Pattern and Prevalence of Patient Admission in Pediatric Intensive Care Unit of Bharatpur Hospital, Chitwan, Nepal

Sarad Chandra Kafle[1,*], Ekta Hooda[2], Bhagawati Sharma[3], Manish Kafle[1]

Tribhuvan University

[2]Faculty of Management,

[*] Corresponding author

Email ID: sarad.kafle49@gmail.com

Abstract

Healthcare professionals consistently document patient data during each hospital visit; however, the utilization of this data for informed decision-making in hospital management remains limited. This study aims to harness patient records from the Pediatric Intensive Care Unit of Bharatpur Hospital, employing a retrospective approach. The analysis encompasses one hundred and twenty cases spanning a two-month duration from 2022 April, incorporating variables such as gender, age, caste, district of origin, primary and final diagnoses, and patient outcomes. Employing descriptive analysis and logistic regression, the findings highlight consistent patient flow patterns between genders, while variations emerge across age groups, castes, and districts of origin. Notably, a meticulous matching analysis between primary and final diagnoses reveals full alignment for conditions like Severe Anemia, AFI, COPD, and Hypertension Urgency, corroborating initial medical assessments. Specifically, the secondary diagnosis of COPD demonstrates a robust correspondence rate of 96.77%, representing the highest admission count, whereas Bill Pneumonia

exhibits a lower alignment rate of 33.33%. This discrepancy is attributed to a small sample size of only three cases, limiting generalizability. Overall, 89.09% of primary diagnoses align with the final diagnoses. The application of logistic regression indicates significantly higher admission probability for the Pediatric Intensive Care Unit among individuals aged 64 to 85, compared to other age groups. The implications of this research extend to policymakers, hospital management stakeholders, and scholars pursuing hospital-focused studies.

1. Introduction

Hospitals play a crucial role as sanctuaries of healthcare, catering to individuals seeking medical well-being following periods of illness or health concerns (Oberstein, 2012). These establishments are frequented by patients from a wide array of socio-demographic backgrounds, reflecting the diverse tapestry of society. The diligent efforts of medical practitioners and hospital staff lead to the meticulous documentation of patient information. However, this wealth of data often remains confined to the pages of records, without undergoing comprehensive and illuminating analyses (Boundaoni, 2015). Conventionally, the analysis of hospital data tends to revolve around the creation of annual reports. These documents primarily capture overarching trends such as the prevalence of various diseases and the sheer volume of patients who traverse the hospital's doors on a daily, monthly, or yearly basis. While these summaries provide a broad overview, they often fall short in terms of offering a nuanced and granular understanding of the data at hand (National Research Council, 2010). The true potential of this data is frequently left untapped, relegated to the periphery once the patient's journey within the hospital concludes. This practice not only results in an underutilization of a valuable resource but also disregards the opportunity to draw meaningful insights from these records. By delving into the intricate details of patient visits, stays, and outcomes, a treasure trove of information awaits discovery (Hippler & Klicpera, 2003).

Furthermore, researchers primarily employed a retrospective approach by analyzing hospital records (Dhungana et al., 2019; Gupta et al., 2015; Nepal et al., 2020). This analysis revealed that demographic variables, admission diagnoses, length of stay, and patient outcomes are pivotal factors influencing the patterns of hospital admission and prevalence.

This research endeavors to unearth the latent patterns embedded within patient data admitted in PICU, with a specific focus on patient information compiled by Bharatpur hospitals, Chitwan, Nepal. The dataset includes a comprehensive array of variables, encompassing critical aspects such as the date of admission, preliminary diagnoses that guide treatment decisions, final diagnoses that encapsulate the course of medical care, the patient's ultimate status of discharge, referrals to other medical facilities, and sadly, occurrences of mortality. These records encapsulate not just medical events but also chronicle critical life events for patients and their families.

By undertaking a rigorous analysis of this dataset, the study aims to uncover intricate trends in patient visits at Bharatpur Hospital and the prevalence of diseases across different demographics. Additionally, it seeks to identify the prevalence of major diseases that prompt individuals to seek care at Bharatpur Hospital. Such insights hold immense value for healthcare administrators, policymakers, and practitioners alike, as they inform critical decisions concerning resource allocation, treatment protocols, and the overall enhancement of patient care.

