Address the Factors Associated with Length of Stay at King Abdullah Medical City in Makkah to Improve the Quality of Healthcare Services

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Abstract

Hospital length of stay (LOS) is considered a quality indicator for assessing patients' care and hospital performance. Patients with prolonged hospital stays are more likely to consume more hospital resources during their hospitalization, up to 40% of LOS was inappropriate. This Cross-sectional study use data from the health information system (HIS) to reveal that the highest average LOS is 56 days for male patients. 41% of the sample size are older people between 50 and 69 years old, but the highest average LOS is for patients between 14-29 years old. Also, 74% of the sample size was Saudi, but the highest average was 56 days for non-Saudi patients. More than 80% receive free medical services, but the highest average is 58 days for Cash patients. The average LOS is equal for deceased and alive patients. SPSS version 21, used to address the research hypothesis, shows a highly significant relation between admission wards and LOS because the p-value is less than 0.05. The Spearman test revealed that the relationship between gender, nationality, payment type, and urgency is insignificant and has no correlation with LOS, unlike the age group. The highest frequency of diagnosis was for sepsis because the number of admissions was 119, and the maximum LOS was 152 days, followed by leukemia. The study recommends further investigation, especially in diagnosis and assessing if additional diagnoses will increase LOS.

Keywords: Length of Stay, Patient-Related Variables, Management Variables, Hospital Variables and Intensive Care Unit.

Introduction

As the increasing demand for healthcare services, hospitals strive to improve the quality of patient services regarding patient flow and facility management (Bekmezian et al., 2011). Hospital length of stay (LOS) is considered a quality indicator for assessing patients' care and hospital performance. One healthcare challenge that negatively influences patient care quality and efficiency is prolonged hospitalization. Due to hospitalization's high cost, researchers have conducted studies to reduce hospital length of stay (LOS) to ensure hospitals' sustainability by reducing hospital LOS(Walsh et al., 2022). Many researchers have been investigating the problem of patient length of stay (LOS) prediction.

There are proofs that a prolonged stay is associated with adverse patient outcomes, including infection, high cost of treatment, and mortality (Ruangkriengsin & Phisalprapa, 2014). Therefore, a reduction in LOS lowers the cost of hospital services, which is essential for establishing a sustainable healthcare system, particularly in light of recent pressures on bed occupancy (Walsh et al., 2022). According to Orooji et al. (2021), LOS refers to the number of days that a patient spends in a hospital and uses health care facilities during this period" Many studies of prolonged patient stay have been conducted for which several factors have been revealed(Orooji et al., 2021).

Research Importance

In hospitals, the length of stay is a commonly used and significant criterion for assessing hospital performance (Noohi et al., 2020). Extended hospitalizations may result in high-cost of treatments and increased healthcare-associated infection risks. By reducing inappropriate LOS, we will optimize the utilization of the current healthcare facilities, including hospital beds, and increase the efficiency of healthcare resources.

Therefore, this study will identify the factors affecting the patient's stay length. Furthermore, introduce the results to the policymakers and healthcare authorities, who are responsible for improving the performance of healthcare organizations where patient safety is critical to producing high-quality healthcare services.

Research Objective

This study aims to assess the relation and correlation between (Patient-related variables, management variables, and hospital variables versus hospital length of stay in KAMC

Research Variables

- Dependent variables: Length of stay,
- Independent variables include:

  - Patient-related variables such as age, gender, and Nationality.
  - Management variables include 30 days of admission and above, type of admission in terms of being elective, urgent, and type of payment (insurance, cash, free)
  - Hospital variables include hospitalization ward and main diagnosis.

Literature Review

The literature review will explore the factors that influence LOS, which will help assess the issue of prolonged hospitalization problem. Accordingly, in a culture where patient safety is considered a priority, more studies would be conducted for further knowledge on predicting LOS. The hospital length of stay is a significant criterion for assessing the efficiency of hospital performance. Infection risks decrease by

reducing inappropriate hospitalization days, and hospital quality services are improved with more effective bed management.

According to a study in South Korea reported that the length of hospital stay varies with the patient's diagnosis. For instance, infarctions of the middle cerebral artery and cerebral infarctions within the central cerebral artery territory were the most common diagnoses linked with extended hospital stays. This probably is because these patients received rehabilitation therapy with the highest average LOS at 15.9 days (Baek et al., 2018).

