles, or 3-day measles) is an acute febrile illness characterized by a rash and posterior auricular and sub occipital lymphadenopathy that affects children and young adults .It is the mildest of common viral exanthemas .However, infection during early pregnancy may result in serious abnormalities of the fetus, including congenital malformations and mental retardation .The consequences of rubella in utero are referred to as the congenital rubella syndrome <sup>[3]</sup>.

When rubella infection occurs during pregnancy, especially during first trimester, serious consequences can result <sup>[4]</sup>. If pregnant women become infected with rubella, there is a high risk (approximately 90%) that the viral infection will be passed on to fetus .This can lead to miscarriage, stillbirth, or birth defects known as congenital rubella syndrome <sup>[5]</sup>.

The virus may spread to the fetus through the bloodstream, causing death due to infection in early pregnancy, congenital malformations in infection during the first trimester and more subtle damage in later infections. The most common malformations caused by rubella are cardiac defects, cataract and deafness, which constitute the classical congenital rubella syndrome <sup>[6]</sup>.

## **2. Justification: 1.**

The absence of vaccination programs for rubella virus at River Nile State increase the risk of developing rubella virus infection. Rubella virus infection in early stage of pregnancy can cause miscarriage .This is reason why we performed this research.

## **Objectives: 1.3**

### **1.3.1. General objective:**

To determine the prevalence of rubella virus in women with miscarriage in the first trimester.

### **1.3.2. Specific objective:**

To detect the presence of acute infection with rubella virus among women recently had a miscarriage in the first trimester.

## **1.4. Literature review:**

### **1.4.1. Historical background:**

In 1814,george maton ,first recognized that a mild illness characterized by rash, adenopathy and little or no fever was discrete entity a Veale ,in 1866 ,named the disease rubella .the illness attracted little attention until 1942, when norman, Gregg noticed that first trimester maternal rubella caused serious birth defect .the the full spectrum and impact of rubella emryopathy remained unclarified until rubella virus was isolated in tissue culture in 1962 by two independent groups .parman , buescher, and ,artenstein ,and neva and weller . using the new tools of the virus laboratory , many investigators concentrated on the consequences of a severe rubella epidemic in

1964, which affected approximately 1% of pregnancies newly recognized transient manifestation of congenital rubella infection (CRI) include neonatal thrombocytopenic purpura , hepatitis , bone lesions ,and meningoencephalitis and late-emerging sequelae such as diabetes ,mellitus and progressive rubella pan encephalitis ,added to the cataract , heart disease mental retardation , and deafness previously defined as due to CRI .sharp contrasts were documented between the patterns of virus excretion and immune response of postnatal VS . Congenital rubella, licensure and widespread distribution of attenuated rubella virus vaccines in 1969 have prevented epidemic rubella. Pockets of illness remain, even in the united state, continued effort will be required to eliminate the rubella problem [7].

#### **1.4.2. Classification:**

Rubella virus a member of the Togaviridae family is the sole member of genus Rubivirus. Although its morphologic features and physicochemical proprieties place in the toga virus group, rubella is not transmitted by arthropods [3].

#### **1.4.3. Properties:**

It agglutinates goose, pigeon, dayold chick and human erythrocytes at 4°C, a characteristic which is utilized in the hemagglutination inhibition test for specific antibodies [6]

#### **1.4.4. Morphology:**

The virus composed of one piece of single –stranded RNA, an icosahedral nucleocapsid, and a lipoprotein envelope. However, unlike the paramyxoviruses, such as measles and mumps viruses, it has a positive-strand RNA and therefore has no virion polymerase, its surface spikes contain hemagglutinin .the virus has a single antigenic type .antibody against hemagglutinin neutralizes infectivity. Humans are the natural host [8].

#### **1.4.5. Summary of replication cycle:**

Because knowledge of rubella virus replication is incomplete ,the following cycle is based on the replication of other togaviruses .after penetration of the cell and uncoating the plus-strand RAN genome is translated into several nonstructural and structural proteins .Note the difference between togaviruses and poliovirus , which also has a plus-strand RNA genome but translates its RNA into a single large polyprotein,which is subsequently cleaved .one of the nonstructural rubella proteins is an RAN-dependent RAN polymerase, which replicates the genome first by making a

minus-strand template and then, from that ,plus-strand progeny. Both replication and assembly occur in the cytoplasm, and the envelope is acquired from the outer membrane as the virion exits the cell [8].

#### **1.4.6. Postnatal Rubella:**

##### **1.4.6.1. Pathogenesis and pathology:**

Neonatal, childhood, and adult infections occur through the mucosa of upper respiratory tract .Initial viral replication probably occurs in the respiratory tract, followed by multiplication in the cervical lymphnodes .Viremia develops after 5-7 days and lasts until the appearance of antibody on about day 13-15.The development of antibody coincides with the appearance of the rash, suggesting an immunologic basis for the rash. After the rash appears, the virus remains detectable only in the nasopharynx. Where it may persist for several weeks. In about 25% of cases, primary infection is subclinical [3].