2. Literature Review

Numerous studies have undertaken the examination of patient admission data within hospital settings through retrospective approaches. The utilization of retrospective methodologies for data collection and analysis has been a consistent feature across much of the research conducted. A comprehensive review of pertinent literature accessible on the internet has also been conducted.

The research paper by Shrestha et al. (2020) presented a retrospective observational study based on records of 358 patients admitted to a tertiary hospital's Pediatric Intensive Care Unit (PICU) from January 2017 to August 2017, revealing that the majority of admissions were infants (54.5%) with a mean age of 1.83 years and a male to female ratio of 1.8:1. Respiratory diseases (27.7%), CNS diseases (19.6%), and infections (17.3%) were the primary reasons for PICU admission. The study reports an average PICU stay of 6.27 days and an overall mortality rate of 22.7%, shedding light on the demographic profile, admission reasons, and outcomes of critically ill pediatric patients in that timeframe. The study by Joshi et al. (2020) utilized a cross-sectional design within Nepal's Kanti Children's Hospital, a prominent government pediatric care facility. The research examines records spanning from January 1, 2018, to December 31, 2018, encompassing 652 admitted children aged one month to 14 years with complete data. The findings showcase a predominantly male population (61%), primarily in the age group of one month to 12 months (54%). Notable disease instances include pneumonia, septicemia, bronchiolitis, and

other infectious diseases. The analysis reveals outcomes: 74.23% improved, 7.05% left against medical advice, and an 18.46% mortality rate. Most fatalities are attributed to infections, encompassing septicemia, acute gastroenteritis, pneumonia, meningitis, and other infectious diseases. The study provides crucial insights into the patient profile, prevalent diseases, and outcomes within the context of this pediatric intensive care unit.

This retrospective hospital-based study conducted by Nepal et al. (2020) at Kanti Children's Hospital in Kathmandu, Nepal, spans six months (February 2019 - July 2019) and focuses on the Neonatal Intensive Care Unit (NICU). Ethical approval was secured from the institute's IRC, and data were extracted from the hospital's medical records. The study includes 163 extramural neonates admitted to the NICU during the specified period. Information on age, sex, gestational age, birth weight, maternal age, parity, and neonatal morbidity (diagnosed clinically with supporting data) was recorded. Notable findings indicate that common NICU admission reasons encompass neonatal sepsis, hyperbilirubinemia, prematurity, and perinatal asphyxia. Adverse outcomes were associated with factors like young primipara mothers, extremely low birth weight, extreme prematurity, and mechanical ventilation. A statistically significant connection between poor outcomes and young mothers (age < 20) as well as neonates with birth weights below 1000 grams was established. This study underscores the risk factors influencing NICU admissions and outcomes, offering vital insights into neonatal care. Gupta et al. (2015) conducted a retrospective study spanning one year at the Department of Pediatrics, College of Medical Sciences-Teaching Hospital in Bharatpur, Chitwan, Nepal. It includes a substantial sample size of 814 cases admitted. Noteworthy findings from the study indicate that the majority (68.8%) of admissions were children below five years old, with males comprising a larger proportion and a male-to-female ratio of 1.9:1. A significant portion of admissions (43.6%) originated from Chitwan itself. The main reasons for admission were respiratory, gastrointestinal, and neurological conditions, with pneumonia, upper respiratory tract infections (URTI), and acute gastroenteritis being the most common diseases observed. The average hospital stay lasted 5.28 days, and the mortality rate was notably low at 0.1%.

Kalraiya (2016) conducted a retrospective analysis of medical records of children aged 1 month to 12 years who were admitted to a Pediatric Intensive Care Unit (PICU) and died over a five-year period in a teaching hospital in central India. The 5-bedded PICU was staffed by senior residents and consultants. Data was collected using a predefined proforma to examine factors such as age, gender, co-morbidities, and diagnosis at the time of death. The study aimed to compare mortality patterns with national and international data and evaluate the services for enhancing patient care. The sample comprised 1767 admissions to the PICU over the five years. Notable findings include a PICU mortality rate of 4.92%,

with a male-to-female ratio of 2:1. The majority of deaths occurred in children aged 1 month to 5 years, and 47.13% of deaths happened within 24 hours of admission. Central Nervous System diseases accounted for the highest mortality rate (35%), followed by Respiratory system diseases (28.73%). Additionally, a significant proportion of critically ill patients (14.8%) left the hospital against medical advice (LAMA). This study provides valuable insights into PICU mortality patterns and challenges, shedding light on potential avenues for improving pediatric critical care services.