Likewise, a descriptive cross-sectional study at a cardiac center in Ethiopia reveals that 50.8% of the patients admitted to ICU after cardiac surgery stay longer. A range of variables such as smoking history, number of surgeries performed, and post-surgery complications showed a significantly increased in ICU stay after surgery(Techane, 2022). Therefore, patients with prolonged hospital stays are more likely to consume more hospital resources during their hospitalization (Birhanu et al., 2022).

In a study of hospital length of stay in Osaka, Japan, the elderly patient was associated with prolonged hospitalization for more than two weeks (Katayama et al., 2021). Similar findings were discovered in the study by (Barisonzo et al., 2013). Which state that old age prolongs hospitalization.

Several studies have revealed that up to 40% of LOS was inappropriate(Aledo et al., 2012)(Li et al., 2021). Most of that is caused by delays in diagnosing and reporting processes, consultations, and surgery procedures (Liu et al., 2017)(Dizdar et al., 2007). Generally, quality improvement plans can reduce unnecessary LOS.

Research Methodology

Study design: this study will be a Cross-sectional analytical study to confirm the hypothesis regarding the impacts of independent variables (patient-related variables, Management variables, and hospital variables) on the LOS.

Study setting: King Abdulla medical city is a non-profit hospital located in the Makkah Region, Saudi Arabia. It has multiple centers of excellence, such as the Cardiovascular, Neurosciences, and Oncology & Specialized Surgery Centers.

Data collection: The required data will be extracted from the health information system (HIS). The collected data will include Patient-related variables such as age and gender. In addition, Management variables include the 30 days of admission or more, type of admission in terms of being elective, urgent, and type of payment, and Hospital variables, including hospitalization ward and final diagnosis.

Statistical methods: Data will analyze using SPSS (Statistical Package for Social Science) version 21. The descriptive statistic will be used to display frequency and assess the normality of distribution. Appropriate tests such as spearman correlation will be employed since the data is not normally distributed around the mean and ANOVA test to determine the differences between the groups.

Research structure:

This study will use a methodological framework to identify factors that affect the length of stay. The organization of this dissertation is divided into six chapters and organized as follows:

Part 1 Introduction: it will provide the background and clarification of the study's purpose and aims and define the research variables. It gives a more excellent picture of the impact of independent variables on LOS. It also explains the methodology of the research adopted.

Part 2 Literature review will explore the factors influencing LOS, which will help assess the prolonged hospitalization problem.

Part 3 Methodology: it will define the research methodology and design, such as the study setting, data collection tool in detail lastly, how to analyze the collected data.

part 4 Result: it will analyze in-depth and measure various factors influencing LOS by applying statistical tests to study the hypothesis.

Part 5 Discussion: it will represent the findings from the research. Then results collected from the study are compared with the previous studies.

Part 6 Conclusion and recommendations: t will conclude the study by revisiting this research's objective, bringing to light the question raised during the study, and developing recommendations. It also demonstrates the limitations of the research.

At the last of the study, the list of sources was used for this work. It also lists the appendices enabling the completion of this research.

Research Result

The result includes descriptive statistics and inferential as well. The study will address the factors that affect lengthy hospitalization.

Table-1 Display the length of stay based on the demographic data

Study Variables	Admission = 1522 (%)	Max LOS	Average LOS	Min LOS
Gender				
Female	662 (**43.5**)	263.9375	51.80019092	29.97152778
Male	860 (**56.5**)	425.7527778	56.45009993	29.96319444
Age Group				
14-29	177 (**11.6**)	359.1555556	58.74561552	30.05763889
30-49	398 (**26.1**)	359.4076389	56.45373325	29.99861111
50-69	638 (**41.9**)	263.9375	51.29477452	29.96319444
70+	309 (**20.3**)	425.7527778	55.81290097	29.97152778
Nationality				
Non-SAUDI	396 (**26.0**)	218.0965278	56.23206141	30.03055556
SAUDI	1126 (**74.0**)	425.7527778	53.79299823	29.96319444
Document Type				
Iqama (**Resident**)	341 (**22.4**)	218.0965278	56.55498992	30.03055556
National ID (**Citizen**)	1124 (**73.9**)	425.7527778	53.79532242	29.96319444
Passport (**Visitor**)	57 (**3.7**)	116.9756944	54.1687433	30.96597222
Type of Payment				
CASH	185 (**12.2**)	218.0965278	58.31790672	30.05
FREE	1320 (**86.7**)	425.7527778	53.93915234	29.96319444
Insurance Company	17 (**1.1**)	100.3805556	50.01873502	30.60773148
Urgency Status				
Elective	1113 (**73.1**)	425.7527778	54.40464207	29.96319444
Life Threatening Case	113 (**7.4**)	156.7013889	55.8780322	30.45555556
Urgent	296 (**19.4**)	218.0965278	53.96022996	30.05
Deceased Status				
No	1025 (**67.3**)	425.7527778	54.47124397	29.96319444
Yes	497 (**32.7**)	359.4076389	54.33760011	30.00145833

The normality was checked, and the result showed data not normally distributed around the mean because the mean is 54.4, the mode is 37.9, the median = 42.8 are not equal, and the SD is 34.2.

