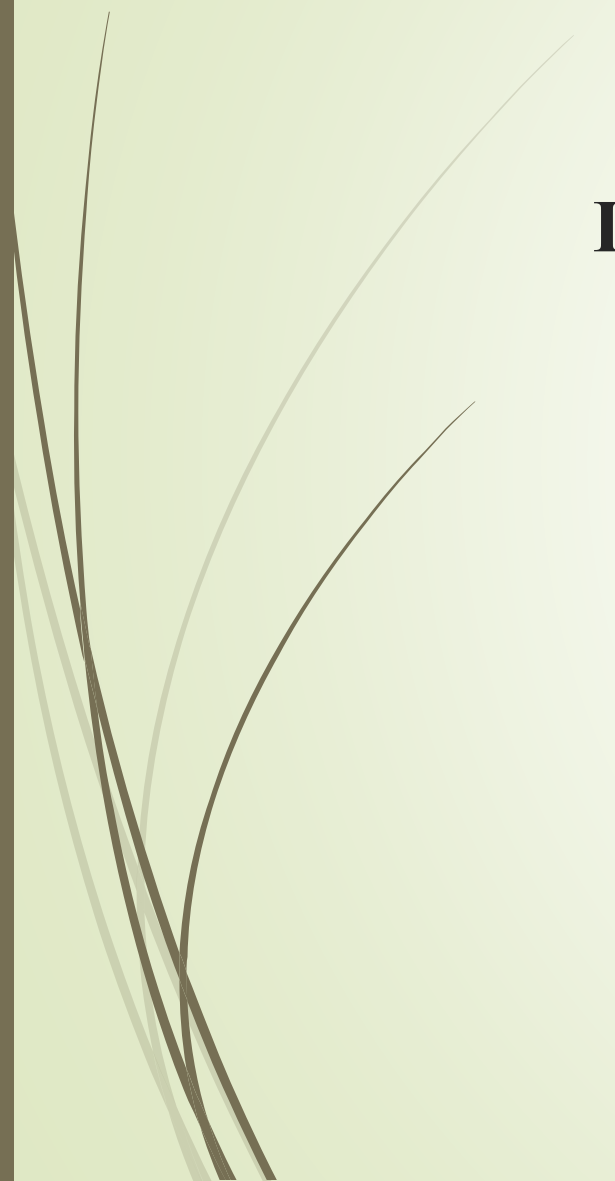




ASSESSMENT OF UTILIZATION INDICATORS AND THEIR RELATIONSHIP WITH QUALITY INDICATORS MONITORED IN INTENSIVE CARE UNIT

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INTRODUCTION

❖ Utilization Services

- Hospital services are defined as the use of healthcare services provided by hospitals, including inpatient admissions, outpatient visits, emergency care etc.
- Utilization is typically measured to assess access to care, efficiency of service delivery, and demand for healthcare resources [1].
- Indicators include average daily bed occupancy, bed occupancy rate, bed turnover rate and average length of stay.

❖ Quality Indicators

- Quality indicators are the tools used to identify potential areas of improvement in the quality of care. Based on the Donabedian concept: structure, process, and outcome [2].
- Indicators include hand hygiene & care bundle compliances, HAPU rate and ICU readmissions within 48 hours.

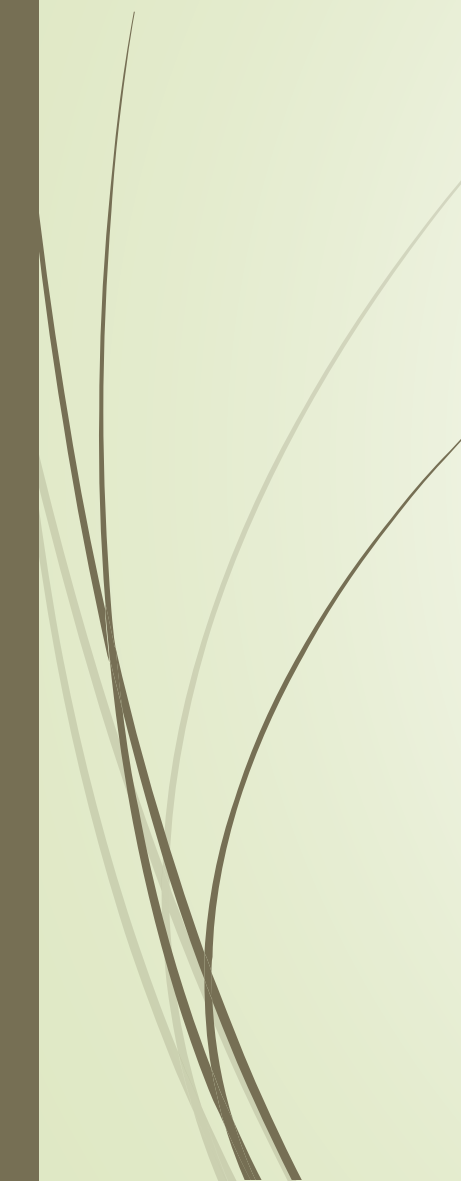


REVIEW OF LITERATURE

- Several researches have been conducted to study the association between ICU utilization during hospitalization, costs, use of invasive procedures and mortality and it was concluded that ICU Utilization, use of invasive procedures and costs were positively correlated, whereas no association was found with mortality rates [3].
- However, Khandelwal et al. (4) found that patients who received palliative care reported a significant decline in admission rates, as well as length of stay was also found to be lower in such patients.
- Another study found that beds availability in ICU have a significant impact on patient outcomes and mortality rates [5]. Similarly, Mercader & Siciliani (6), have concluded that bed occupancy rate was positively correlated with surgical mortality and negatively correlated with health gains of patients.