##### **1.4.6.2. Clinical findings:**

Rubella usually begins with malaise, low grade fever, and a morbilliform rash appearing on the same day. The rash starts on the face, extends over the trunk and extremities, and rarely lasts more than 3 days. No feature of the rash is path gnomonic for rubella. Unless an epidemic occurs, the disease is difficult to diagnose clinically, as the rash caused by other viruses (e.g., enterovirus) is similar. Around 50–80% of infections are asymptomatic; infections in childhood are likely to be asymptomatic. Symptoms are usually mild and consist of fever and a maculopapular rash, which may be transient. Arthralgia (joint pains) or frank arthritis may occur in up to 30% of adolescents and young adults with rubella, but are less common in children. Usually big joints are involved and pain may be fleeting in nature. Development of post-auricular shotty lymph nodes is almost pathognomic of rubella (✓)

##### **1.4.6.3. Laboratory diagnosis:**

Clinical diagnosis of rubella is unreliable because many viral infections produce symptoms similar to those of rubella .certain diagnosis rests on specific laboratory studies (isolation of virus or evidence of seroconversion).

### **Isolation and identification of virus:**

Nasopharyngeal or throat swabs taken within 3-4 days after symptoms appear are the best source of rubella virus. Various tissue culture cell lines of monkey (BSC-1.Vero) or rabbit (RK-13.SIRC) ORIGIN, as well as primary African green monkey Kidney cultures, may be used. Rubella produces a rather inconspicuous cytopathic effect in most of the cell line. Using cells cultured in shell vials. Viral antigens can be detected by immunofluorescence 3-4 days post inoculation.

### **Serology:**

The HI test is a standard serologic remove nonspecific inhibitors before testing. ELISA test are preferred in that serum pre treatment is not required and they can be adapted to detect specific IgM.

Detection of IgG is evidence of immunity, as there is only one serotype of rubella virus. To accurately confirm a recent rubella infection

(critically important in the case of a pregnant woman), either a rise in antibody titer must be demonstrated between two serum samples taken at least 10 days apart or rubella specific IgM must be detected in a single specimen. Accurate serologic testing for rubella antibodies is so important that various diagnostic kits in a variety of formats are commercially available. Most individuals are unable to assess their rubella immunity status reliably, because subclinical infections are common and rashes induced by other virus may be mistaken for rubella.

#### **1.4.6.4. Immunity:**

Rubella antibodies appear in the serum of patients as the rash fades and the antibody titer rises rapidly over the next 1-3 weeks. Much of the initial antibody consists of IgM antibodies, which generally do not persist beyond 6 weeks after the illness. IgM rubella antibodies found in a single serum sample obtained 2 weeks after the rash give evidence of recent rubella infection. IgG rubella antibodies usually persist for life<sup>[3]</sup>.

One attack of the disease confers lifelong immunity, as only one antigenic type of the virus exists. Because of the nondescript nature of the rash, immune mothers can transfer antibodies to their offspring who are then protected for 4-6 months.

Maternal viremia associated with rubella infection during pregnancy may result in infection of the placenta and fetus. Only a limited number of fetal cells become infected. Although the virus does not destroy the cells, the growth rate of infected

cells is reduced , resulting in fewer numbers of cells in affected organs at birth .The infection may lead to deranged and hypoplastic organ development , resulting in structural anomalies in the newborn.

Timing of the fetal infection determines the extent of teratogenic effect .In general , the earlier in pregnancy infection occurs , the greater the damage to the fetus .Infection during the first trimester of pregnancy is most critical .Infection in the first month of pregnancy results in abnormalities in the infant in about 50% of cases , whereas detectable defects are found in about 20% of infants who acquired the disease during the second month of gestation and in about 4% of infants infected during the third month .Birth defects are uncommon if maternal infection occurs after the 18<sup>th</sup> week of pregnancy .In apparent maternal infections can produce these anomalies as well. Rubella infection can also result in fetal death and spontaneous abortion.

#### **1.4.7. Congenital rubella:**

Sir Norman Gregg, an Australian ophthalmologist, was the first to describe congenital rubella syndrome (CRS), which consists of the classical triad of bilateral cataract, microcephaly and sensorineural deafness. Other features are hepatosplenomegaly, thrombocytopaenia and a purpurial rash. The risk of fetal malformation is highest (80%) after maternal rubella in the first trimester especially in the first 6 weeks of pregnancy. The risk of fetal malformation decreases from the second trimester onwards, and maternal infection after 20 weeks of gestation although leading to fetal infection has little risk of fetal abnormality (i.e. congenital malformation), although a minority of infants may develop sensorineural deafness later on; therefore long-term follow up is advisable <sup>[9]</sup>.

##### **1.4.7.1. Complications:**

Postnatal acute rubella is a self-limiting illness; in adults rare complications are rubella hepatitis and encephalitis. Acute infection, especially in the first trimester of pregnancy, leads to fetal infection and congenital infection <sup>[9]</sup> .

