

## BACKGROUND

Sepsis and septic shock are the life threatening condition for any patient. Early treatment with the appropriate empiric antibiotic is the most effective treatment strategy. However, use of broad spectrum antibiotic for longer time can lead to C. Diff infection, resistance and other adverse reaction. Although the Surviving Sepsis Campaign (SSC) the International Guidelines for Management of Sepsis and Septic Shock 2016 recommends de-escalation of treatment after getting the final culture and identification of causative pathogen, yet adherence to this practice remains unknown.<sup>1-2</sup>

## OBJECTIVE

- To evaluate the time to de-escalate antibiotic therapy after getting preliminary culture in sepsis patient at community teaching hospital.
- To understand the development of C.Diff infection due to overuse or misuse of antibiotic therapy.

## METHODS

### Study Design

- Setting: 362 bed tertiary care center
- The study design was single-center retrospective cohort study
- A chart review of 207 sepsis patients was conducted. Out of 207 patients only 93 patients were included in this study as shown in Figure 1.
- Electronic medical records were examined for patient characteristics, antibiotic indication, empiric and de-escalated regimen, duration of therapy, length of stay and in-hospital mortality.
- Primary outcome assessed based on the length of hospital stay when the de-escalation was carried out within 8 hours and when no de-escalation was carried out up until 3 days.

### Inclusion Criteria

- Adults aged 18-89 years
- Diagnosed with a sepsis/severe sepsis or septic shock and started on broad spectrum antibiotic

### Exclusion Criteria

- Patient who did not satisfy the inclusion criteria

### Definitions

- De-escalation refers to reduction in spectrum of administrated antibiotic by either discontinuation or by switching it to narrow spectrum agent based on the antibiogram.<sup>2</sup>
- Sepsis was defined as 2 or more SIRS criteria and a suspected or documented infection.
- Broad spectrum was defined as the antibiotic which has at least one MRSA or pseudomonas coverage.

### Statistical analysis

- The Student's t test (Welch's test) for unequal variance was used to compare the LOS between the two de-escalation groups.
- The distribution of LOS of the two groups were not bell shaped therefore, t-test was not appropriate for this study. The non-parametric Mann-Whitney U test was used to compare the LOS of two groups.
- Mann-Whitney U test was used to compare LOS for genders.
- Kruskal-Wallis test was used to compare LOS for different races and different types of infection (Table 1).
- This study also looked at association between the age of the patient and LOS(Figure 2). A small value of R<sup>2</sup> indicates that age is not predictor of LOS.
- Comparison was only conducted for who was started on broad spectrum antibiotic and satisfies the inclusion criteria.
- A p-value of 0.05 or less indicated statistical significance.
- The project was approved by the Institutional Review Board(IRB) committee.