A retrospective observational study was conducted by Adhikari et al. (2017) within the Neonatal Intensive Care Unit (NICU) of Manipal Teaching Hospital in Pokhara, Nepal, covering the period from January 2014 to December 2015. Data on all NICU admissions were collected using a predefined proforma. The study encompassed a significant sample size of 1708 admissions during the specified timeframe. The major findings of the study indicate that primary reasons for NICU hospitalization included neonatal hyperbilirubinemia, neonatal sepsis, prematurity, perinatal asphyxia, meconium aspiration syndrome, and intrauterine growth restriction. The outcomes revealed that 82.6% of patients were discharged after treatment, 9.7% left against medical advice, 6.7% passed away within the hospital, and 1% were referred elsewhere. Notably, preterm neonates exhibited twice the risk of mortality compared to term neonates, and those with a birth weight below 2500 grams had a threefold increased risk of neonatal mortality compared to those with normal birth weight. This study provides valuable insights into the NICU's patient profile, common indications for admission, and significant risk factors affecting neonatal outcomes.

Adhikari (2018) conducted research at Gandaki Medical College Teaching Hospital, this retrospective study involved a review of hospital records from the pediatric ward during the period from July 2015 to January 2016. The study included a substantial sample size of 1348 admitted children within the specified timeframe. The findings reveal that the majority of admitted children were males (65%) and were below the age of five (74%). The main reasons for admission were lower respiratory tract infections (30%), enteric fever (10%), and acute gastroenteritis (7.7%). The average hospital stay duration was 4.43 days. Interestingly, the highest number of admissions occurred during the months of August and September. Notably, infectious diseases stood out as the primary causes of morbidity, with a heightened incidence during the rainy season. This study provides insights into the pediatric patient profile, prevalent admission reasons, and seasonal variations in disease patterns within the hospital's pediatric ward.

The study by Dhungana et al. (2019) employed a prospective cohort design within the Pediatric Intensive Care Unit (PICU) of Nepal Medical College Teaching Hospital

(NMCTH) during the period from August 2017 to December 2018. The study encompassed all cases admitted to the PICU, ranging from term newborns to children up to 14 years old. Noteworthy findings from the study highlight the performance of the Pediatric Index of Mortality-2 (PIM 2) scoring system, which demonstrated strong discrimination with an area under the curve of 0.809 (95% CI: 0.709-0.910) and good calibration across risk deciles indicated by the Hosmer-Lemeshow goodness of fit test (p = 0.163, chi-square value of 11.752). The study reported a PICU mortality rate of 28.4% and a standardized mortality ratio of 1. These findings provide insights into the efficacy of a specific mortality prediction tool and the observed mortality rates within the PICU during the study period. The research paper by Bhavari et al. (2019)conducted a retrospective study at a rural teaching hospital's Paediatric Intensive Care Unit (PICU) in Pune, India, covering data from January 2016 to July 2018. The study encompasses a sample size of 417 patients admitted to the PICU within the 30-month study window. Notable findings highlight that the majority of admitted patients were below 1 year of age, spanning an age range from 1 day to 18 years. Lower respiratory tract infection (LRTI) emerged as the most common diagnosis, observed in 14.7% of cases, with the respiratory system being the most frequently affected system overall (21.8%). In terms of outcomes, 85.6% of cases were discharged, 8.6% were discharged against medical advice (DAMA), and 5.8% unfortunately expired. The study concludes that with improved treatment protocols and skilled expertise in rural PICUs, favorable outcomes can be attained with low mortality rates. This study offers insights into the demographic profile, common diagnoses, and outcomes of critically ill pediatric patients within a rural PICU setting.