Descriptive Statistics

Most of the sample size was male patients, with the highest average LOS of 56 days. 41% of the sample size are older people between 50 and 69 years old, but the highest average LOS is for groups aged between 14 and 29. Also, 74% of the sample size was Saudi, but the highest average was 56 days for non-Saudi patients. More than 80% receive free medical services, but the highest average is 58 days for Cash patients. The average LOS is equal for deceased patients, 54.47%, and 54.33 for alive patients. (Table-1)

Analytical Statistics

The highest average LOS was for Intensive care patients 74 days, followed by Neuroscience 60 days, then Haemato-Oncology56 days. According to the maximum LOS column, Neuroscience patients have the highest LOS at 425 days, and the lowest was for surgical ICU patients at 46 days (Figure 1). The study assesses the homogeneity by applying the Levene test, rejecting the null hypothesis, and accepting a highly significant relation between admission wards and LOS because the p-value is less than 0.05. (Table-2).

The Spearman test revealed that the relationship between gender, nationality, payment type, and urgency is insignificant and has no correlation with LOS. Unlike the age group, the test result shows a significant p-value = 0.027, but the correlation coefficient is weak. It equals -0.057*, indicating rejection of the hypothesis and accepting the null.

Table-2 Display the length of stay based on the admission ward and address the relationship between them

| WARDS		Max LOS	Average LOS	Min LOS
ICU		359.1555556	74.67426235	30.02240741
C.C.U		106.0444444	47.35688317	30.58888889
Surgical ICU		46.60694444	39.43009259	35.52083333
Neuroscience ICU		209.0791667	54.78036616	30.22638889
Medical Oncology		207.2423611	51.87922107	29.99236111
Haemato-Oncology Ward		218.0965278	56.10896316	30.02083333
Cardiac Ward		372.2631944	53.22657184	30.08611111
Cardiac Surgery Ward		279.8479167	51.39257576	30.05
Neuroscience Ward		425.7527778	60.98936348	29.96319444
Specialized Internal Medicine ward		114.24375	42.6592172	30.04027778
Specialized Surgical ward		165.0708333	50.11260146	29.97152778
Mortality Department		359.4076389	54.87332328	30.22916667
Levene Test	ANOVA	F	Wlech	df
3.454	Sig 001	2.828	Sig 000	11
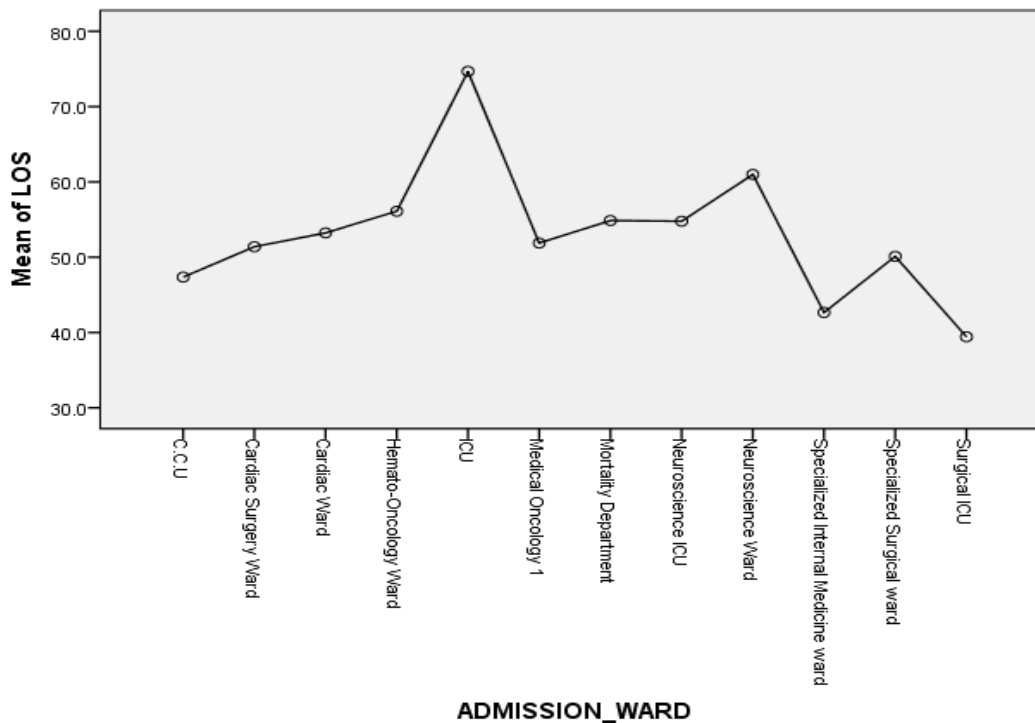
Figure 1: Display the LOS based on the admission ward.