Intrauterine infections with rubella is associated with chronic persistence of the virus in the newborn .At birth, virus is easily detectable in pharyngeal secretions, multiple organs, cerebrospinal fluid, urine and rectal swabs. Viral excretion may last for 12-18 months after birth, but the level of shedding gradually decreases with age <sup>[7]</sup>.

#### **1.4.7.2. Laboratory diagnosis:**

Infants infected in utero shed large amounts of virus in pharyngeal secretion and other fluids for up to 18 months of age. Virus has been recovered from many tissues tested postmortem

Demonstration of rubella antibodies of the IgM Class in infants is diagnostic of congenital rubella. IgM antibodies do not cross placenta .so their presence indicates That they must have been synthesized by the infant in utero .children with congenital rubella exhibit impaired cell – mediated immunity specific for rubella virus.

#### **1.4.7.3. Immunity:**

Normally maternal rubella antibody in the form of IgG is transferred to infants and is gradually lost over a period of 6 months .In the infants infected in utero , persistence of rubella virus causes a rising titer of rubella-specific IgM and a rise in the specific IgG level that persist long after the fall in maternal IgG.

#### **1.4.8. Transmission:**

The virus is transmitted via respiratory droplets and from mother to fetus transplacentally.

#### **1.4.9. Epidemiology:**

The disease occurs worldwide in areas where the vaccine is not used, epidemics occur every 6 to 9 years, with explosive pandemics every 20-25 years. Humans are the only host for rubella infection is transmitted by the respiratory route. Currently, only 2–3% of young adult females are susceptible <sup>[3]</sup>.

#### **1.4.10. Prophylaxis:**

Passive prophylaxis: There is little evidence that administering normal human immunoglobulin after contact reduces the risk of maternal rubella and fetal infection. Active Prophylaxis Rubella vaccines: Live attenuated vaccine in use now is the RA 27/3 strain grown in human diploid cell culture and administered by subcutaneous injection in a single dose of 0.5 mL. The vaccine is available as a single antigen or combined with measles and mumps components as MMR vaccine. Vaccine induced immunity persists in most vaccines for at least 14–16 years and probably is lifelong. The vaccine virus is apparently not teratogenic. Inadvertent administration of the vaccine to pregnant women may not therefore lead to congenital defects in the baby <sup>[6]</sup>.

#### **1.4.11. Treatment**

There is no specific treatment of rubella nevertheless management is directed towards symptoms so as to reduce discomfort. In the case of CRS in newborns, management focuses on dealing with the complications. The control of rubella has always the golden tool of prevention. Live attenuated vaccine have been in existence since 1969, this vaccine is available either as a single antigen or combined with measles and mumps congenital vaccines. The primary purpose of the rubella vaccine however, is to prevent Congenital rubella infections (Brooks et al., 2010) <sup>[10]</sup>.

## Materials and Methods

### **2.1. Study design:**

#### **2.1.1. Type of study:**

A descriptive cross sectional study.

#### **2.1.2. Study period:**

The study was conducted during the period from March 2018 to July 2018.

#### **2.1.3. Study area:**

River Nile State, in cities of Atbara Aldamar and Berber.

#### **2.1.4. Study population:**

Women with miscarriage in the first trimester

### **2.2. Sample size:**

60 venous blood samples.

### **2.3. Inclusion criteria:**

Women with recent miscarriage (not more than two weeks ago) in the first trimester are the main inclusion selection criteria for all participants.

### **2.4. Exclusion criteria:**

Women without miscarriage.

Women with miscarriage above the third month of pregnancy.

Women with miscarriage more than two weeks ago.

### **2.5. Methodology:**

#### **2.5.1. Collection of blood samples:**

Blood samples were collected by medial vein puncture using 5 ml syringe into plain container

### **2.5.2. Sample processing:**

Each blood sample was centrifuged at 3000 g for 5 minutes, and then serum was gently

Collected into plain container and stored at -20 °C until the serological analysis.

### **2.3.5. Sample analysis:**

The samples were analyzed for qualitative detection of Rubella IgM antibodies by commercially available enzyme–linked immunosorbent assay rubella IgM

ELISA kit.

The assays were performed following the instructions of the manufacturer, According to the information included in the kit’s insert, the immunoassay used has (93.5%) sensitivity and (96.8%) specificity for IgM.

### **2.5.4. Principles of RV IgM:**

The RV IgM EIA test kit is a solid phase enzyme immunoassay based on immunocapture principle for qualitative detection of IgM antibodies in human serum or plasma. The micro well plate was coated with Anti human IgM antibodies. During testing, the specimen diluent and specimens are added to antibody coated micro well plate and then incubated. If the specimens contain IgM antibodies to RV, it will bind to the antibodies coated on the micro well plate to form immobilized anti-human IgM antibody-rubella IgM antibody complexes. If the specimens do not contain IgM antibodies to rubella virus, the complexes will not be formed. After initial incubation, the micro well plate was washed to remove unbound materials. The enzyme-conjugated rubella antigens are added to the micro well plate and then were incubated. The enzyme-conjugated rubella antigens will bind to the immobilized anti-human IgM antibody-rubella IgM antibody complexes Present. After the second incubation, the micro well plate was washed to remove unbound materials. Substrate a (hydrogen peroxide) and substrate b (tetra methyl Benzidine) are added and then incubated to produce blue color indicating amount of rubella virus IgM antibodies present in specimens. Sulfuric acid solution was added to micro well plate to stop the reaction producing a color change from blue to yellow. The color intensity which corresponds to the amount of rubella IgM antibodies present in the specimen was measured with a micro plate reader at 450nm