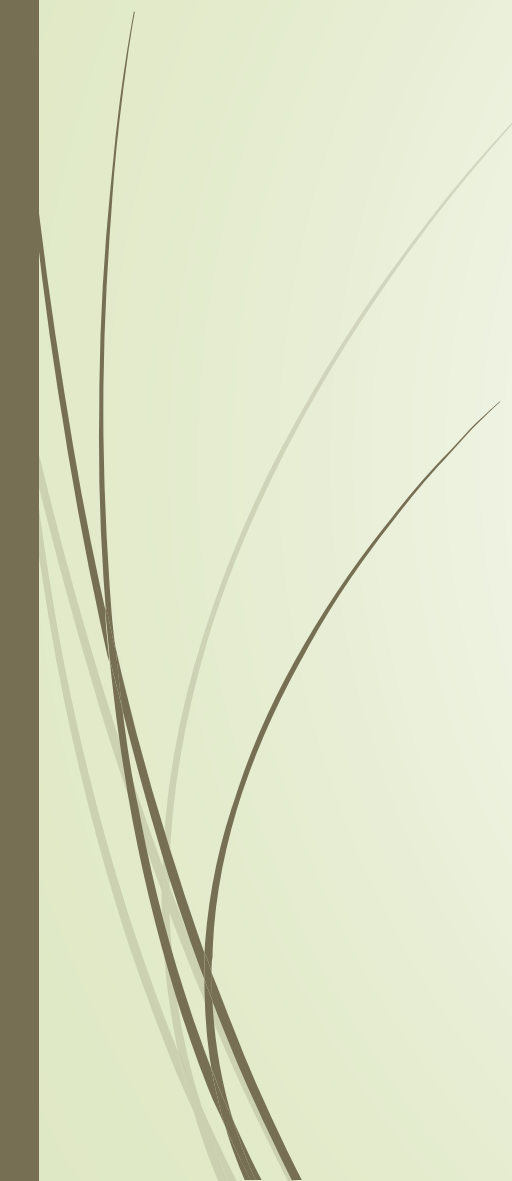


Various researches have been done to study the role of Quality indicators in patient care.

- Dorzi & Arabi (2) found that various indicators play a significant role in quality care, including bed occupancy, length of stay, hand hygiene, ICU readmissions, compliance with care bundles, etc. Additionally, proper monitoring and training is required by the nursing staff for quality improvement.
 - Another research studied the prominent causes of readmission and it was resulted that patients with surgical admissions at the time of ER, severity of disease, infection rates, high Sequential Organ Failure Assessment (SOFA), immunodeficiency, and elderly patients were the most common causes of re-admission within 24, 48, and 72 hours [7].
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❖ Objectives

- To assess ICU Utilization parameters, including Average Daily Bed Occupancy, Bed Occupancy Rate, Bed Turnover Rate, and the Average length of stay.
 - To monitor ICU quality indicators, including hand hygiene compliance, ICU readmission within 48 hours, Compliance with Bundle care, HAPU and Phlebitis compliances.
 - To explore the relationship between ICU Utilization indicators and Quality indicators in an Intensive Care Unit.
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❖ Hypotheses

H0: There will be no significant correlation between ICU Utilization indicators and Quality indicators in the ICU.

H1: There will be a significant correlation between ICU Utilization indicators and Quality indicators in the ICU.



RESEARCH METHODOLOGY

❖ Method

- Non-experimental Cross-sectional research design

❖ Sample

- Purposive sampling
- Sample size (N) = 10

❖ Variables

- ICU utilization indicators including average daily bed occupancy, bed occupancy rate, bed turnover rate, average length of stay.
- Quality indicators including hand hygiene compliance, ICU readmission within 48 hours, VAP rate, CAUTI rate, CLABSI rate, HAPU rate and phlebitis rate.



❖ Inclusive Criteria

The participants must belong to Intensive Care unit of RJN Apollo Spectra Hospital and both genders are selected for the study.

❖ Exclusive Criteria

NICU patients and patients from other wards are excluded from the study.

❖ Statistical Tests

Spearman Rank Correlation is used to examine the relationship between utilization and quality indicators in ICU.

RESULTS

An analysis was conducted to assess and examine the correlation between ICU utilization indicators and quality indicators. Data were collected over a period of 10 months and subsequently compared against the NABH benchmarks to determine the levels of compliance and non-compliance.