The highest frequency of diagnosis was for sepsis because the number of admissions was 119, and the maximum LOS was 152 days, followed by leukemia. Otherwise, among the top 5 diagnoses, the highest average LOS was for Acute & subacute infective endocarditis at 58 days and Malignant neoplasm of the brain at 58 days. The maximum LOS days was 200 days for Acute transmural MI of the anterior wall (Table-3).

Table-3 Display the length of stay based top 5 Diagnosis

No.	Main Diagnosis	Code	Admission	Max LOS	Average LOS	Min LOS
1.	Acute & subacute infective endocarditis	133.0	21	112.2666667	58.19927249	30.19722222
2.	Acute transmural Myocardial Infraction of anterior wall	121.0	21	200.6631944	57.81951058	31.21319444
3.	Acute myeloid leukemia without mention of remission	C92.00	57	163.1326389	57.26602258	30.24861111
4.	Sepsis, unspecified	A41.9	119	152.2034722	55.31091104	30.22638889
5.	Urinary tract infection site not specified	N93.0	21	169.3506944	53.3220194	30.86041667

Research Discussion

This section is focused on discussing the key findings related to the objectives of the whole study. This study aims to address the factors that affect the length of stay to improve the performance of healthcare organizations where patient safety is critical to producing high-quality healthcare services.

The study's main findings revealed that the relationship between gender, nationality, payment type, and urgency is insignificant, p-value > 0.05, and has no correlation with LOS. These findings are compatible with a cross-sectional study conducted to determine factors affecting LOS in teaching hospitals of Qazvin Providence; the results showed that some factors, including gender, and type of admission, did not affect LOS. Unlike factors related to the payment type that affected LOS (Khosravizadeh et al., 2016).

The results of this study differ from other studies, such as a cross-sectional study of two months carried out in Liaquat University Hospital, Pakistan. The results show a significant association between gender and length of stay (p=0.01) (G. Usman et al., 2015). Also, a descriptive study was conducted in the Department of Medicine, Postgraduate Medical Institute, Hayatabad Medical Complex Peshawar, Pakistan, from April to September 2010; the results confirmed that females compared to males stay longer in a hospital(M. Usman et al., 2011). Additionally, regarding the payment type and its effects on LOS, a study conducted in Irbid, North Jordan, found that insured patients had significantly longer hospital lengths of stay than others (Mawajdeh et al., 1997). Another study revealed a significant correlation between LOS and the type of admission (Baniasadi et al., 2019) (Ravangard et al., 2011).

This study's results indicate that the age group significantly affected the LOS p-value = 0.027, but the correlation coefficient is weak. It is equal -0.057*. This result is consistence with a study conducted in teaching hospitals in a middle-income country to determine factors affecting LOS, which revealed that age had an impact on LOS (Khosravizadeh et al., 2016) (Barisonzo et al., 2013). In addition to a study titled (The Contribution of Ageing to Hospitalization Days in Hong Kong: A Decomposition Analysis). The results showed that aging is associated with an increased length of hospital stay (Kwok et al., 2017).

Moreover, the current study assesses the association between admission departments and LOS. The results found a highly significant association between admission wards and LOS because the p-value is less than 0.05. In our study, the average length of stay for a patient admitted to ICU was the highest (74 days). Compared to the study in Ethiopia's cardiac center, patients admitted to ICU following cardiac surgery had longer stays (Techane, 2022). This consistency probably is due to the contribution of heart disease and its complications to prolonged LOS in the ICU unit. In contrast, one study in Korea (Baek et al., 2018) were meaningful as they revealed the association between LOS and patients in Rehabilitation center(RH) or those transferred to RH because of their diagnosis of heart infarction diseases.