### **2.5.5. Procedure:**

All reagents and specimens were settled to reach room temperature, 100 µl of calibrator Positive control and negative control were added to their respective wells. 100 µl of sample diluent was added to each well except the blank, and then 5 µl of sample was added. The micro well plate was mixed gently and covered by plate sealer then incubated for 30 minutes at 37 °C. At the end of incubation the micro well plate was washed 5 times using diluted wash buffer. 100µl of conjugate was added to each well except the blank; the plate was covered and incubated for 30 minutes at 37 °C. By the end of incubation period each well was washed 5times with diluted wash buffer. After washing 50 µl of substrate A and substrate B were added to each well including the blank, and then the plate was covered and incubated for 10 minutes at 37 °C. Finally 50 µl of stop solution was added to stop the reaction and the optical density was read at 450 nm within 30 minutes.

#### **2.5.6. Quality control:**

Reagents and calibrators were checked for storage, stability and preparation before starting work Blank absorbance was  $>0.050$  and  $<0.100$  at 450 nm.

Calibrator absorbance was  $< 0.150$  and  $> 0.450$  at 450 nm.

Negative control absorbance was  $> 0.100$  at 450 nm.

Positive control absorbance was  $< 0.500$  at 450 nm.

#### **2.5.7. Calculation of results:**

The results were calculated by relating each specimen absorbance to index value Cut-off value = absorbance of calibrator – Blank absorbance. Index value = Specimen absorbance / cut-off value

#### **2.5.8. Interpretation rubella IgM:**

Positive more than 1.1nm

Negative less than 0.9 nm

Equivocal between {0.9-1.1} nm

$>1.1$  nm negative No significant IgM antibodies to RV were detected  $0.9 < \text{nm} < 1.1$   
Equivocal The sample should be retested using a different method .

$< 0.9$  nm positive Presumptive for the presence of IgM antibodies to RV( )26

In cases of equivocal test results, an additional patient sample should be taken 7 days

Later and re-tested in parallel with the first patient sample

## **2.6. Data analysis:**

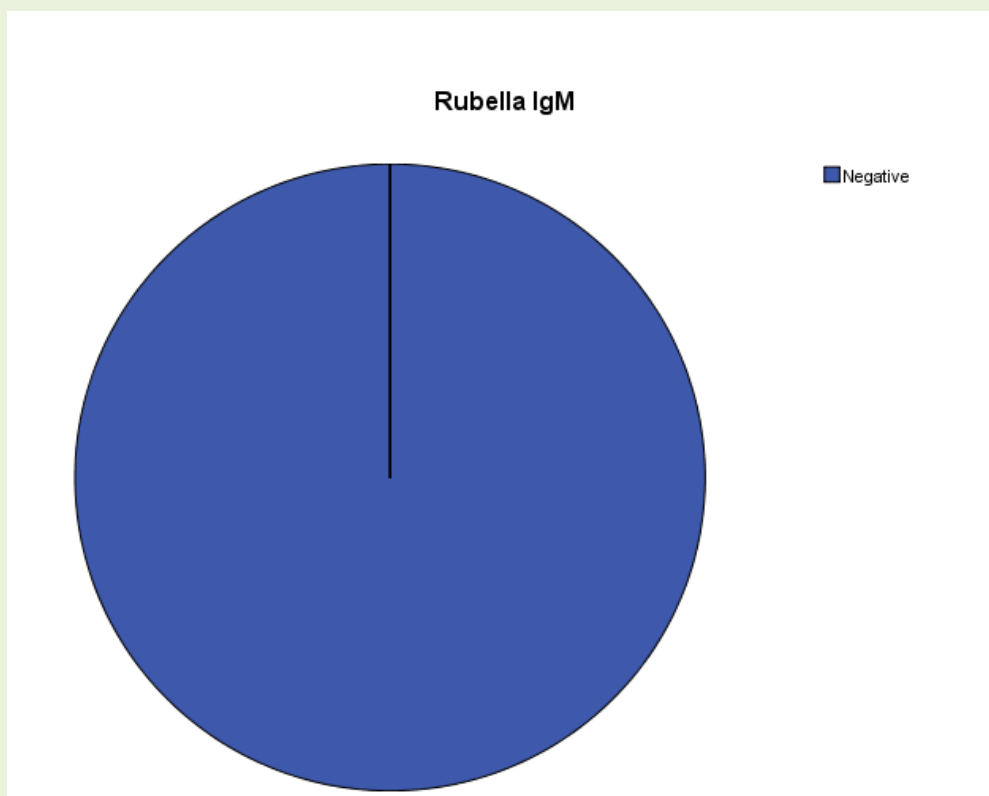
Data was analyzed using software program SPSS (Statistical Package for Social Sciences), Version 16, 0 computerized program.