Bagchi et al. (2020) carried out a tertiary care hospital in the Sub-Himalayan region, aiming to analyze the demographic characteristics and morbidity trends within the pediatric intensive care unit (PICU). The research focused on collecting data related to patient demographics and morbidity patterns within the PICU setting. The major findings of the study indicated that the primary cause of mortality in the PICU was meningoencephalitis, followed by sepsis and lower respiratory tract infections (LRTI). The study also revealed a higher mortality rate in the PICU compared to similar recent studies, underscoring the importance of prompt referrals and increased PICU facilities in the region. While the demographic profile of patients aligned with global PICU trends in terms of age, sex, and length of PICU stay, there were significant differences in disease patterns, with a notable prevalence of LRTI cases in this region. The average duration of PICU stay ranged from 3 to 7 days, with LRTIs being the most prevalent case type. The study's insights shed light on disease patterns specific to the Sub-Himalayan region and highlight the need for targeted interventions to improve pediatric critical care in the area.

Despite numerous investigations in the realm of hospital admission data analysis, particularly focusing on patterns and prevalence among patients, a noticeable gap exists: the absence of such a study at Bharatpur Hospital. By scrutinizing the patient admission records within the PICU at Bharatpur Hospital, valuable insights can be gleaned, underscoring the imperative nature of this research endeavor.

3.   Method and Materials

The research is centered on studying the records of patients admitted to Bharatpur Hospital in Chitwan. This hospital was chosen due to its diverse patient population from various districts and demographics, ensuring a representative sample. The study focuses on secondary data obtained from the records of 120 patients admitted to the PICU of Bharatpur Hospital, spanning from 15 April 2022 to August 24, 2022. Data collection from the hospital adheres to ethical guidelines and is carried out following official approval from the hospital administration. The dataset includes several variables: admission and outcome dates, gender, age, caste, district, primary and final diagnoses, and patient outcome (discharged with recovery, referred, or deceased). The data from the hospital register was input into Microsoft Excel and subsequently analyzed using SPSS version 22.

The analysis involves multiple steps. A trend line is employed to visualize patient flow over time, while a pie chart is used to illustrate the disparity in gender distribution. Bar diagram is used to analyze the frequency distribution of patient outcomes. Frequency and percentage analyses are conducted to examine patient flow across different demographic categories. Match case analysis is carried out to find whether the Primary Diagnosis (PD) is matched with the Final diagnosis of patients with cross-tabulation. Additionally, a binary logistic regression model is applied to predict patient discharge using gender, caste, district, and age group as independent variables.

4.   Results and Discussion

The admission rate to the PICU at Bharatpur Hospital varies from a minimum of one patient per day to a maximum of seven patients over two months. On average, there are 2.5 patients admitted daily, with a standard deviation of 1.55, reflecting the fluctuating nature of patient inflow. However, it's important to note that this trend follows a highly random pattern, making it challenging to predict using linear forecasting methods.
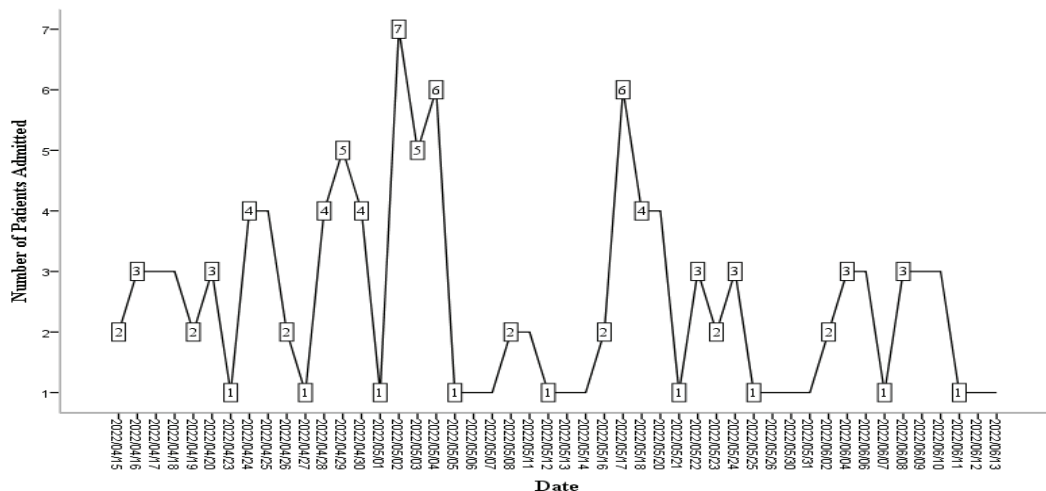
Figure 1: *Daily Patient Flow in PICU of Bharatpur Hospital*

