Epidemiological and Clinical characteristics of patients with clinically diagnosed scrub typhus in Chiang Rai province

Hutsaya Tantipong, MD.
Chiang Rai Hospital

Background

- Scrub typhus is found to be a main cause of acute undifferentiated fever in Thailand, including in Chiang Rai province
- In 2008, Chiang Rai province is ranked third in the country for total Scrub Typhus cases (40.22/100,000)
- However, its epidemiology and clinical characteristics have not been elucidated.

Objective

- To describe the epidemiology and clinical features of patients with clinically diagnosed scrub typhus who were admitted in Chiang Rai Hospital between 2005-2010.
- To assess the factors associated with death in patients with clinically diagnosed scrub typhus.

Methods

- We retrospectively reviewed the medical records of patients diagnosed with scrub typhus from 2005 to 2010 in Chiang Rai hospital
- Febrile patients who were diagnosed to have scrub typhus were included in this study.
- A detailed history of the patients, clinical and laboratory manifestations were retrospectively recorded from medical charts for each patient.

Methods

- The diagnosis of scrub typhus was made on clinical manifestations: fever, headache, calf pain, cough, abdominal pain, myalgia, nausea/vomiting, diarrhea, lymphadenophthy, skin rashes, and eschar.

- Scrub typhus antibody test (SD TSUTSUGAMUSHI, BIOLINE®) was performed in all study patients.

- All diagnosed cases of scrub typhus were positive for antibody against *O. tsutsugamushi*

Study area

- Chiang Rai province is Thailand's northernmost province, and shares natural border with Myanmar and Laos.
- Over 30% of the land area is officially classed as farmland, and rainy season starts around May and ends in October
- The average annual rainfall day is 140 and the average humidity is 76%.

Results

- From 2005 to 2010, a total of 249 patients (age ≥15years) were included in the study.
- Of these, 51% were male and 49% were female.
- The study patients ranged in age from 15 to 84 years.
- Scrub typhus cases were found throughout Chiang Rai province, but varied from district to district.