## Results

**Table [3.1] : Prevalence of rubella IgM**

<b>Result</b>	
<b>Negative</b>	<b>Positive</b>
<b>60</b>	<b>0</b>

60 samples were negative for rubella IgM and no positive cases

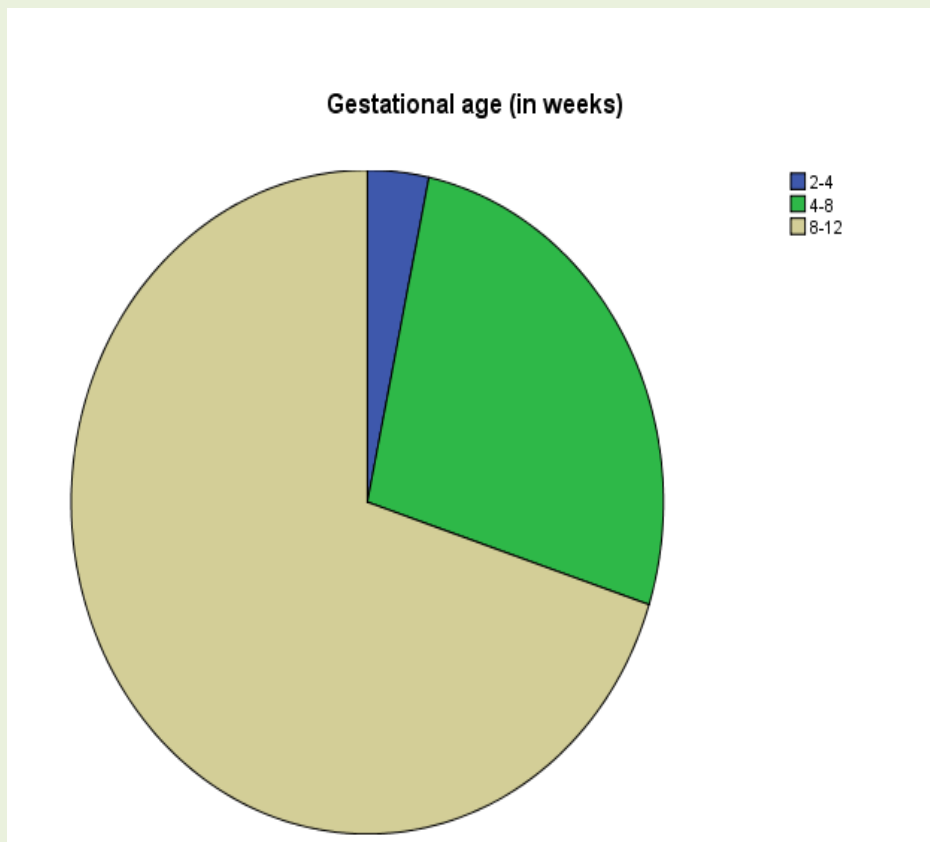


**Figure [3.1]: Prevalence of rubella IgM**

**Table [3.2] :Prevalence of rubella IgM result according to gestational age of miscarriage**

Gestational age (in weeks)	Rubella IgM	
	Positive	Negative
2-4	0	2
4-8	0	16
8-12	0	42

According to gestational age of last miscarriage 2 negative samples in age 2-4 weeks, 16 negative samples in age 4-8 weeks and 42 were negative in age 8-12 weeks and no positive cases in all gestational ages