## RESULTS

Figure 1: De-escalation patients with sepsis

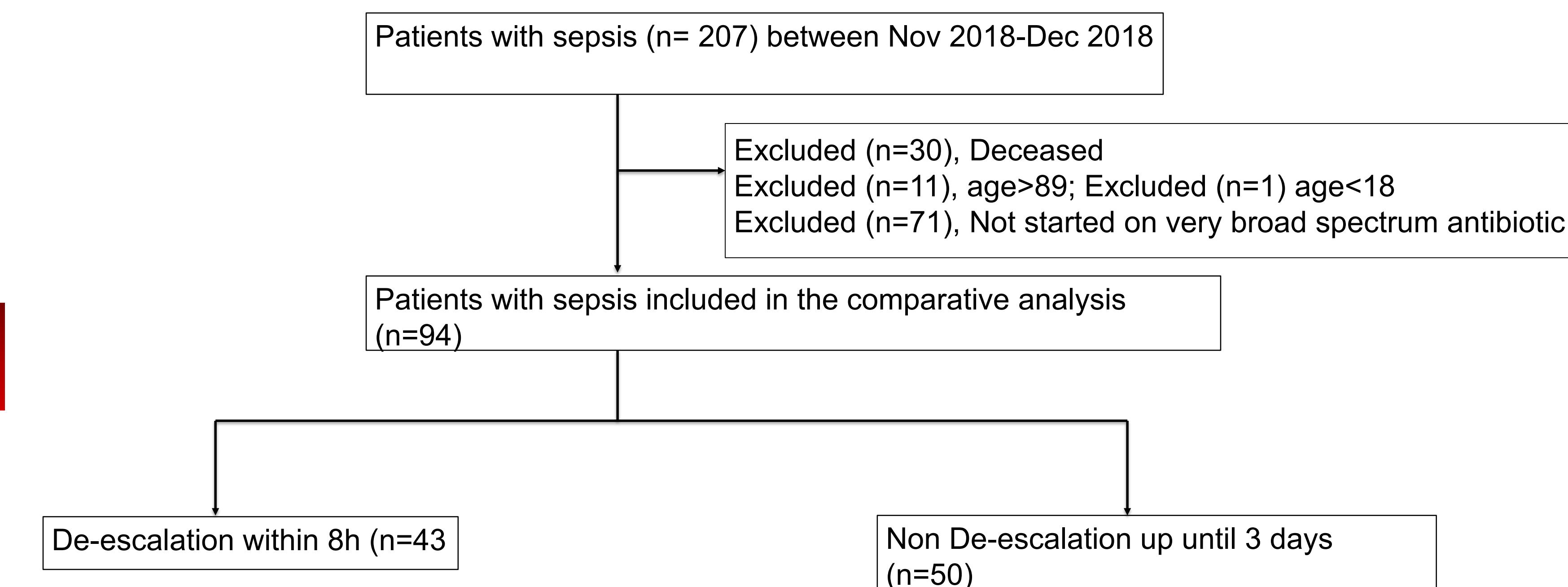
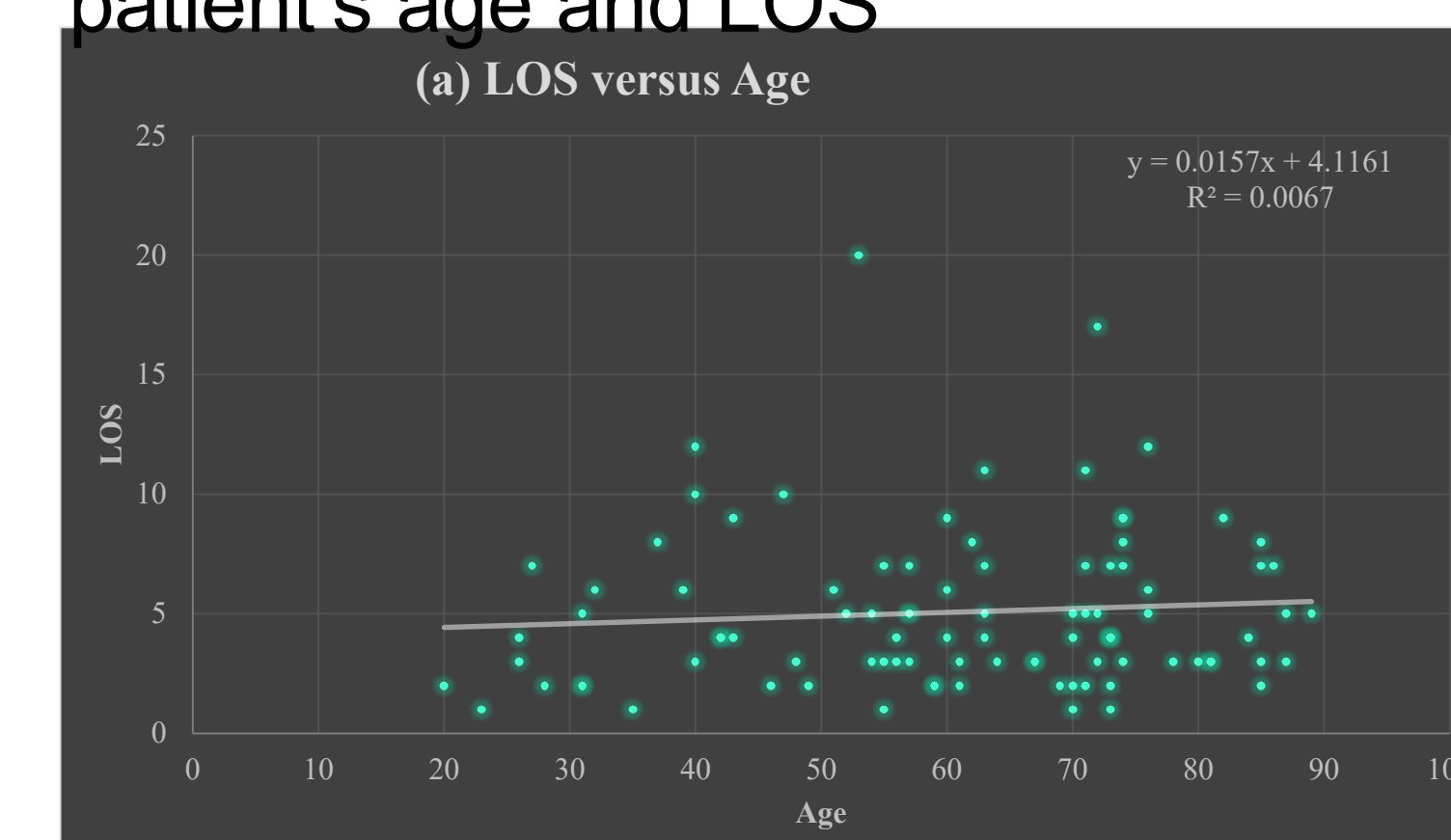