According to descriptive data for the top 5 diagnoses in king Abdullah medical city (Table 3), and coded using ICD10-AM, the Australian coding system. The result shows that the highest average LOS was for the following: infective endocarditis was 58 days, myocardial infarction at 57 days, acute myeloid leukemia at 57 days, sepsis at 55 days, and urinary tract infections at 53 days.

A study conducted to determine which factors relate to the length of stay in a tertiary general university hospital in South Korea revealed that 121.9 (myocardial infraction) was correlated with the longest average hospital stay and high standard deviation.(Baek et al., 2018). Based on a retrospective cohort study of hospital patients' discharge database from 2004 to 2007, Sepsis is considered to be responsible for a significant healthcare burden. In addition, Sepsis patients with ICU admission had significantly higher hospital mortality rates (50.8% versus 12.7%, P b .001) and longer hospital LOS(Yang et al., 2010). In order to estimate the highest length of stay and mortality in an intensive care unit (ICU) due to a urinary tract infection. A cohort of all patients admitted to ICU during a specific period. The results showed that urinary tract infection leads to a minor increased LOS in ICU (Calderón, 2011).

Conclusion and Recommendations

The average length of stay is high for middle-aged male patients and foreigners in Saudi Arabia who pay cash for medical services and are classified as critically ill. Most of them suffer from infectious diseases or are diagnosed as oncology patients. Further investigation is needed to determine whether a different diagnosis of the 'comorbidity patients' takes a prolonged hospital stay.

Limitation of the Research

Addressing the average LOS may be affected by the maximum value and volume of the visits, for instance, if one patient stays more than a year the group average may be affected and the reason behind prolonged LOS will not be identified. Also, the study concentrates on patients with 30 days and more but if other patients are added to the analysis research result definitely will be changed.

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Declaration of Interest Statement

As a team, we declare that we have no financial or non-financial interests.

References

Aledo, V. S., Alcaraz, A. C., Pastor, B. F., Egea, A. M., Prats, M. C., & Albasini, J. L. A. (2012). Reduction in inappropriate hospital use based on analysis of the causes. *BMC Health Services Research*, *12*, 361.

Baek, H., Cho, M., Kim, S., Hwang, H., Song, M., & Yoo, S. (2018). Analysis of length of hospital stay using electronic health records: A statistical and data mining approach. *PLoS ONE*, *13*(4), 1–16. https://doi.org/10.1371/journal.pone.0195901

Baniasadi, T., Kahnouji, K., Davaridolatabadi, N., & Hosseini Teshnizi, S. (2019). Factors affecting length of stay in Children Hospital in Southern Iran. *BMC Health Services Research*, *19*(1), 1–6. https://doi.org/10.1186/s12913-019-4799-1

Barisonzo, R., Wiedermann, W., Unterhuber, M., & Wiedermann, C. J. (2013). Length of stay as risk factor for inappropriate hospital days: Interaction with patient age and co-morbidity. In *Journal of Evaluation in Clinical Practice* (Vol. 19, Issue 1, pp. 80–85). https://doi.org/10.1111/j.1365-2753.2011.01775.x

Bekmezian, A., Chung, P. J., Cabana, M. D., Maselli, J. H., Hilton, J. F., & Hersh, A. L. (2011). Factors associated with prolonged emergency department length of stay for admitted children. *Pediatric Emergency Care*, *27*(2), 110–115. https://doi.org/10.1097/PEC.0b013e31820943e4

Birhanu, A., Merga, B. T., Ayana, G. M., Alemu, A., Negash, B., & Dessie, Y. (2022). Factors associated with prolonged length of hospital stay among COVID-19 cases admitted to the largest treatment center in Eastern Ethiopia. *SAGE Open Medicine*, *10*, 205031212110703. https://doi.org/10.1177/20503121211070366

Calderón, R. (2011). *QUT Digital Repository : This is the accepted version of the following journal article : Hernández , H . T ., Abouqal , R ., Medeiros , E . A ., Espinoza , T . A ., Kanj , S . S ., Gikas , A ., Barnett , A . G ., & Graves , N . (2010) Time - dependent a*. *62*(2010).