FIG 4.1: AVERAGE DAILY BED OCCUPANCY

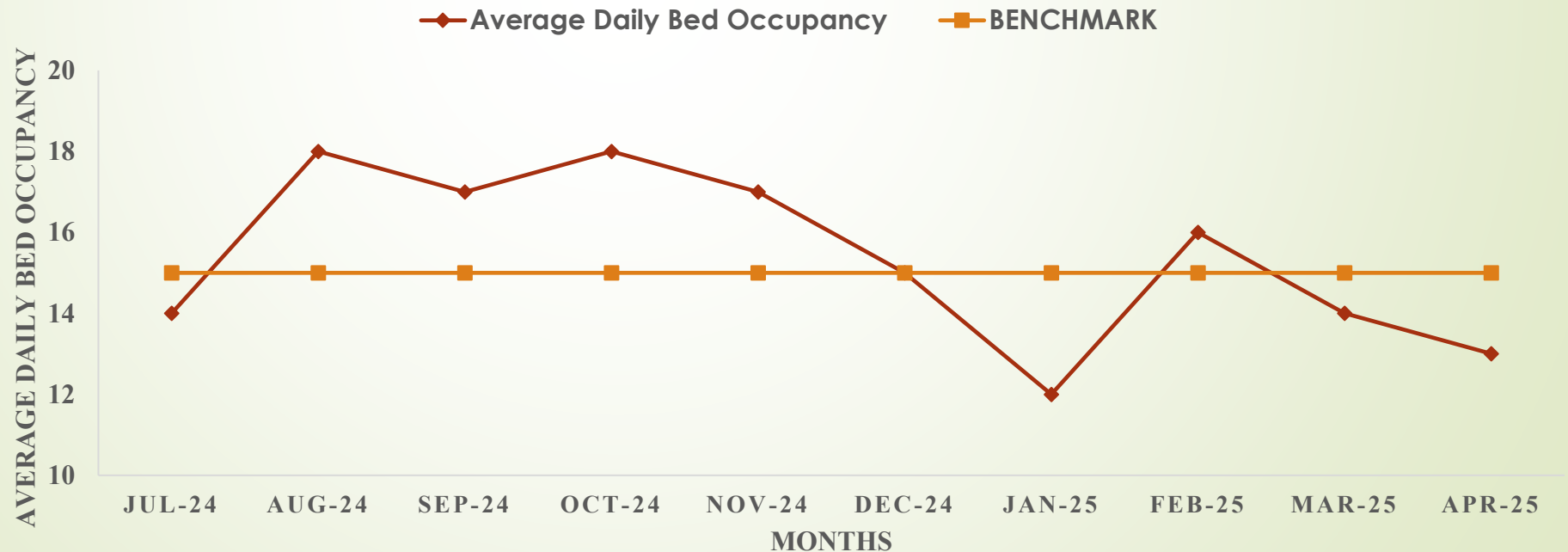
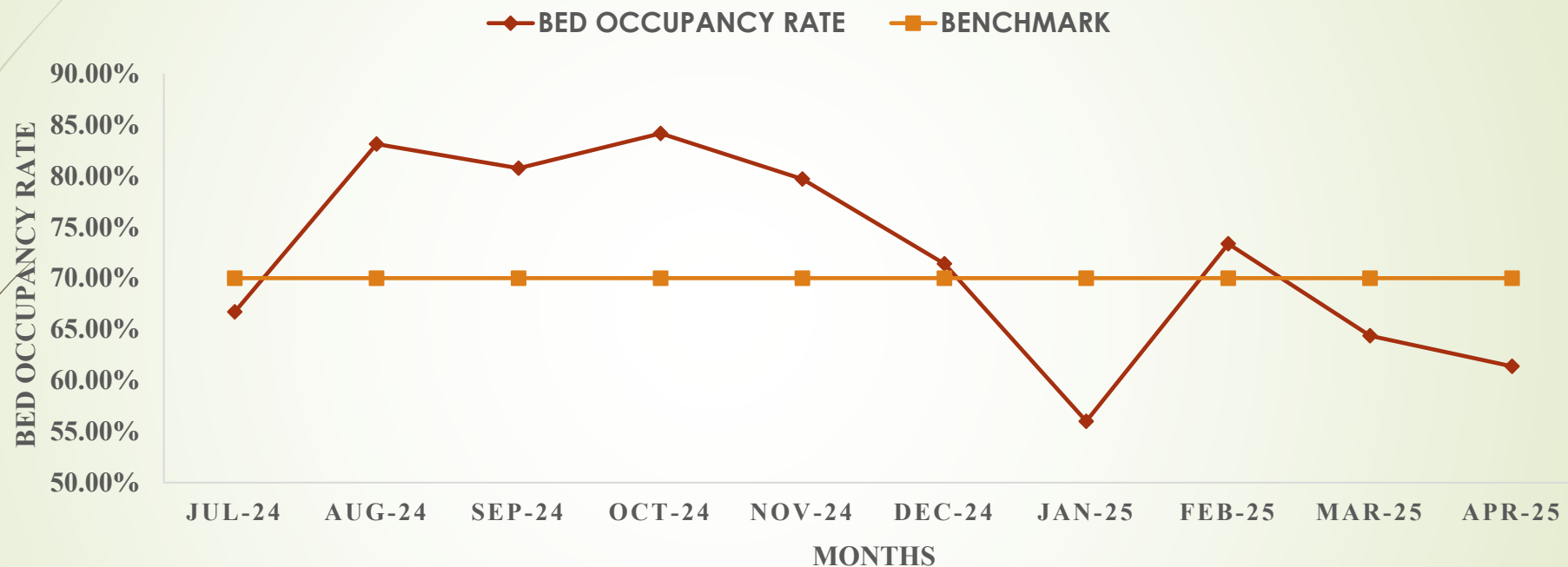
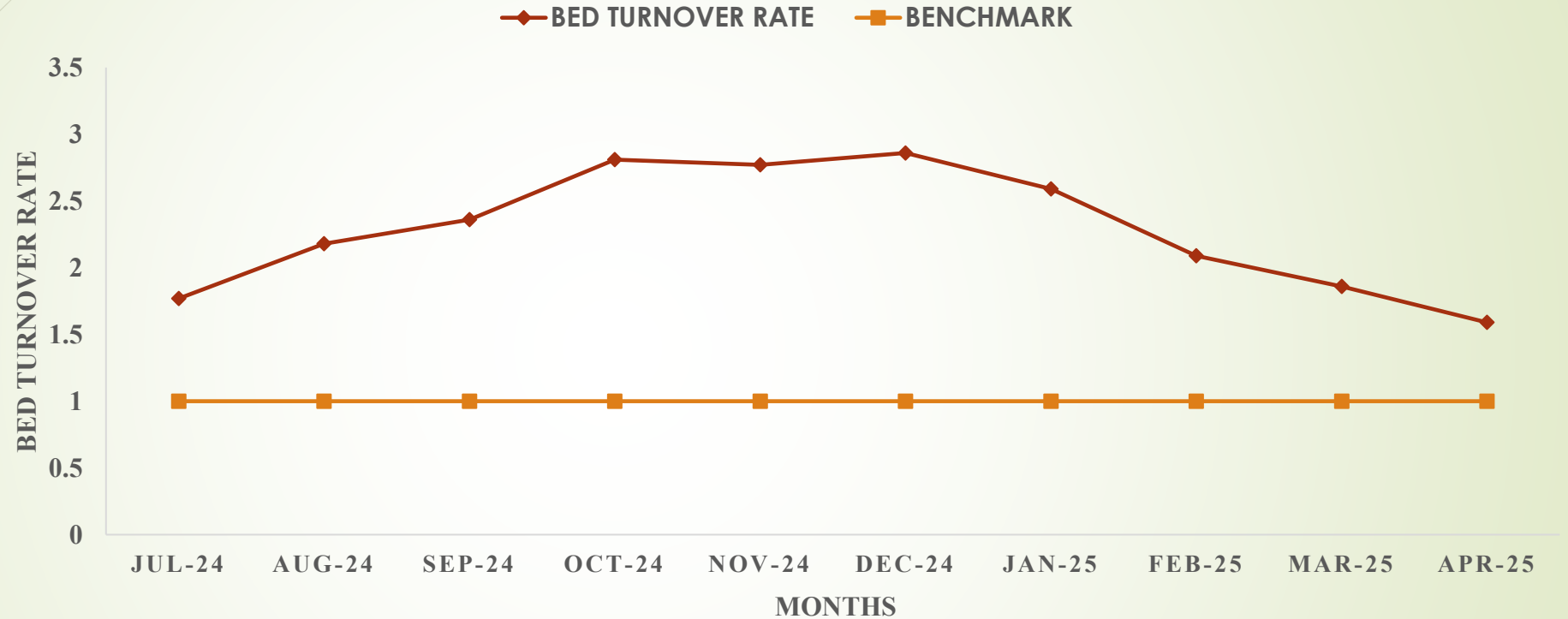