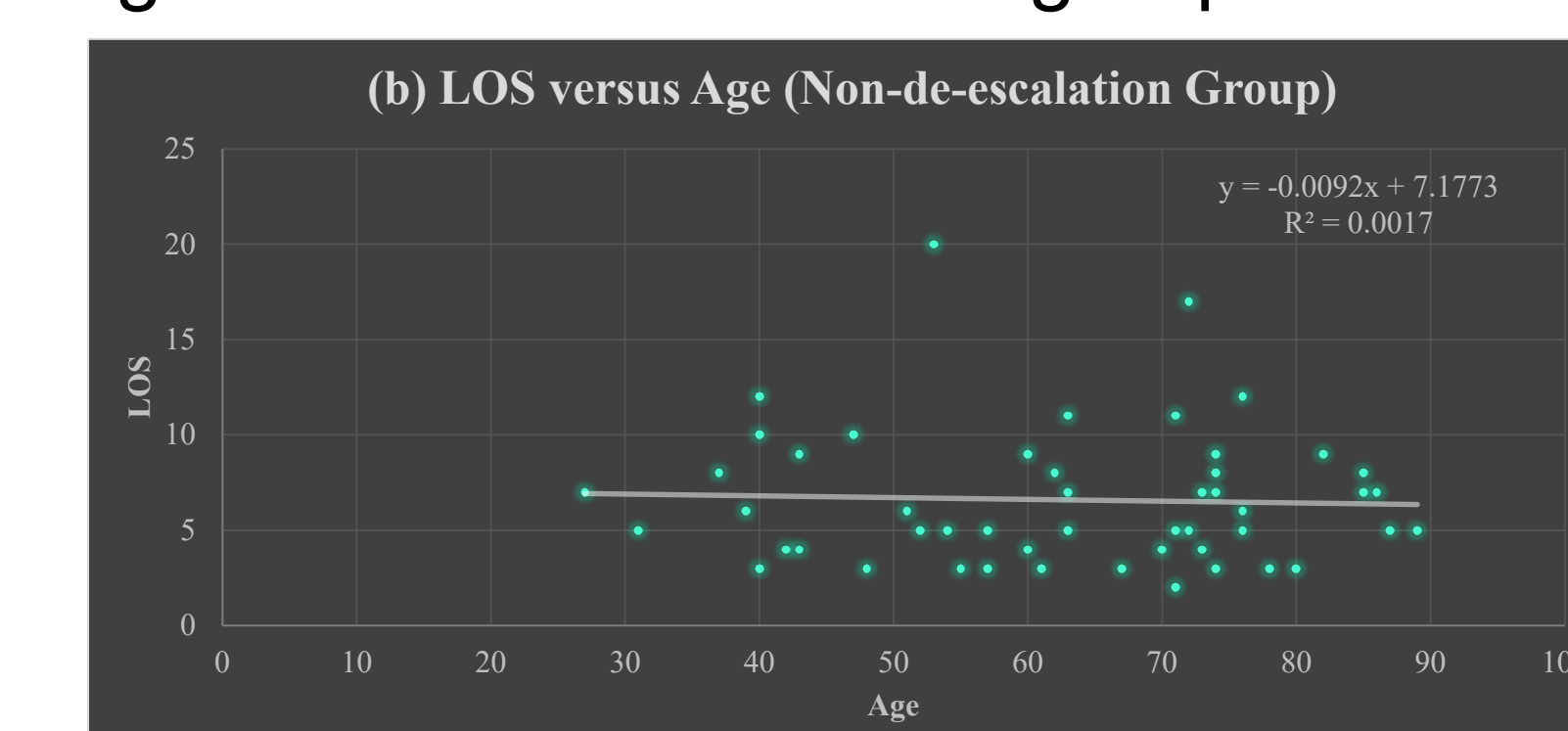
Table 1: Baseline characteristics of patients by study group

