

# RESEARCH ON CLINICAL CHARACTERISTICS AND LABORATORY TESTING IN PREGNANT WOMEN WITH MEASLES

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## Summary

*Objectives:* To investigate clinical characteristics and laboratory testing in pregnant women with measles. *Subjects and methods:* 49 pregnant female patients were diagnosed with measles and were treated at the National Hospital of Tropical Diseases from 1/2018 to 12/2019. Descriptive and cross-sectional study. *Result:* The mean age, parity, and gestational age of the 49 pregnant women with measles were  $28.76 \pm 0.59$  years (21 - 29),  $1.91 \pm 0.12$  (1 - 4),  $21.24 \pm 1.3$  weeks (6 - 39), respectively. All patients were febrile, of which 98% patient had temperature from 38°C upwards. Every patient had erythema (87.8% typical measles rash). The cough was found in 85.7% patients, in which dry cough occupied 50%. Runny nose, Koplic's spots, and conjunctivitis were all accounted for 30.6%. There was 28.6% diarrhea. The number of leukocytes above 10G/L was found in 8.2% patients; the rate of lymphocytes < 25% took up 89.8%; thrombopenia (< 150) constituted 30.6%. Enzyme AST and ALT  $\geq 40$  IU/L were responsible for 38.8%, 44.9% respectively. 13 cases had obstetric complications (4 miscarriage, 2 stillbirths, 2 premature birth, 3 threatened to miscarry, 3 threatened preterm birth). *Conclusion:* Pregnant women are possible to get measles at any age, gestational age, any time of year. The clinical characteristics and laboratory tests in pregnant women with measles are similar to those of measles in adults. Pregnant women with measles can be subject to obstetric complications such as miscarriage, stillbirth, and preterm birth.

**Key words:** Measles, pregnant women.

## INTRODUCTION

After the 2014 outbreak, measles comes back all over the world. In 2019, the world confirmed 664221 measles cases in 171/194 countries and territories. The reports of the Preventive Medicine Department had shown that there were 2942 cases of typhus fever in 51 provinces, of which 1093 cases were positive for measles in 40 provinces, with 1 case of death in Hungyen (patient with chronic pneumonia) as of October 22, 2018<sup>[1]</sup>. At the National Hospital of tropical disease, there were more than 500 patients

identified with measles in 2019, of which, many are pregnant women.

Measles is an acute respiratory tract infection that causes many dangerous complications such as pneumonia, malnutrition, encephalitis, otitis media, and corneal ulcer. Especially, Pregnant women with measles can be subject to obstetric complications such as miscarriage, stillbirth, and preterm birth. However, in Vietnam, there is no research on this subject now. Therefore, we conduct this research with the purpose: "To find clinical characteristics and laboratory testing in pregnant women with measles".

## SUBJECTS AND METHODS

**Research subjects:** 49 pregnant patients with measles treated at the National Hospital of Tropical Diseases from 1/2018 to 12/2019. The criteria for chosen patients follow

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the measles diagnostic criteria of the Ministry of Health in 2014.

Exclusion criteria: HIV patients, patients identified with other infections such as rubella, flu, chickenpox, mumps, dengue fever, rickettsia... at the time of admission.

**Methods:** descriptive and cross - sectional study.

- Study time: from 1/2018 to 6/2020.
- Retrospective research: from 1/2018 to 2/2019.
- Prospective research: from 7/2019 to 6/2020.

The criteria of clinical research include age, fever, rash, cough, Koplic's spot, conjunctivitis, runny nose, obstetric complications... Clinical symptoms are examined daily from when the patients are admitted to the hospital to the patients are discharged; the criteria of laboratory testing include the number of leukocyte, CRP, AST, ALT... Test results are taken at the eruption of the disease.

Statistical analysis: Statistical analyses were performed by SPSS version 20.0. Data were presented as either mean  $\pm$  SD or median (range) for continuous variables and the number (%) for categorical variables.

## RESULT

From 1/2018 to 6/2020, there were 49 pregnant women with measles and treated at the National Hospital of Tropical Diseases: 15 patients in the retrospective stage and 34 patients in the prospective stage.