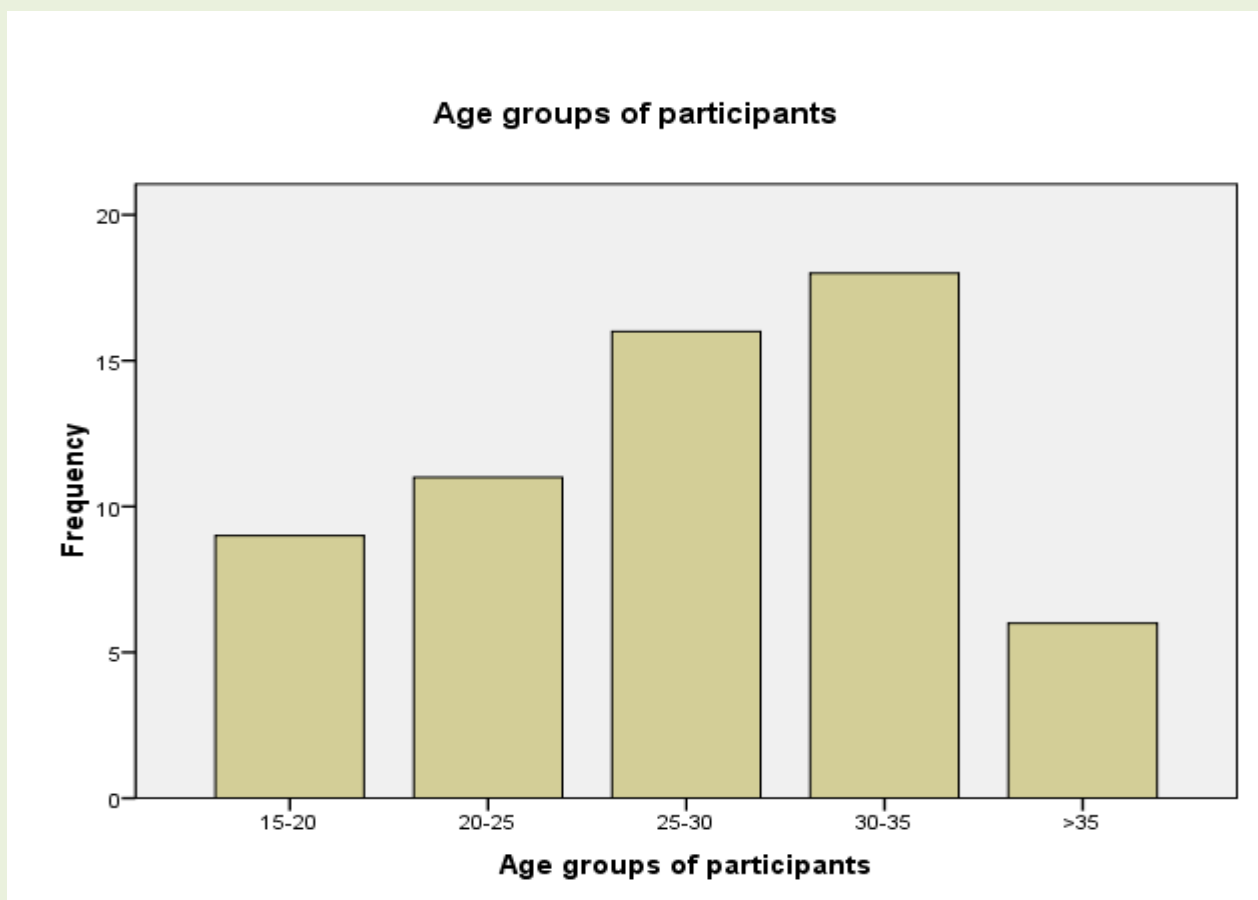


**Figure [3.2] : Prevalence of rubella IgM according to gestational age**

**Table [3.3]: Age groups of participants**

Age groups of participants		
	Frequency	Percent
15-20	9	15.0 %
20-25	11	18.3 %
25-30	16	26.7 %
30-35	18	30.0 %
>35	6	10.0 %

9 (15%) of participants aged 15-20, 11(18.3%) aged 20-25, 16 (26.7%) aged 25-30, 18 (30%) aged 30-35 which is most frequent age, and 6(10%) aged more than 35 years.