FIG 4.2: BED OCCUPANCY RATE



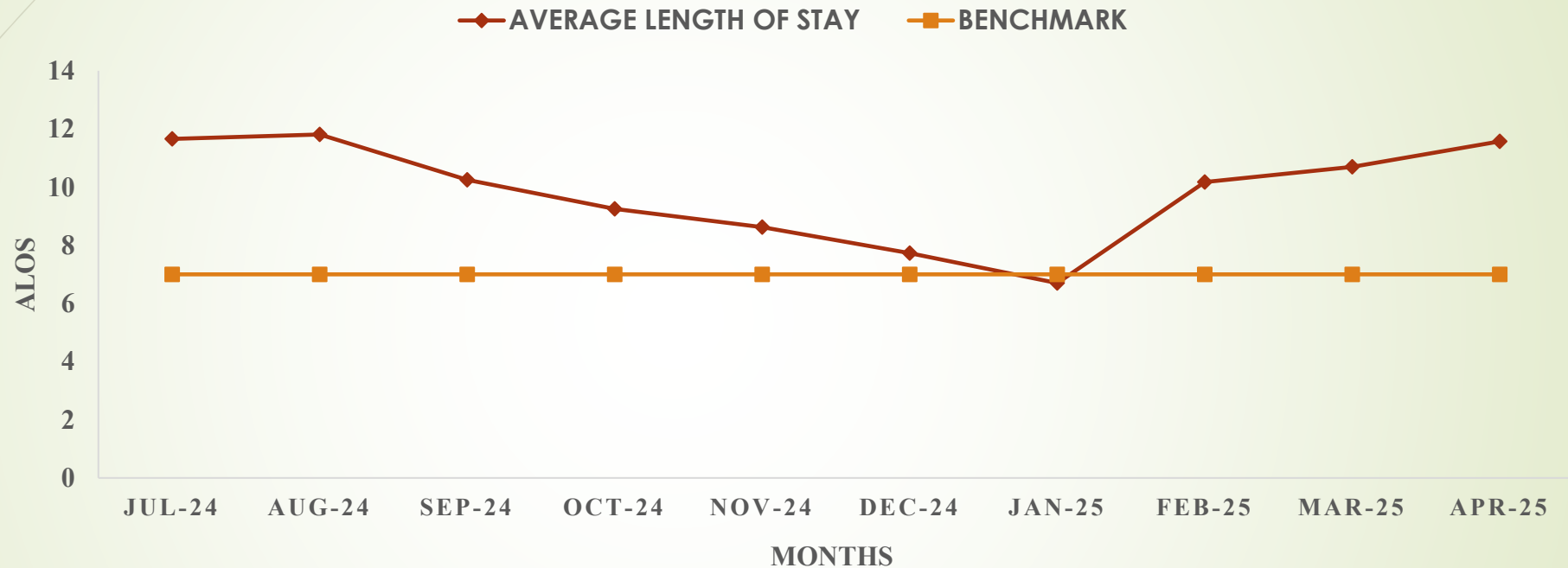
The above graph shows that there is a deviation in bed occupancy rate in four months, and the minimum occupancy is reported in the month of January. It was due to a lower number of inpatient admissions of critically ill patients.

FIG 4.3: BED TURNOVER RATE



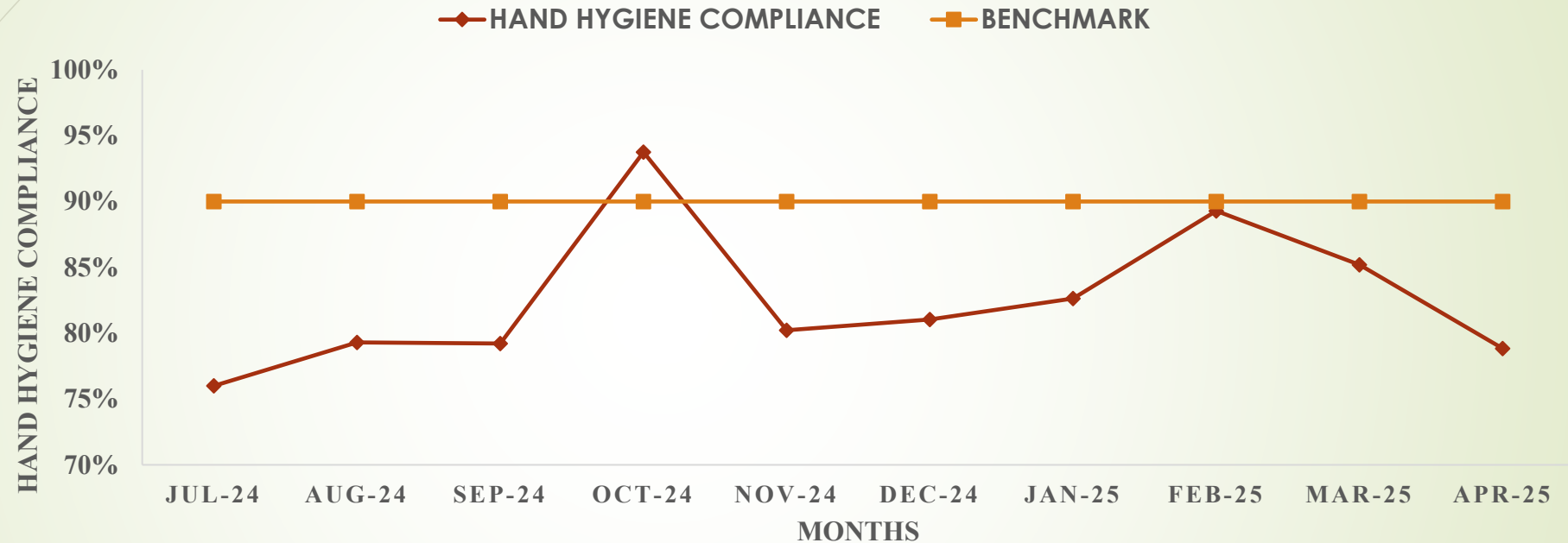
The above data resulted in the bed turnover rate within the recommended period falling under the category of NABH compliance.