Demographics play a crucial role in patient care, as healthcare professionals often record patient information such as age, gender, and medical history to assess the likelihood of illness or susceptibility to specific diseases (Egan & Beaton, 1987). In this study, researchers examined patient demographics to investigate whether the influx of patients at Bharatpur Hospital is consistent across various population groups. Additionally, the study explored whether the average length of hospital stay remains uniform for all diverse populations, aiming to discern any potential differences in the duration of hospitalization among these distinct groups.

Table 1: *Demographic Profile of Respondents*

Demographics	Categories	Patients	Chi Square	P-value
Gender	Female	55 (45.80%)	1.25	0.2633
	Male	65 (54.20%)		
Age	Up to 64 years	5 (4.20%)	90.25	<0.001
	65- 84 years	95 (79.20%)		
	Above 85 years	20 (16.70%)		
Caste	Brahman	51 (42.50%)	43.73	<0.001
	Chhetri	8 (6.70%)		
	Dalit	18 (15.00%)		

Demographics	Categories	Patients	Chi Square	P-value
Districts	Janajati	43 (35.80%)	17.6	<0.001
	Intra-District Patients	64 (53.30%)		
	Neighboring District Patients	32 (26.70%)		
	Extended District Patients	24 (20.00%)		

The primary diagnosis (PD) assigned to a patient's ailment is closely linked to their actual medical condition, and the subsequent treatment administered by healthcare professionals hinges on the accuracy of this initial diagnosis. The diagnostic process is carried out in alignment with the primary diagnosis. Upon reviewing laboratory reports for corroborative evidence, healthcare providers ascertain the true nature of the patient's illness, referred to as the final diagnosis (FD). It is noteworthy that the final diagnosis may or may not align with the primary diagnosis; nevertheless, physicians formulate their understanding of potential causes based on patient symptoms and medical history. The examination of matching cases delves into the proficiency of doctors in predicting patients' conditions based on symptomatic and historical information. In this study encompassing 120 patients, encompassing a diverse array of primary diagnoses (PD) and final diagnoses (FD), the cross-tabulation derived from data analysis has been distilled to major primary and final diagnoses, yielding 55 cases. Notably, illnesses with a minimum of two cases have been included in the assessment of matching cases. The selected illnesses for scrutiny include Acute Exacerbation of Chronic Obstructive Pulmonary Disease (AE of COPD), Severe Anemia, Acute Febrile Illness (AFI), Bill Pneumonia, Ischemic Stroke (CVA), Chronic Obstructive Pulmonary Disease (COPD), Dyselectrolytemia, Hypertension Urgency, and Uncontrolled Diabetes Mellitus (D.M.) (Table 2).

Table 2: *Match Case of Primary Diagnosis with Final Diagnosis*

Primary Diagnosis	Match (%)	Do not Match (%)	Total Cases
AE of COPD	30 (96.77%)	1 (3.23%)	31
Severe Anemia	5 (100%)	0 (0%)	5
AFI	4 (100%)	0 (0%)	4
Bill Pneumonia	1 (33.33%)	2 (66.67%)	3
Ischemic stroke(CVA)	2 (66.67%)	1 (33.33%)	3
COPD	2 (100%)	0 (0%)	2

Primary Diagnosis	Match (%)	Do not Match (%)	Total Cases
Dysecletrolytemi	1 (50%)	1 (50%)	2
Hypertension urgency	2 (100%)	0 (0%)	2
Uncontrolled D.M	1 (50%)	1 (50%)	2

The analysis of match percentages reveals that Severe Anemia, AFI, COPD, and Hypertension urgency are perfectly aligned with what doctors initially thought. AE of COPD comes next in line for matching (96.77%) and it has a maximum number of cases, while Bill Pneumonia has a lower match rate of 33.33% however it may not generalized due to its small sample size of only three cases. Overall, 89.09% of primary diagnoses match the final diagnoses, showing doctors at Bharatpur Hospital are skilled at identifying a good number of cases accurately, even with the diverse patient problems they face (Table 2).