Mae Sai = 16

Mae Fa Luang = 13

Mae Chan= 18

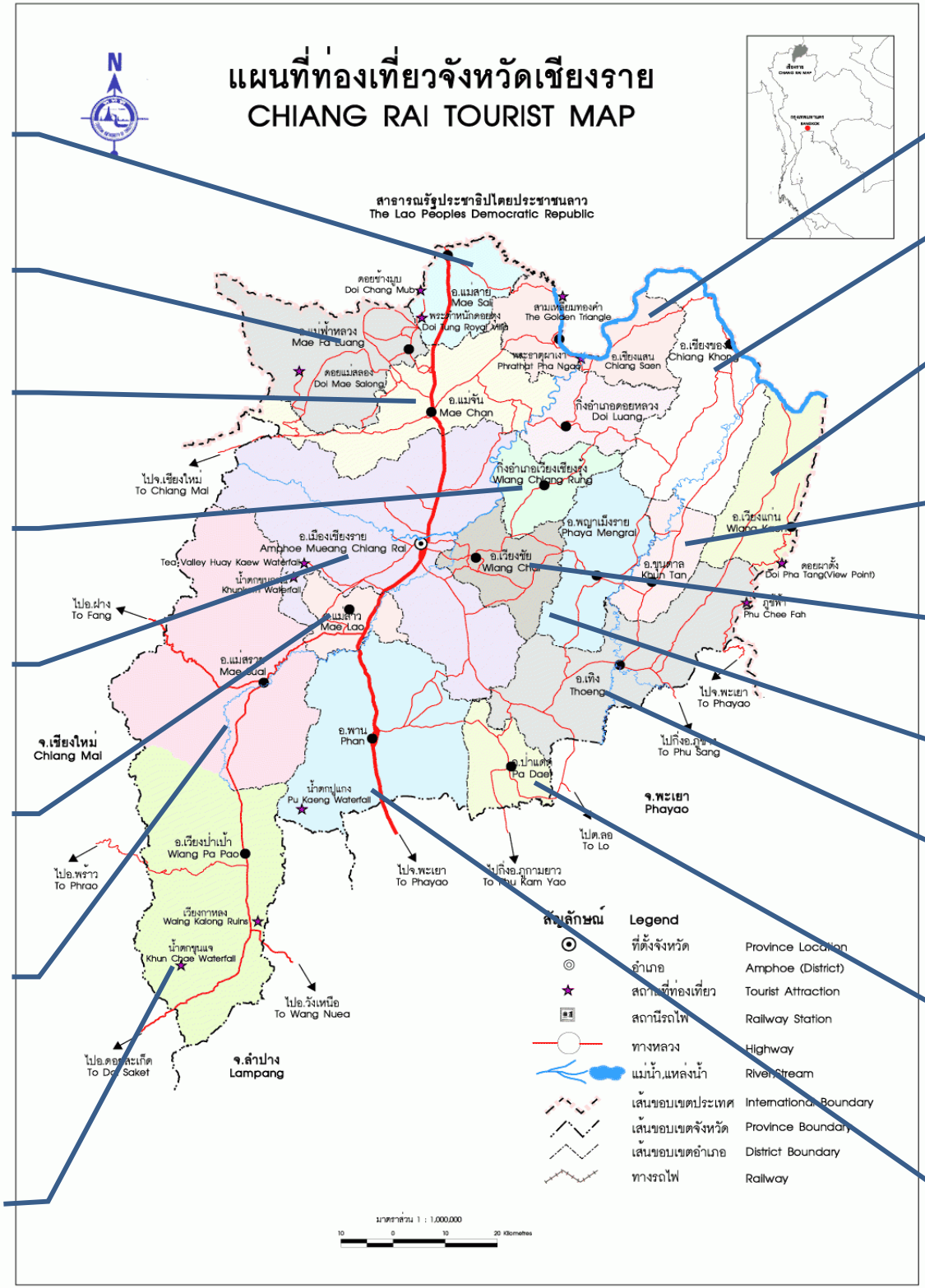
Wiang Chiang Rung = 3

Muang = 88

Mae Lao = 4

Mae Suai = 32

Wiang Pa Pao = 13



Chiang San = 3

Chiang Khong = 3

Wiang Kaen= 7

Khun Tan = 2

Wiang Chai = 7

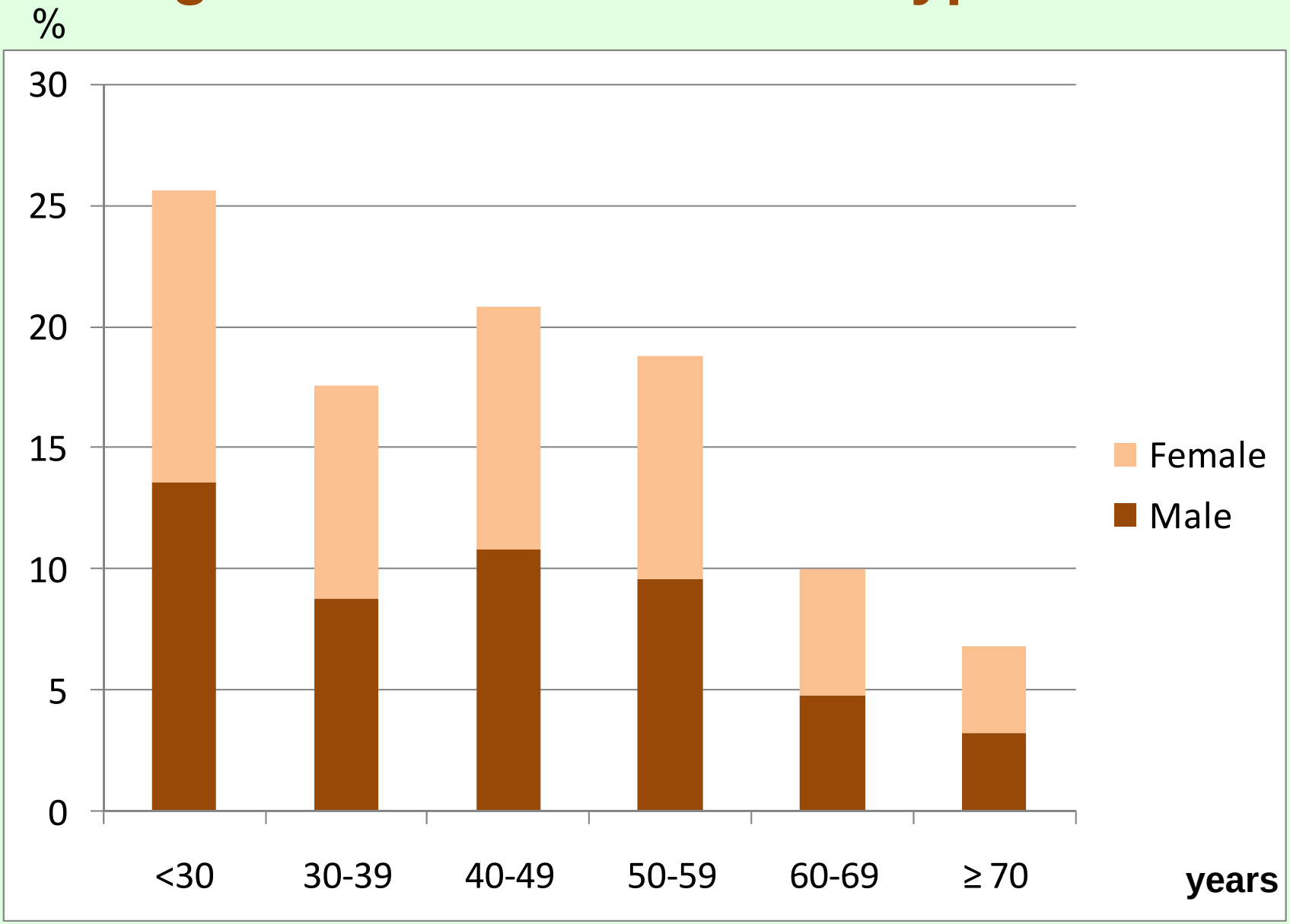
Phaya Mengrai= 2

Thoeng = 15

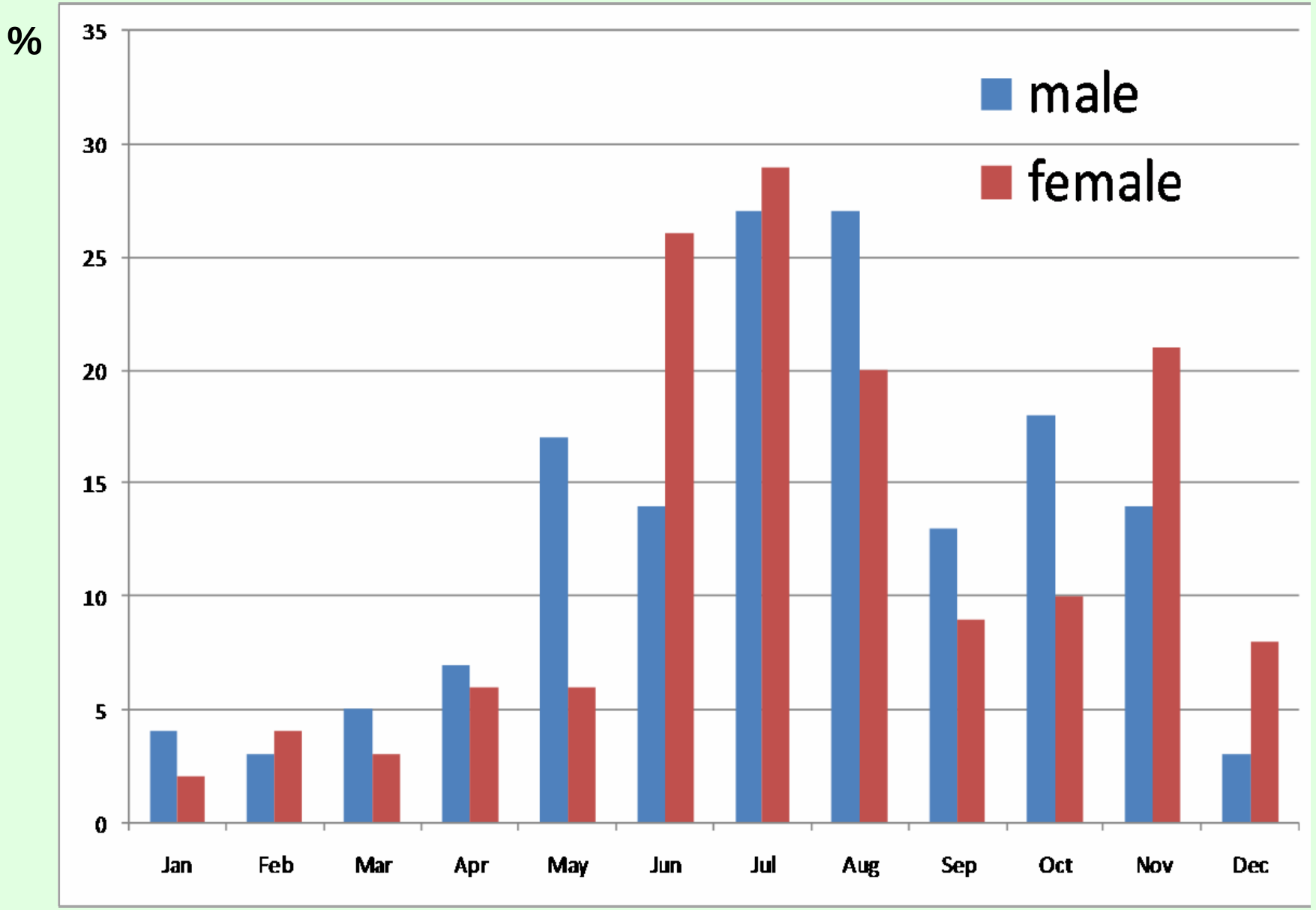
Pa Daed = 5

Phan = 5

Age distribution of scrub typhus cases



Monthly occurrence of scrub typhus cases in 2005-2010



Summer 11.5%