FIG 4.4: AVERAGE LENGTH OF STAY



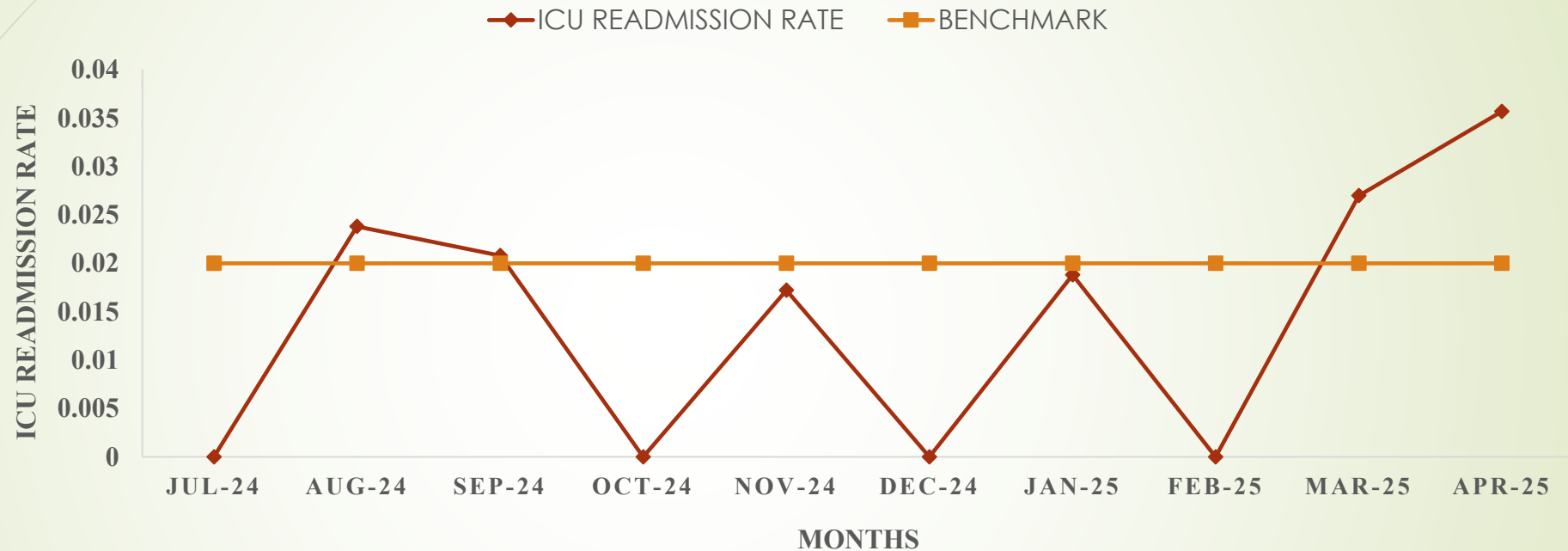
It was observed from the above graph that, average length of stay falls under the category of non-compliance for the majority of the indices. One of the reasons was the patients who suffered from brain injury required more time to recover.

FIG 4.5: HAND HYGIENE COMPLIANCE



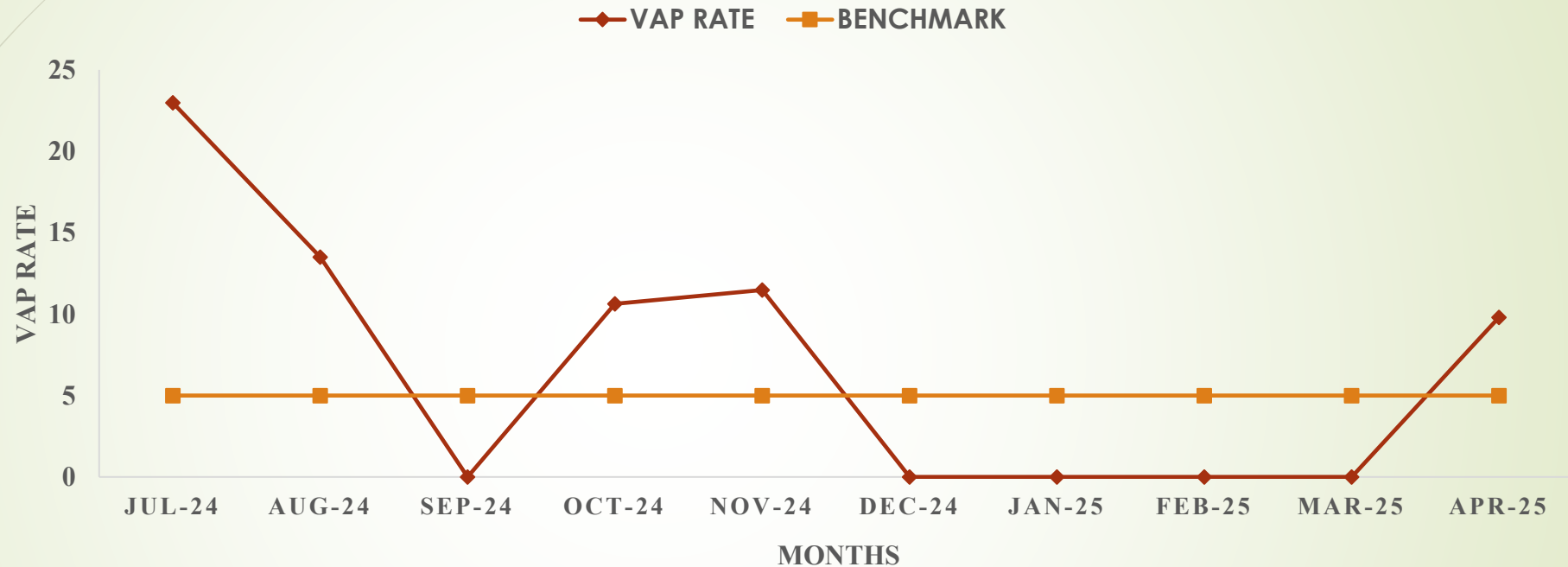
The above graph shows the requirement of hand hygiene training for the staff, as the majority of the data displayed non-compliance. One of the reasons was patient load on the staff due to the unavailability of sufficient nursing staff.