	De-escalation within 8 hours (n= 43)	No de-escalation up until 3 days (n= 50)	P-value
<b>Demographic data</b>			
Age	58.2 (20-87)	61.2 (27-87)	0.12 >0.05
Female	22	33	0.14 >0.05
Male	21	18	0.29 >0.05
Race			0.42>0.05
<b>Focus of sepsis</b>			0.25>0.05
CAP	7	12	
UTI	7	4	
Skin-soft tissue	5	9	
Intra-abdominal	11	7	
HAP/VAP	2	5	
Bacteremia	2	2	
Other infection	9	12	

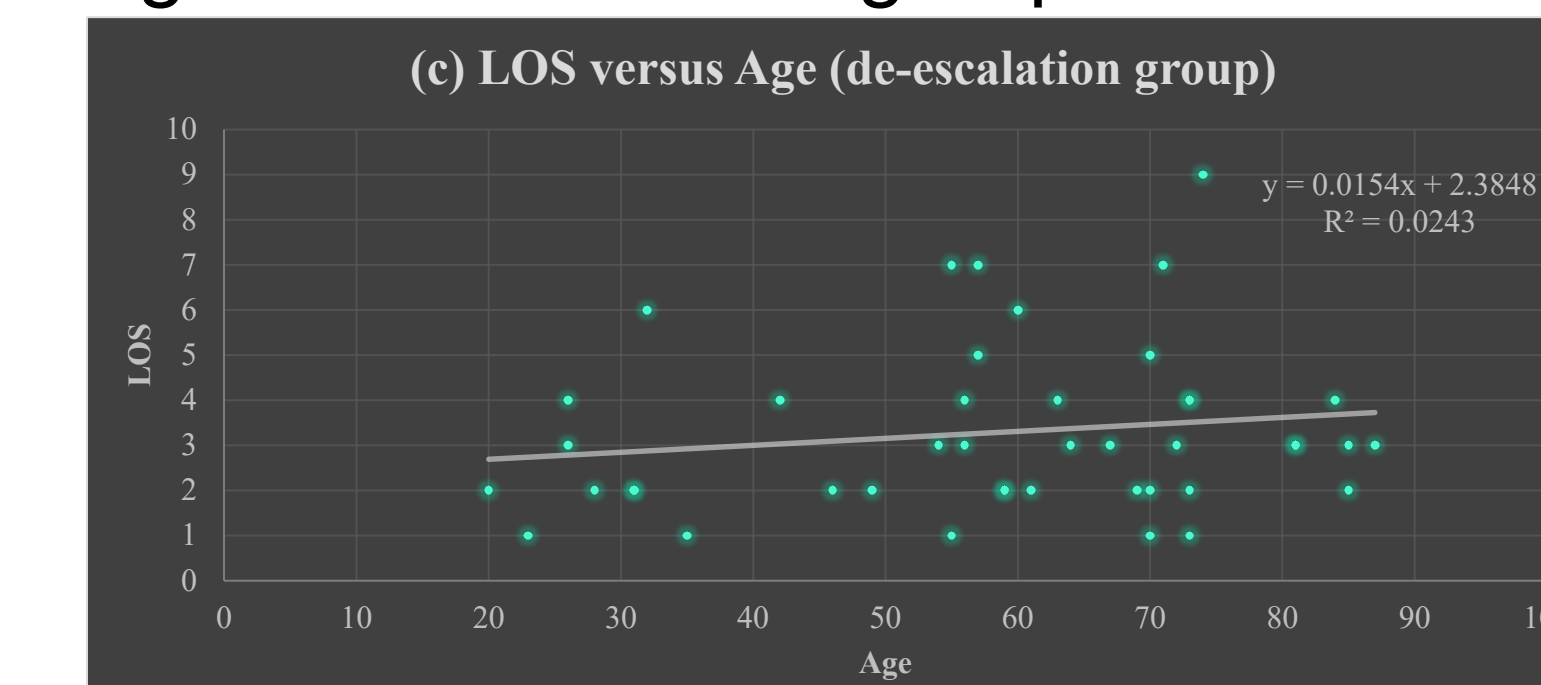
Figure 2 (a) Association between overall patient's age and LOS



2 (b) Association between the patient's age in non-de-escalation group and LOS



2 (c) Association between the patient's age in de-escalated group and the LOS.



## RESULTS

Figure 3: Length of hospital stay for the patients who underwent de-escalation within 8 hour versus patient who were not de-escalated up until 3 days