Rainy 56.1%

winter 32.4%

Demographic characteristics of patient with scrub typhus between survivors and those who died

Demographic characteristic	All (n = 249)	Survived (n= 228)	Dead (n=21)	*p-value*
Age (yr)	45.45 (15-84)	44.98 (15-80)	50.52 (16-84)	0.12
Sex, M/F	127/122	117/111	10/11	0.746
Days of fever	5.78(1-14)	5.79 (1-14)	5.71 (1-10)	0.92
Underlying disease	47	44	3	0.57
Organ involvement	197	176	21	<.001
Fever clearance time	2.21 (1-10)	2.21 (1-10)	NA	NA

Clinical symptoms of patients with scrub typhus between survivors and those who died

Symptoms / signs	All (n = 249)	Survived (n= 228)	Dead (n=21)	*p-value*
Fever/ Hx of fever with in 14 day	249	228	21	
Headach	93 (38.8%)	88	5	0.65
Abdominal pain	80 (33.3%)	71	6	0.79
GI symptoms (nausea,/vomiting/ no appetite)	80 (33.3)	75	5	1
Myalgia	61 (25.3)	56	5	0.46
Cough	57 (23.8%)	54	3	0.72
diarrhea	33 (13.7%)	29	4	0.13
Lymphadenopathy	29 (12.1%)	28	1	0.50
Rash	10 (4.2%)	10	0	0.40
Calf pain	9 (3.7%)	9	0	0.70
Eschar	55 (22.1%)	45	10	0.003