FIG 4.6: ICU RE-ADMISSION RATE



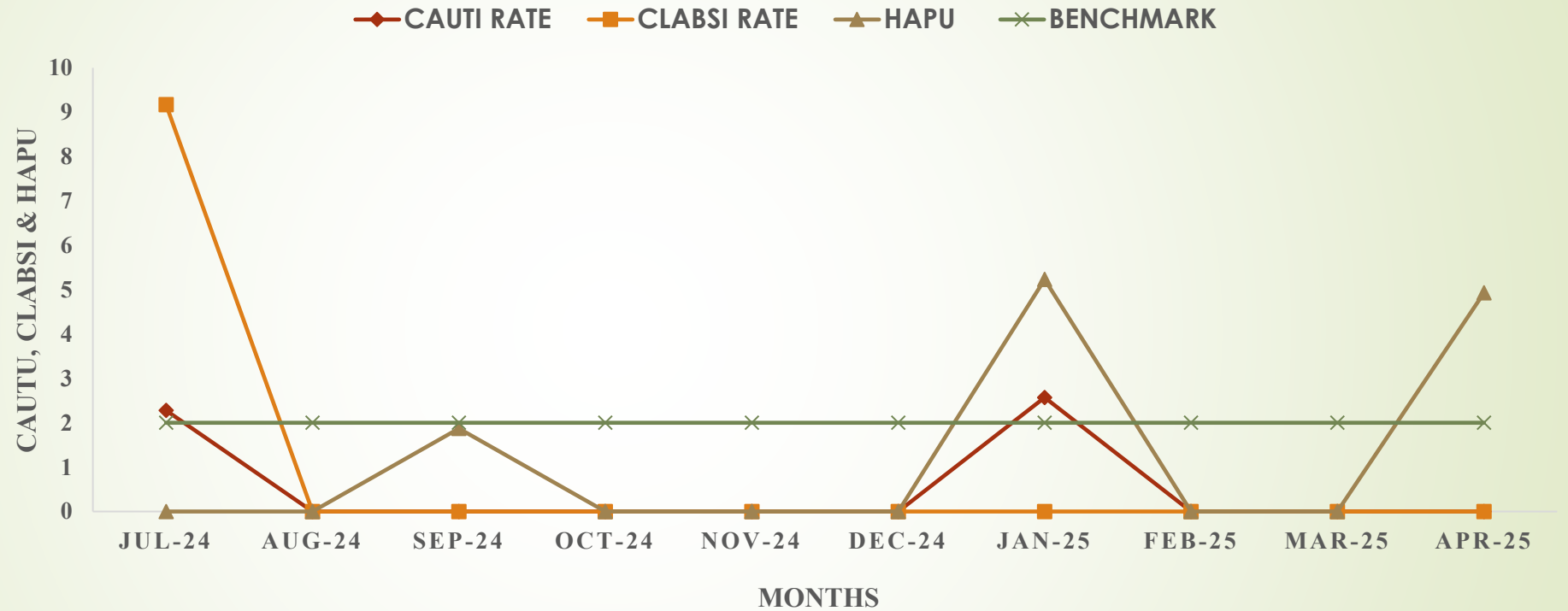
The above data showed major changes in readmission rates of patients; besides this, it falls under the compliance category. Although recently deviation was observed mainly due to the inability of the informants to look after the patients.