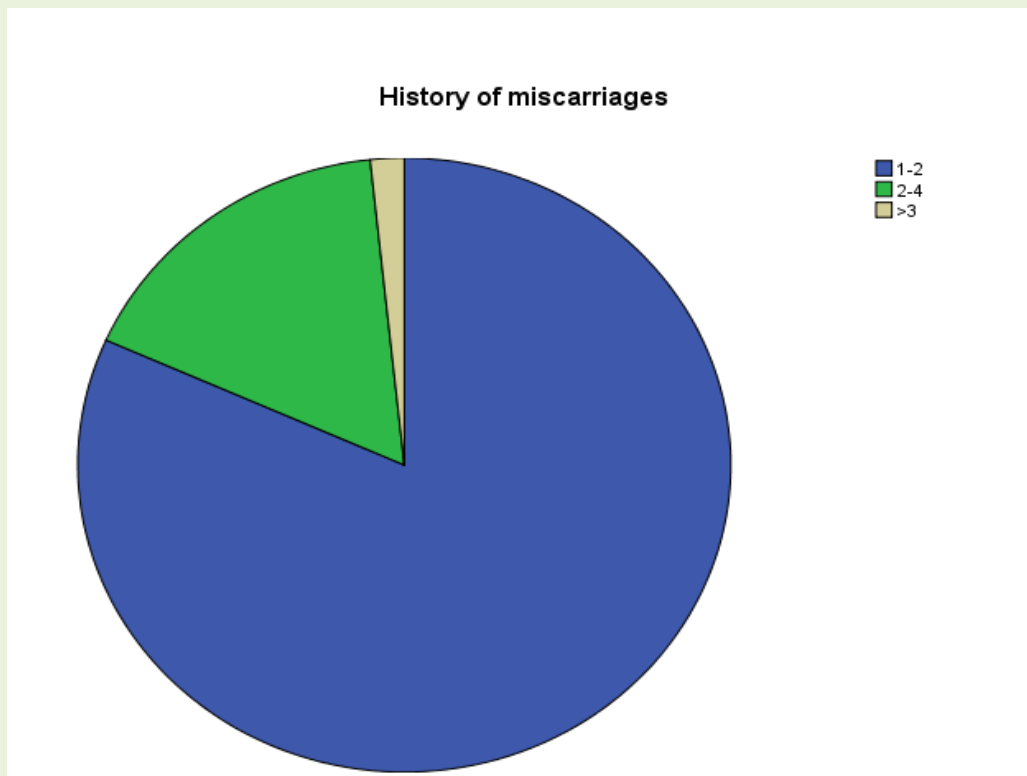


**Figure [3.3]: Age groups of participants**

**Table [3.4]: History of miscarriages according to age groups:**

Age groups of participants	History of miscarriages		
	1-2	2-3	>3
15-20	8	1	0
20-25	10	1	0
25-30	11	5	0
30-35	14	3	1
>35	6	0	0

All age groups of the participants had number of previous miscarriages between 1 and more than three times, most miscarriages occurred in age 30-35 years.

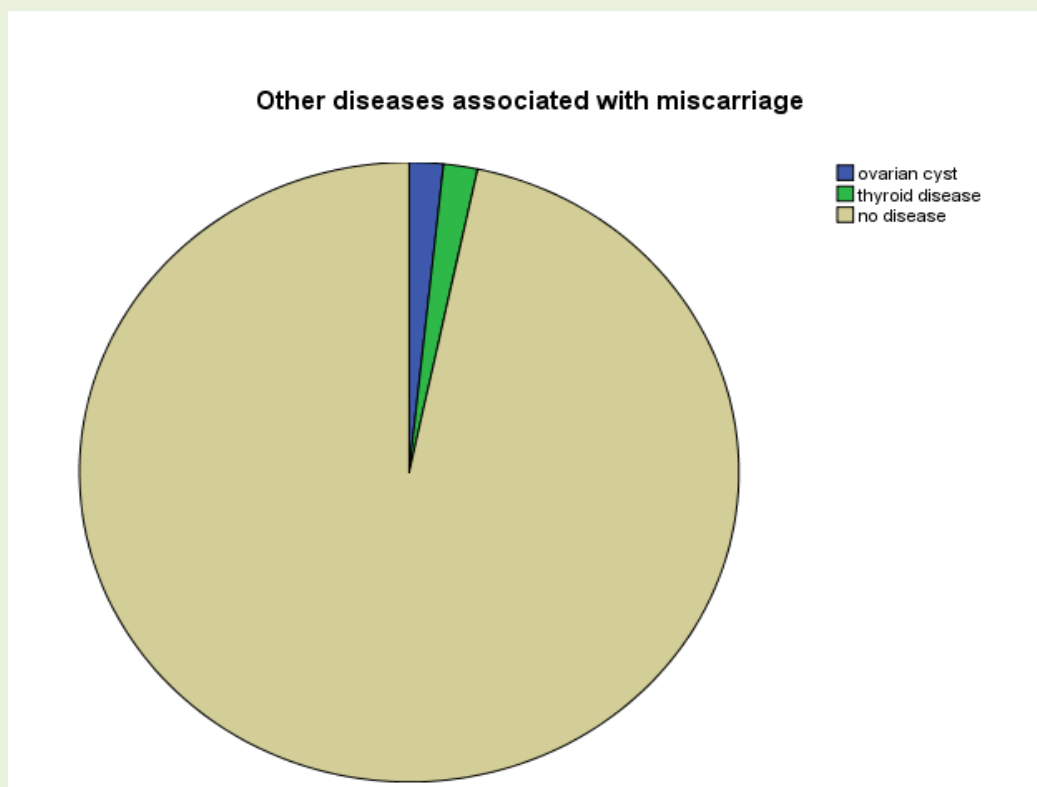


**Figure [3.4]: History of miscarriages**

**Table [3.5]: Universal variables:**

Variables		Frequency	Percent
Residence	Aldamar	20	33.3 %
	Atbara	21	30.0 %
	Berber	19	31.1 %
History of pregnancies	1-3	27	45.0 %
	3-5	13	21.7%
	>5	20	33.3%
Other disease associated with miscarriage	ovarian cyst	1	1.7 %
	thyroid disease	1	1.7 %
	no disease	58	96.7 %

The samples distributed as 20 samples from Aldamar, 21 from Atbara, and 19 from Berber. The history of pregnancies of our participants starts from one to more than five pregnancies. One participant had ovarian cyst and another on had thyroid disease all other participants had no disease with relation to miscarriage.



**Figure [5] : Other disease associated with miscarriage**

#### **4.1. Discussion:**

The diagnosis of rubella is very often missed as the infection is mild and the rash and lymphadenopathy are transient. Infection from rubella virus is particularly serious if contracted during the first 3 months of pregnancy. Primary virus infection during pregnancy may lead to teratogenic effects on the fetus. It is highest in cases of infection during first 3 months of pregnancy (40-60%) and progressively decreases during the fourth and fifth months (10-20%). Women of child bearing age may also be infected as a result of occupational exposure<sup>9</sup>. Episodes of increased incidence of rubella are reported to occur every 3-4 years. The incidence of RV has been decreasing worldwide due to increasing coverage of rubella vaccination, but it remains a threatening and costly disease in regions where pregnant women were not immunized.