Dizdar, Ö., Karadağ, Ö., Kalyoncu, U., Kurt, M., Ülger, Z., Şardan, Y. Ç., & Ünal, S. (2007). Appropriate utilization of hospital beds in internal medicine: Evaluation in a tertiary care hospital. *Journal of Evaluation in Clinical Practice*, *13*(3), 408–411. https://doi.org/10.1111/j.1365-2753.2006.00724.x

Katayama, Y., Kitamura, T., Tanaka, J., Nakao, S., Nitta, M., Fujimi, S., Kuwagata, Y., Shimazu, T., &

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Matsuoka, T. (2021). Factors associated with prolonged hospitalization among patients transported by emergency medical services: A population-based study in Osaka, Japan. *Medicine (United States)*, *100*(48). https://doi.org/10.1097/MD.0000000000027862

Khosravizadeh, O., Vatankhah, S., Bastani, P., Kalhor, R., Alirezaei, S., & Doosty, F. (2016). Factors affecting length of stay in teaching hospitals of a middle-income country. *Electronic Physician*, *8*(10), 3042–3047. https://doi.org/10.19082/3042

Kwok, C. L., Lee, C. K. M., Lo, W. T. L., & Yip, P. S. F. (2017). The contribution of ageing to hospitalisation days in Hong Kong: A decomposition analysis. *International Journal of Health Policy and Management*, *6*(3), 155–164. https://doi.org/10.15171/ijhpm.2016.108

Li, H., Tao, H., & Li, G. (2021). Predictors and reasons for inappropriate hospitalization days for surgical patients in a tertiary hospital in Wuhan, China: a retrospective study. *BMC Health Services Research*, *21*(1), 1–11. https://doi.org/10.1186/s12913-021-06845-y

Liu, W., Yuan, S., Wei, F., Yang, J., Zhu, C., Yu, Y., & Ma, J. (2017). Inappropriate hospital days of a tertiary hospital in Shanghai, China. *International Journal for Quality in Health Care*, *29*(5), 699–704. https://doi.org/10.1093/intqhc/mzx091

Mawajdeh, S., Hayajneh, Y., & Al-Qutob, R. (1997). The effect of type of hospital and health insurance on hospital length of stay in Irbid, North Jordan. *Health Policy and Planning*, *12*(2), 166–172. https://doi.org/10.1093/heapol/12.2.166

Noohi, S., Kalantari, S., Hasanvandi, S., & Elikaei, M. (2020). Determinants of Length of Stay in a Psychiatric Ward: a Retrospective Chart Review. In *Psychiatric Quarterly* (Vol. 91, Issue 2, pp. 273–287). https://doi.org/10.1007/s11126-019-09699-0

Orooji, A., Nazar, E., Sadeghi, M., Moradi, A., Jafari, Z., & Esmaily, H. (2021). Factors associated with length of stay in hospital among the elderly patients using count regression models. *Medical Journal of the Islamic Republic of Iran*, *35*(1), 1–5. https://doi.org/10.47176/mjiri.35.5

Ravangard, R., Arab, M., Zeraati, H., Rashidian, A., Akbarisari, A., & Mostaan, F. (2011). Patients' length of stay in women hospital and its associated clinical and non-clinical factors, Tehran, Iran. *Iranian Red Crescent Medical Journal*, *13*(5), 309–315.

Ruangkriengsin, D., & Phisalprapa, P. (2014). Causes of prolonged hospitalization among general internal medicine patients of a tertiary care center. *Journal of the Medical Association of Thailand*, *97*(3 SUPPL. 3), 206–215.

Techane, T. (2022). Factors Associated with Length of Intensive Care Unit Stay Following Cardiac Surgery [Response to Letter]. *Research Reports in Clinical Cardiology*, *Volume 13*(February), 37–38. https://doi.org/10.2147/rrcc.s369341

Usman, G., Memon, K. N. a., & Shaikh, S. (2015). Bed Occupancy Rate and Length of Stay of Patients in Medical and Allied Wards of a Tertiary Care Hospital. *Journal of Ayub Medical College, Abbottabad : JAMC*, *27*(2), 367–370.

Usman, M., Jamal, S., Tabassum, S., & Zafran, M. (2011). Length of stay of patients in a tertiary care hospital. *Gomal Journal of Medical Sciences*, *9*(1), 18–21.

Walsh, B., Smith, S., Wren, M. A., Eighan, J., & Lyons, S. (2022). The impact of inpatient bed capacity on length of stay. *European Journal of Health Economics*, *23*(3), 499–510. https://doi.org/10.1007/s10198-021-01373-2

Yang, Y., Yang, K. S., Hsann, Y. M., Lim, V., & Ong, B. C. (2010). The effect of comorbidity and age on hospital mortality and length of stay in patients with sepsis. *Journal of Critical Care*, *25*(3), 398–405. https://doi.org/10.1016/j.jcrc.2009.09.001