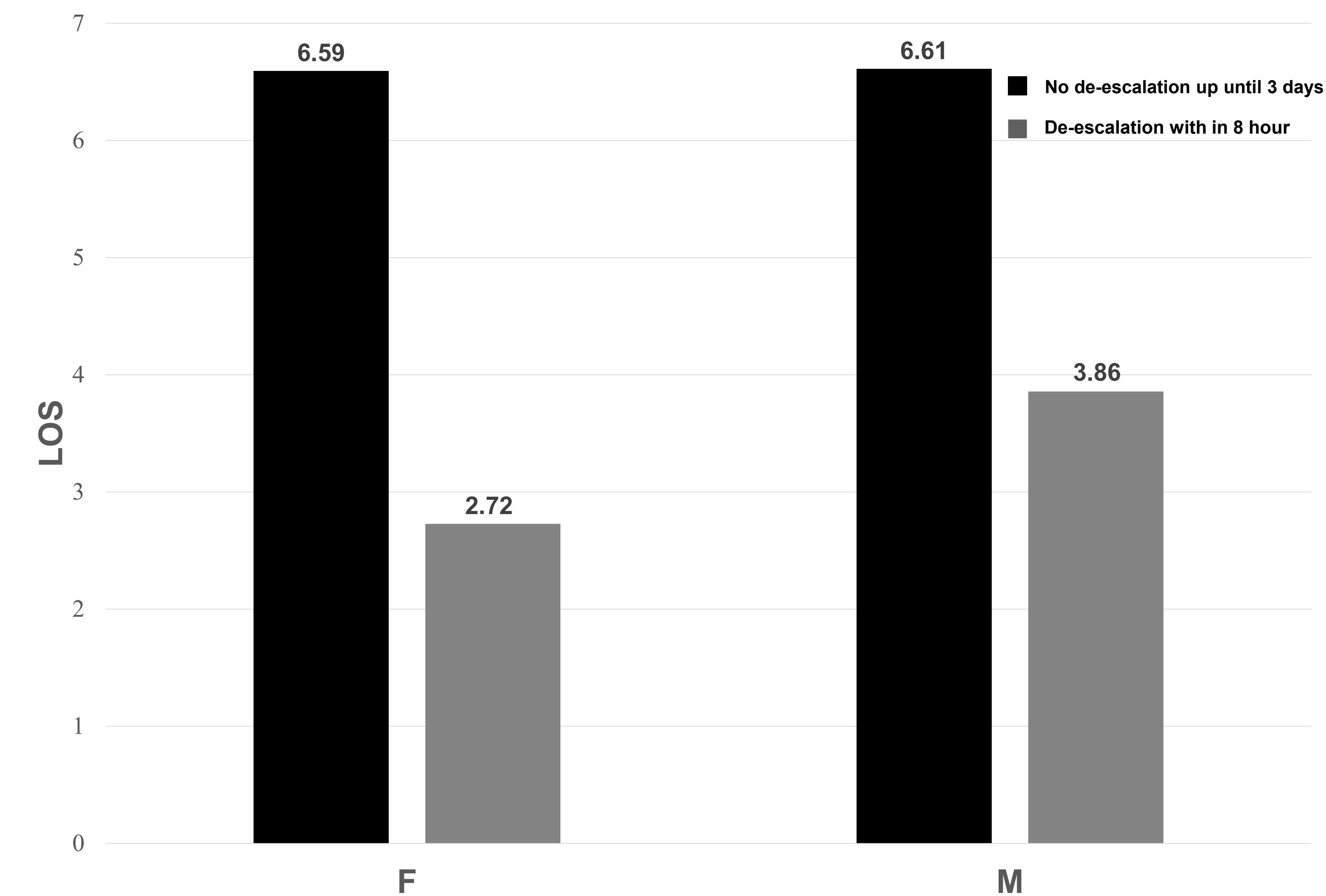


Table 2: Comparison of outcomes by de-escalation status

		De-escalation with in 8 hour (n=43)	No De-escalation up until 3 days (n=50)	P-value
<b>Primary outcome</b>	LOS	3.2 (1-9)	6.6 (2-20)	<0.0001
<b>Secondary outcome</b>	Development of C.Diff infection	0 (0)	0 (0)	1

## LIMITATION

- Retrospective, single-center design limits external validity
- Not powered to detect difference in primary and secondary outcome
- Small sample size

## CONCLUSION

- The results of the present study indicate that the de-escalation of antibiotic based on the culture tests are beneficial
- It can reduce the LOS and hence overall cost burden on patient as well as on hospital.
- However, the LOS can be affected by other comorbid conditions of patients. Thus, further research is required in this area.

## REFERENCES

- Cowley MC, Ritchie DJ, Hampton N, Kollef MH, Micek ST. Outcomes Associated With De-escalating Therapy for Methicillin-Resistant Staphylococcus aureus in Culture-Negative Nosocomial Pneumonia. *Chest journal.org*. 2019 ; 155(1):53-59.
- Niimura T, Zamami Y, Imai T, Nagao K, Kayano M, Sagara H, Goda M, Okada N, Chuma M, Takechi K, Imanishi M, Koyama T, Koga T, Nakura H, Sendo T, Ishizawa K. Evaluation of the Benefits of De-Escalation for Patients with Sepsis in the Emergency Intensive Care Unit. *J Pharm Pharm Sci*. 2018 ; 21: 54 – 59.