### Characteristics of pregnant women with measles

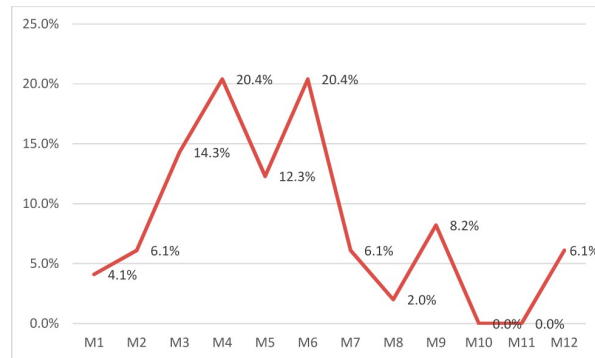
**Table 1. Characteristics of pregnant women with measles (n = 49)**

Variable		n	%
Age	< 30	24	49.0%
	30 - 34	22	44.9%
	> 34	3	6.1%
	$\bar{X} \pm SD$	28.76 $\pm$ 0.59	
	Max - Min	21 - 39	
Gestational age	First trimester	10	20.4%
	Second trimester	25	51.0%
	Third trimester	14	28.6%
	$\bar{X} \pm SD$	21.24 $\pm$ 1.3	
	Max - Min	6 - 39	
Parity	1	15	30.6%
	2	27	55.1%
	3	3	6.1%
	4	4	8.2%
	$\bar{X} \pm SD$	1.91 $\pm$ 0.12	

The age of the pregnant women with measles ranged from 21 - 39 years old with a mean age of 28.76  $\pm$  0.59. The majority of patients were in the age group from 21 to 34, accounting for 93.9%.

The mean gestational age is 21.24  $\pm$  1.3 weeks (6 - 39), the second trimester was most popular and occupied 57.1%.

The average parity was 1.91  $\pm$  0.12 (1 - 4), the second pregnancy was most popular and constituted 51.0%.



**Chart 1 Distribution of cases by month (n = 49)**

Patients were hospitalized sporadically for months of a year, the most in April and June, accounting for 20.4%, there were no patients in the study group hospitalized in October and November.

### Clinical characteristics and laboratory testing in pregnant women with measles

**Table 2. Clinical characteristics of pregnant women with measles (n = 49)**

Characteristic	Pregnant (n = 49)	
	n	%
Typical measles rash	43	87.8%
Koplic's spots	17	34.7%
Cough	42	85.7%
Fever level	37.5 - 37.9	1 (2.0%)
	38 - 39	40 (81.6%)
	> 39	8 (16.3%)
Fever	Hot	42 (85.7%)
	Chills	4 (8.2%)
	freezing	3 (6.1%)
Sore throat	26	53.2%
Runny nose	15	30.6%
Conjunctivitis	17	34.7%
Diarrhea	14	28.6%
Headache	6	12.2%

Among 49 pregnant women with measles, 43 (87.8%) had typical measles rash. While the koplic's spots took up 34.7%, the cough was responsible for 85.7% in pregnant women with measles.

All pregnant women with measles had a fever, of those 81.6% had a moderate fever, and hot fever had 85.7%.

There were 53.2% pregnant patients with measles patients had sore throat while 12.2% pregnant patients had a headache

Some different symptoms were such as runny nose (30.6%), conjunctivitis (34.7%), diarrhea (36.7%) in pregnant patients with measles.

**Table 3. Laboratory testing of pregnant women with measles (n = 49)**

Feature		n	%
Leukocyte	> 10	4	8,2%
	$\bar{X} \pm SD$	6.91 $\pm$ 0.28	
	Max - Min	4.0 - 11.9	
The ratio of lymphocyte under 25%		44	89.8%
Platelet	Thrombocytopenia (< 150)	34	69.4%
	$\bar{X} \pm SD$	165.26 $\pm$ 5.59	
	Max - Min	84 - 254	
AST	> 40	19	38,8%
	$\bar{X} \pm SD$	53.65 $\pm$ 7.24	
	Max - Min	8 - 352	
ALT	> 40	22	44.9%
	$\bar{X} \pm SD$	45.36 $\pm$ 7.39	
	Max - Min	5.0 - 340.8	

The mean of leukocytes was 6.91  $\pm$  0.28 (4.0 - 11.9), 8.2% had an increase in leukocyte, while the proportion of lymphocytes under 25% was 89.8%. The average platelets were 165.26  $\pm$  5.59 (84 - 245), the rate of thrombocytopenia was 69.4%.

The rates of increased AST and ALT were 38.8% and 44.9% respectively.

**Table 4. Frequencies of obstetric complications in pregnant women with measles (n = 49)**

Complications	n	%
Miscarriage	4	8.2%
Stillbirths	2	4.1%
Premature birth	2	4.1%
Threatened to miscarry	3	6.1%
Threatened preterm birth	2	4.1%
Maternal deaths	0	0.0%
Sum	13	26.5%

Obstetric complications accounted for 26.5%, of which the miscarriage constituted 8.2%, the stillbirth took up 4.1% and the preterm births were responsible for 4.1%.