Information about the immunity status against rubella is lacking in our country, however, we found two Sudanese studies assessing rubella seroprevalence among women [10, 15].

Sixty blood specimens were collected from women with miscarriage in the first trimester and tested for the presence of rubella virus, by antibody detection using the solid – phase Enzyme-Linked Immune sorbent Assay, detection of IgM antibodies is evidence of immunity as there is only one serotype of rubella virus. Rubella IgM among our study group which consisted of 60 samples was not detected in levels that consider to be positive, that means all of them are susceptible to rubella virus infection.

This rate is considered low when compared with rates in a study made in Khartoum in 2016 in which out of 93 samples were tested for rubella virus 5 participants (5.4%) were IgM positives<sup>[10]</sup>, and another study by Dr Wafaa and her partners in Khartoum in same year consist of 396 pregnant women found that two (0.7%) were IgM positive for rubella virus and 262 (89.4%) were IgG positive<sup>[15]</sup>. But in Nigeria a study in 2015 found that of a 160 pregnant women, 149 (93.1%) and 62 (38.8%) cases were positive for anti-rubella IgM and IgG antibodies<sup>[13]</sup>. In previous research found that 7.4% of cases( 109 cases of total 1471) were rubella virus IgM positive (Zheng F et al , 2002) [8]. In other research out of 507 women with repeated abortion 17.55% were IgM positive for rubella virus in Kashmir India<sup>[11]</sup>. In Egypt the study group consisted of 339 femals the overall prevalence of rubella antibodies in the study group was (88.2% 95% CI 84.8% 91.6%) .The prevalence was 83.9% among women aged 20-25 years and 39 9% among those aged 25-30 years (Amr kandeel et al 2010)<sup>[14]</sup>.

## **4.2. Conclusion:**

In the present study no detection of rubella IgM antibodies was found in these women with miscarriage in the first trimester of gestation.

Facilities for routine diagnosis and vaccination are lacking, all of our sixty participants were not vaccinated against rubella virus.

There is a need to screen all pregnant women and those women in childbearing age for presence of rubella specific IgM antibodies to prevent pregnancy wastage and congenital anomalies.

### **4.3. Recommendations:**

1. Rubella virus IgG should be included in the listed tests for pre married girls in order to give vaccine to negative ones.
2. Pre pregnant screening for antibodies to rubella virus are recommended to be done as routine practice that prevent fetus from infection by rubella virus.
3. A research with large sample size should be done.
4. A research using the PCR technique to detect the rubella virus should be done.
5. Newborns with anomalies should be tested for presence of antibodies against rubella virus.
6. Providing universal infant immunization to decrease circulation of virus.

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## Appendix

### Questionnaire:

Name ..... Residence .....

Age group:

15-20 ( )                  20-25 ( )                  25-30 ( )                  30-35 ( )                  >35 ( )

History of pregnancy .....

Children with anomalies?                                  Yes ( )                                  No ( )

History of miscarriage: ... ..

Gestational age of last miscarriage: ... ..

Cause of last miscarriage: .....

Genetic disease:                                  Yes ( )                                  No ( )

Diabetic?                                  Yes ( )                                  No ( )

Thyroid disease?                                  Yes ( )                                  No ( )

Cardiovascular disease?                                  Yes ( )                                  No ( )

Ovarian cyst?                                  Yes ( )                                  No ( )

Uterine defects?                                  Yes ( )                                  No ( )

Vaccine against rubella?                                  Yes ( )                                  No ( )

Diagnosed with rubella?                                  Yes ( )                                  No ( )

Family member diagnosed with rubella?                                  Yes ( )                                  No ( )

## الإستبيان :

الاسم رباعي :..... المحلية :..... الحي :.....

ما هي فئة عمرك ؟

أكبر من ٣٥ ( ) ٣٥ الى ٣٠ ( ) ٢٥ الى ٣٠ ( ) ٢٥ الى ٢٠ ( ) ١٥ الى ٢٠ ( )

كم عدد مرات الحمل ؟ ( )

هل لديك طفل تمت ولادته بعيوب خلقية

نعم ( ) لا ( )

كم عدد الإجهاضات ؟

في اي شهر حدث الإجهاض الأخير ؟ في الشهر ( )

هل تعانين من مرض في القلب ؟

نعم ( ) لا ( )

هل تعانين من تكيس في المبايض ؟

نعم ( ) لا ( )

هل تعانين من عيوب خلقية في الرحم ؟

نعم ( ) لا ( )

هل سبق تطعيمك ضد الحصبة الألمانية ؟

نعم ( ) لا ( )

هل تم تشخيصك من قبل بالحصبة الألمانية ؟

نعم ( ) لا ( )

( هل بالأسرة شخص تم تشخيصه بالحصبة الألمانية

نعم ( ) لا ( )