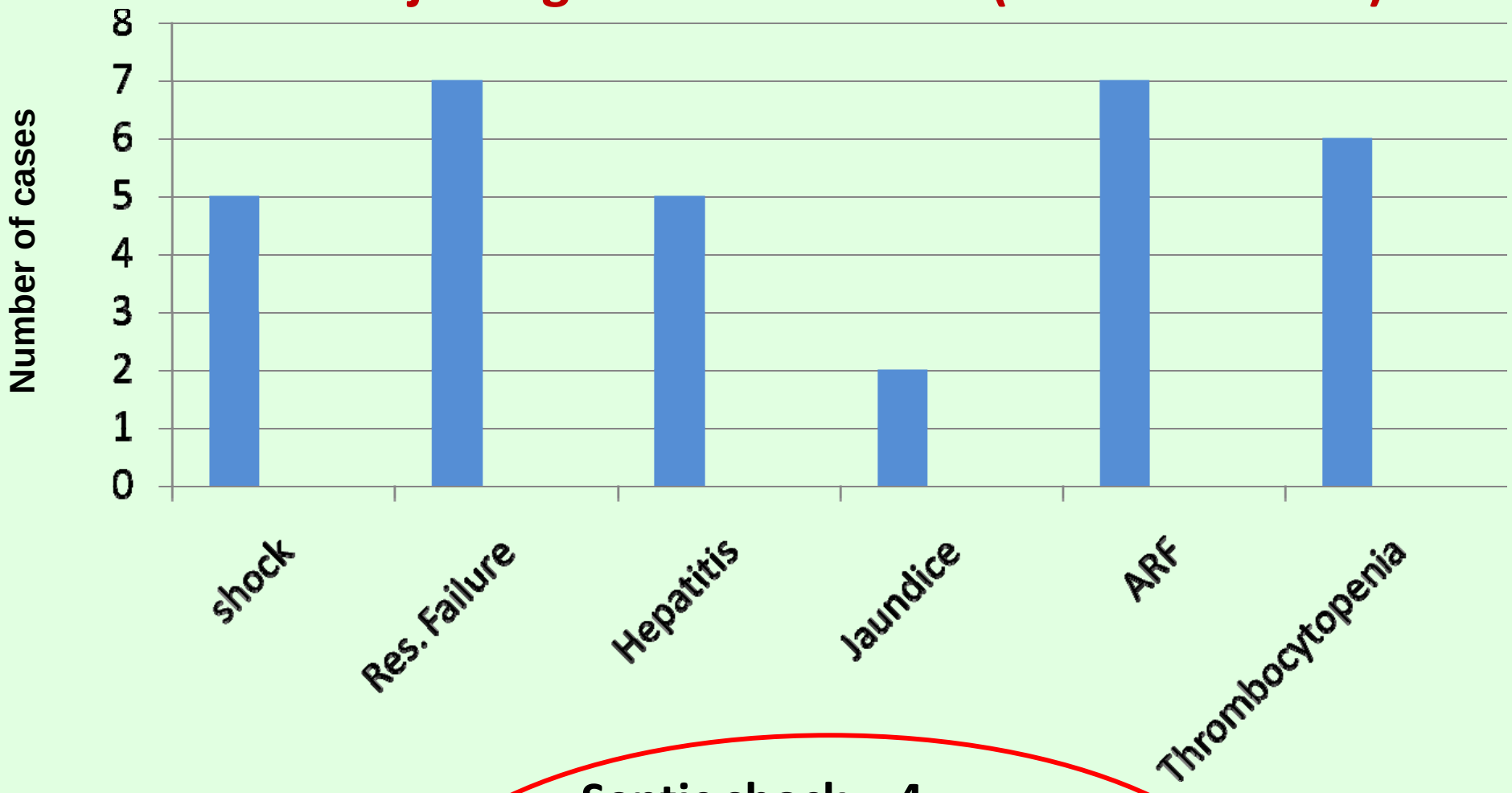
Laboratory findings of patients with scrub typhus

LAB (mean) (normal range)	All (n = 249)	Survived (n= 228)	Dead (n=21)	*P-value*
AST (IU/L) (16-40)	149.2	141.3	218.6	0.005
ALT (IU/L) (8-54)	101.5	102.5	93.2	0.65
Total bilirubin (mg/dl) (0-1.5)	3.0	2.7	5.5	0.12
Alkaline phosphatase (IU/L) (36-92)	220.5	220.2	223.2	0.95
Creatinine (mg/dl) (0.5-1.5)	1.8	1.6	3.9	<.001
Hematocrit (%) (F 36-45, M 40-50)	35.6	35.6	36.0	0.74
White blood cell (/mm^3) (5,000-10,000)	10,012	9753	12,810	0.02
Platelet (/mm^3) (140,000-400,000)	132,985	140,090	56,190	0.001
Neutrophil (%) (55-65)	71.9	71.0	80.2	0.01
Lymphocyte (%) (25-35)	19.9	20.6	12.1	0.006

Clinical Syndromes of patients with scrub typhus between survivors and those who died