FIG 4.7: VAP RATE



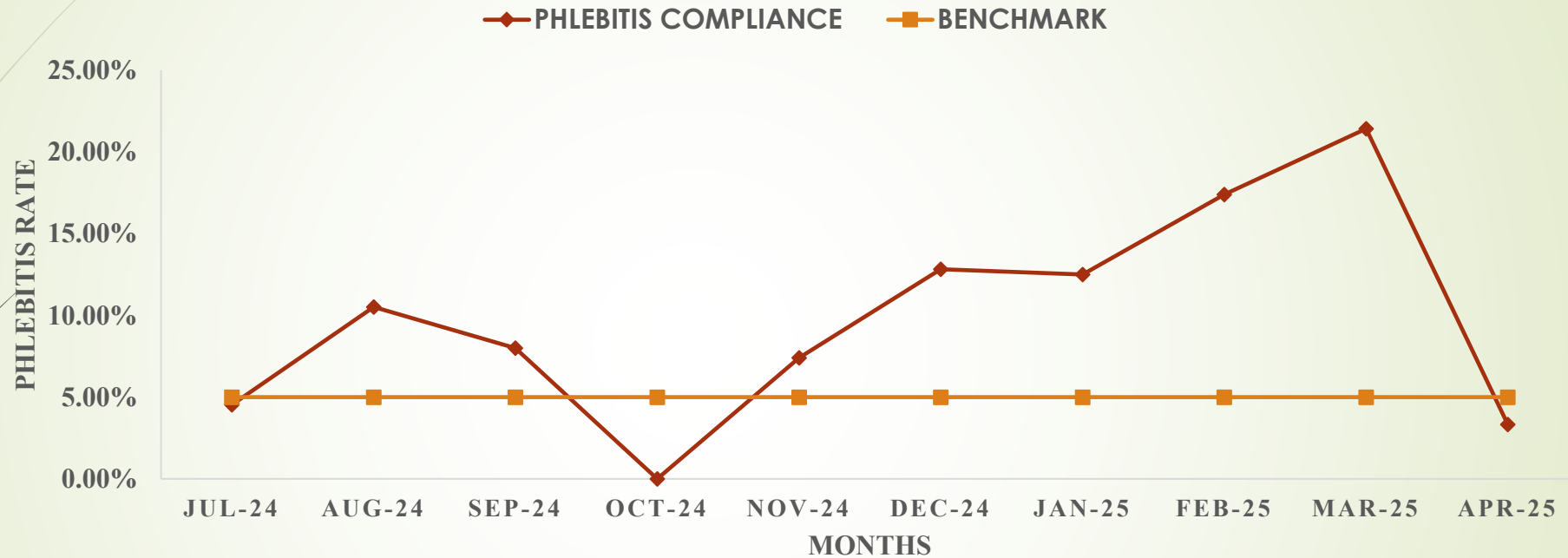
It was clearly observed that, there are remarkable improvement in the infection rates of ventilated patients. But, again more attention is required in terms of nurse patient ratio, proper surveillance and documentation, hand hygiene practices and Endotracheal tube care.

FIG 4.8: ADVERSE EVENTS



The above figure shows the hospital associated adverse events including CAUTI rate, CLABSI rate and the HAPU rate respectively.

FIG 4.9: PHLEBITIS RATE



The above graph shows that the majority of the indices fall under non-compliance suggested by NABH guidelines. As a result of which investigations are done, which are followed by proper monitoring of critically ill patients that leading to maintaining the phlebitis infection rates in critically ill patients.

Table 4.1: Tests of Normality

	Kolmogorov-Smirnov			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
Average Daily Bed Occupancy	.175	10	.200*	.933	10	.475
Bed Occupancy Rate	.181	10	.200*	.939	10	.543
Bed Turnover Rate	.381	10	.000	.640	10	.000
Average Length of Stay	.172	10	.200*	.919	10	.350
Hand Hygiene Compliance	.210	10	.200*	.892	10	.180
ICU Readmission Rate	.259	10	.056	.860	10	.077
VAP Rate	.303	10	.010	.812	10	.021
CAUTI Rate	.478	10	.000	.539	10	.000
CLABSI Rate	.524	10	.000	.366	10	.000
HAPU	.141	10	.200*	.939	10	.542
Phlebitis Compliance	.181	10	.200*	.965	10	.841

*. This is a lower bound of the true significance.

a. Lilliefors Significance Correction

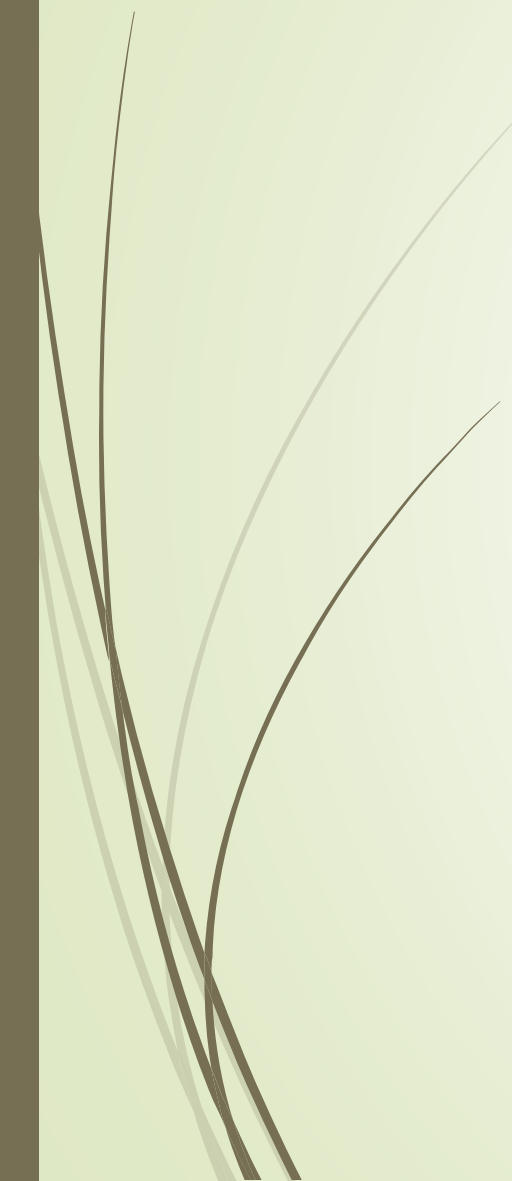
Table 4.2 represents the Spearman rank correlation test at 0.1 level of significance.