## DISCUSSTION

Measles is an acute infectious respiratory disease caused by the measles virus circulating worldwide. The reports of the Preventive Medicine Department had shown that there were 2942 cases of typhus fever in 51 provinces, of which 1093 cases were positive for measles in 40 provinces, with 1 case of death in Hungyen (patient with chronic pneumonia) as of October 22, 2018<sup>[1]</sup>. At the National Hospital of tropical disease, there were more than 500 patients identified with measles in 2019, of which, many patients are pregnant women.

Our study included 49 pregnant women with measles, the results showed that the age of the pregnant patients ranged from 21 - 39 years old with a mean age of 28.76  $\pm$  0.59, the mean gestational age was 21.24  $\pm$  1.3 (6 - 39), of which the first trimester took up 20.4%, the second trimester made up 51.0%, the third trimester was responsible for 28.6%, the average parity was 1.91  $\pm$  0.12 (1 - 4). Comparison to the study in Eastern Sudan on 61 pregnant patients, the figures for the patients were 26.4  $\pm$  4.6 years, 34.9  $\pm$  8.3 weeks, 2.6  $\pm$  1.73 respectively<sup>[3]</sup>. The study in Namibia on 55 pregnant patients demonstrated the mean of age 26 (16 - 43) while The research in Italy on 24 pregnant provides information with a mean age of 27 (17 - 40)<sup>[4]</sup>. Therefore, there is a similarity in age and parity among pregnant patients with measles in our country with Namibia, Italy, and Sudan. And this age is also the most popular childbearing age in the world. Thus, pregnant women can get measles at any age, any stage of pregnancy.

In our study, patients admitted to hospital for several months in a year, April and June accounted for 20.4%. Compared to the study of Phuc Chu Thi in Hanoi 2018, the high rate of measles was found in May, June, July<sup>[5]</sup>.

Researching the clinical symptoms in pregnant patients with measles, we found that all patients had a fever. In which, fever  $\geq$  38 accounted for 81.6%; the hot fever took up 85.7%. While the erythema was responsible for 100%, the typical measles rash made up 87.8%. 34.7% had koplic's spots, the rate of cough was 34.7%, the sore throat was found in 53.2%, the figures for headache,

runny nose, conjunctivitis, and diarrhea were 12.2%, 30.6%, 34.7%, 28.6% respectively. Compared to the study of Ougbuana in Namibia, all patients had fever and rash, the ratio of cough was 91%; runny nose accounted for 60%; conjunctivitis was responsible for 45%; diarrhea was found in 60%<sup>4</sup>. This comparative indicated that almost clinical symptoms in pregnant patients in Namibia were more common than in Vietnam.

Researching laboratory tests in pregnant women with measles, we found that WBC count is within the normal range (91.8%), the proportion of lymphocyte under 25% (89.8%), thrombocytopenia (69.4%), liver enzymes increased (44.9%). Compared to the study of Thu Hoang Thi, the rate of lymphocyte under 25% was 53.2%<sup>(6)</sup>. Lymphopenia occurs in the early days of measles. Measles virus invades the cellular immune system of the body including mononuclear cells, T lymphocytes, and endothelial cells, causing immunodeficiency. The rate of hepatitis of the two groups was 53.1% and 67.3%, respectively. In the research results of Rosalia in Italy, the rate of thrombocytopenia was 4.1%, hepatitis accounted for 1 (0.0%) in pregnant with measles<sup>[7]</sup>.

Research on obstetric complications in pregnant women with measles showed that 13 patients (25.5%) had obstetric complications, of those, miscarriage was 8.2%, stillbirth accounted for 4.1%, premature birth made up 4.1%. Compared to the study of Thu Hoang Thi in 2015, there were 49 pregnant patients with measles, 9 (18.4%) patients had obstetric complications<sup>[6]</sup>. The research of AbdelAzem in eastern Sudan illustrated that the rates of miscarriage, premature birth, and stillbirth were 6 (11.3%), 4 (7.5%), and 3 (5.7%), respectively<sup>[3]</sup>.

## CONCLUSION

Pregnant women are possible to get measles at any age, gestational age, any time of year.

The clinical characteristics and laboratory tests in pregnant women with measles are similar to those of measles in adults.

Pregnant women with measles can be subject to obstetric complications such as miscarriage, stillbirth, and preterm birth.

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