	All (n = 249)	Survived (n= 228)	Dead (n=21)	*p-value*
Thrombocytopenia	129 (51.8%)	109	20	<.001
Hepatic dysfunction	121 (48.6%)	103	18	<.001
Acute renal failure	62 (24.9%)	42	20	<.001
Pulmonary involvement	61 (24.5%)	40	21	<.001
CVS involvement	57 (22.9%)	39	18	<.001
Neurological involvement	30 (12%)	23	7	0.02
Number of organ involved				
1 organ	75	75	0	
2 organs	53	53	0	
3 organs	28	28	0	
4 organs	19	11	8	
5 organs	14	8	6	
6 organs	8	1	7	

Clinical syndromes of patients who had 4 major organ involvements (death : 8 cases)



Causes of death

Septic shock : 4
Pulmonary haemor./septic shock: 1
ARDS/septic shock: 1
CHF/ARDS/septic shock: 1
ARF/septic shock : 1

Clinical syndromes of Pts who had 5 organ involvements (death : 6 cases)

Age/ sex	Organ involvement						Causes of dead
	Cardio vascular	Resp.	Neuro.	Hepatic	Acute renal Fail.	Thrombocy topenia	
63/M	shock	Resp.fail	N	hepatitis	Y	Y+ UGIH	Hospital acquired infection (CABSI)
19/M	shock	ARDS, resp.fail	N	Hepato megaly	Y	Y+ UGIH	Pul. hemorrhage
57/M	shock	ARDS, resp.fail	N	hepatitis	Y	Y	Septic shock
83/ M	Myocarditis cardiogenic shock	Pul. edema Resp. failure	N	hepatitis	Y	Y	Hospital acquired infection (VAP , CABSI)
58/M	shock	ALI Resp.fail	N	hepatitis	Y	Y + UGIH	Hospital acquired infection (VAP)
54/F	SVT, shock	Resp.fail	N	hepatitis	Y	Y	Septic shock

Clinical syndromes of patients who had 6 major organ involvements (death : 7 cases)

Age/ sex	Organ involvement						Causes of dead
	Cardiovas.	Resp.	Neuro.	Hepatic	Ac. Renal Failue	Thrombo cytopenia	
75/F	shock	ARDS Resp. fail	Alter. Of conscious	hepatitis	Y	Y	Hospital acquired infection (VAP)
56/F	shock	Pneumonitis ALI	meningitis	hepatitis	Y	Y	Septic shock
60/M	shock	ARDS, resp.fail	seizure	Hepatitis/ jaundice	Y	Y+UGIH	Septic shock
53/F	shock	ARDS, resp.fail	seizure	hepatitis	Y	Y	Septic shock
45/F	shock	ALI resp.fail	encephalitis	Hepatitis/ Jaundice	Y	Y	Hospital acquired infection (CABSI)
38/F	shock	Resp.fail	seizure	Hepatitis/ Jaundice	Y	Y	Rhabdomyolysis Septic shock
46/F	shock	ARDS, resp.fail	seizure	Hepatitis/ Jaundice	Y	Y+ UGIH	Hospital acquired infection (VAP)

Treatment

- In this study, drug of choice for treatment scrub typhus was Doxycycline :
  - Doxycycline and Chloramphenicol were prescribed in 213 cases and 35 cases, respectively.
  - Azithromycin was prescribed in 1 case
- For those with serious complication or those who have clinical sepsis, drug of choices were Ceftriaxone and Doxycycline.

Response to treatment

- Most patients had clinical response to doxycycline.
- A slow response was found in 39 cases (response to treatment $\geq$ 3 days after receiving treatment).
- For 21 cases who died:
  - 9 cases died within 2 days after admission
  - 7 cases; response to treatment, but died from hospital acquired infections (VAP, CABSI)
  - 5 cases; data regarding response to treatment was not available.

Conclusion

- Most patients presented with non specific symptoms such as fever with headache, abdominal pain, GI symptoms.
- The presence of eschar, the pathognomonic sign of scrub typhus, was found only in 55 cases (22.1%)
- 79.11% of scrub patients had at least one organ involvement and 48.9% had multi organs involvement

Conclusion

- All of dead cases had at least 4 organs involvement .
- Septic shock is the most common causes of dead in this study.
- Eschar, organ involvement, Liver enzyme AST,

serum creatinine level, thrombocytopenia and leukocytosis with predominant neutrophil were associated with death

Thank you for your kind attention