Table 4.2: Spearman Rank Correlation Test

		HHC	RAR	VAP	CAUTI	CLABSI	HAPU	PHL
ADBO	Correlation Coefficient	.208	-.240	.347	-.589**	-.234	-.549**	-.252
	p-value	.564	.505	.326	.073	.515	.100	.483
	N	10	10	10	10	10	10	10
BOR	Correlation Coefficient	.188	-.300	.350	-.545	-.174	-.515	-.316
	Sig. (2-tailed)	.603	.399	.321	.103	.631	.128	.374
	N	10	10	10	10	10	10	10
BTR	Correlation Coefficient	.426	-.440	-.076	.152	-.272	-.1.72	-.143
	Sig. (2-tailed)	.219	.203	.835	.675	.447	.636	.694
	N	10	10	10	10	10	10	10
ALOS	Correlation Coefficient	-.568**	.440	.502	-.159	.414	-.186	-.220
	Sig. (2-tailed)	.087	.204	.139	.662	.235	.606	.542
	N	10	10	10	10	10	10	10

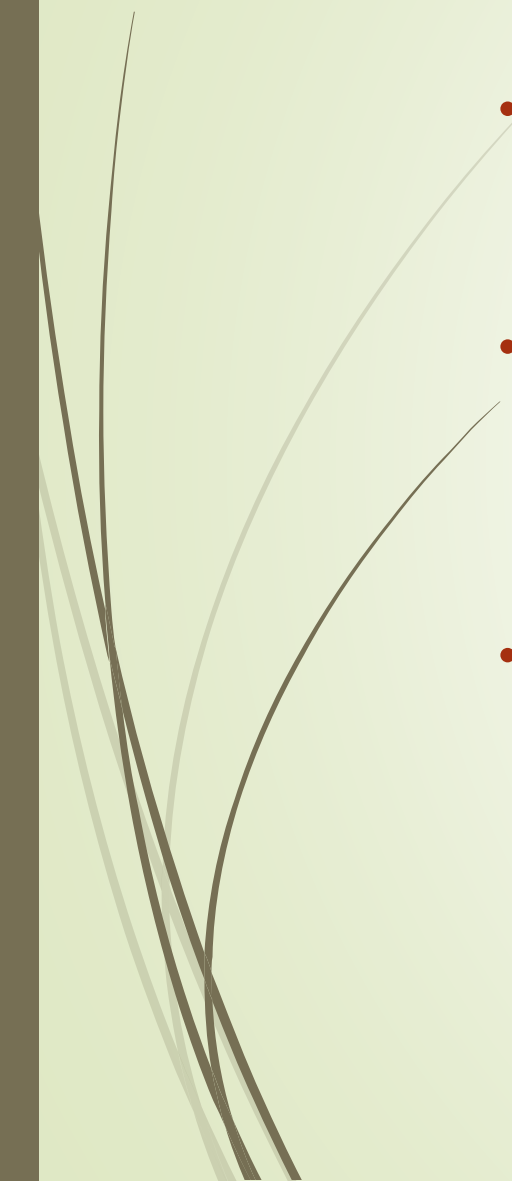
DISCUSSION

- Based on the above results, it can be inferred that among ICU utilization indicators, bed turnover rate showed the highest compliance in comparison to other indicators, whereas average length of stay is a matter of concern from the point of view of compliance rates.
- In addition, in the case of quality indicators, CAUTI rate and CLABSI rate manifested the best output. Further, ICU re-admission within 48 hours, HAPU rate, and phlebitis rate in ventilated patients still need to improve a little.
- Based on the obtained results, it can be observed that the Spearman's rho coefficients for CAUTI rate and HAPU rates with average daily bed occupancy were $-.589$ and $-.549$ respectively which were significant at 10 percent level of significance (rho coefficient = $-.589$, $p = 0.073 < 0.1$; rho coefficient = $-.549$, $p = 10$).

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- Additionally, results also showed there exists a significant negative correlation between average length of stay and hand hygiene compliance of critically ill patients at a 10 percent significance level (rho coefficient = $-.568$, $p = 0.087 < 0.1$).
- 



CONCLUSION

- Based on the above results and discussion, it can be concluded that the bed turnover rate, CAUTI rate and CLABSI rate fall under the category of compliance whereas, little attention need to be given on other variables.
 - In addition, there exists a statistically significant negative correlation between average daily bed occupancy and CAUTI rate, average daily bed occupancy and HAPU rate, and average length of stay and hand hygiene compliance.
 - Therefore, it can be inferred that the hypothesis “there will be a significant correlation between ICU Utilization indicators and Quality indicators in the ICU” is been accepted.
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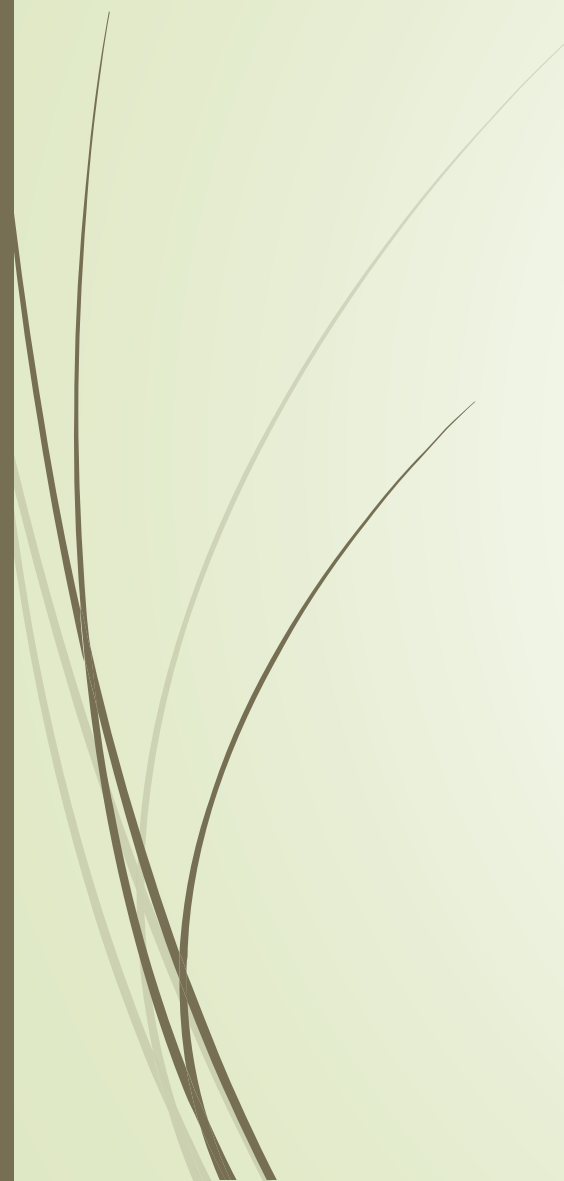
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