Patients' hospitalization durations before discharge can vary based on demographic factors. To ascertain whether these durations exhibit uniformity across demographic groups, a meticulous analysis is imperative. Employing a one-way ANOVA is indispensable when considering demographic variables with more than two categories. Simultaneously, a two-category gender variable is subject to a t-test of independent means. To ensure the statistical robustness of these tests, a preliminary assessment of data normality is conducted employing the Kolmogorov-Smirnov test. The outcomes provide empirical evidence supporting the assumption of normal distribution for each category (P-value >0.05). This pre-analysis step fortifies the subsequent parametric tests, reinforcing the credibility of ensuing conclusions.

Table 3: *Average Hospital Stay of Patients*

Demographics	Categories	N	Mean	SD	Lower Limit	Upper Limit	P-value
Gender	Female	55	5.38	3.44	4.45	6.31	0.977
	Male	65	5.4	3.5	4.53	6.27	
Age	Up to 64 years	5	3.4	1.82	1.14	5.66	0.229
	65- 84 years	95	5.64	3.69	4.89	6.39	
	Above 85 years	20	4.7	2.2	3.67	5.73	

Demographics	Categories	N	Mean	SD	Lower Limit	Upper Limit	P-value
Caste	Brahman	51	5.51	4.06	4.37	6.65	0.308
	Chhetri	8	7.38	3.46	4.48	10.27	
	Dalit	18	5.39	3.23	3.76	7.02	
	Janajati	43	4.88	2.62	4.08	5.69	
District	Intra-District Patients	64	5.23	3.62	4.33	6.14	0.865
	Neighboring District Patients	32	5.53	3.63	4.22	6.84	
	Extended District Patients	24	5.63	2.86	4.42	6.83	

The examination of patient hospitalization durations in Bharatpur has demonstrated non-significant differences in average stays across demographic categories (P-value > 0.05), implying minimal demographic influence on hospital duration. However, a notable revelation stems from the 95% confidence interval estimates, notably the Chhetri caste, whose upper limit dramatically surpasses other castes. While the mean stay appears consistent, this finding suggests a unique, prolonged hospitalization pattern for the Chhetri caste, warranting targeted investigation for tailored care strategies and equitable health outcomes. It's worth noting that, regardless of demographics, the average patient stay is estimated to be 5.39 ± 3.46 days, with a 90% confidence interval ranging from 4.77 to 6.02 days, providing a comprehensive overview of the expected hospitalization duration. (Table 3)

In the comprehensive study of final diagnoses encompassing 120 cases, noteworthy prevalence rates have surfaced. Among these cases, the prevalence of Acute Exacerbation of Chronic Obstructive Pulmonary Disease (AE of COPD) emerges prominently at 26.7%, highlighting its significance within the cohort. Equally notable is the equivalent prevalence of 4.2% observed for both Acute Febrile Illness (AFI) and Severe Anemia. In contrast, other diagnostic categories exhibit markedly lower prevalence rates and boast a considerable volume of diverse final diagnoses, rendering their inclusion in the study impractical. Hence, the prevalence AE of COPD emerges as a significant contributing factor to patient admissions in the PICU of Bharatpur Hospital.

Table 4: *Bootstrap Results based on 32 cases for 1000 Bootstrap Samples to know Prevalence*

Demographics	Categories	Frequency	Prevalence (%)	Bias	Std. Error	95% Confidence Interval of prevalence	
						Lower	*Upper*
Gender	Female	17	53.1	0.8	8.9	36.4	71
	Male	15	46.9	-0.8	8.9	29	63.6
Age	65- 84 years	24	75	-0.4	7.8	58.6	89.7
	Above 85 years	8	25	0.4	7.8	10.3	41.4
Caste Group	Brahman	18	56.3	-0.6	9	36.7	73
	Chhetri	2	6.3	0.1	4.4	0	16.7
	Dalit	6	18.8	0.4	6.8	7.1	33.3
	Janajati	6	18.8	0.1	7.1	6.1	32.4
District	Intra-District Patients	19	59.4	0.3	8.7	41.9	76
	Neighboring District Patients	8	25	0	7.7	10.4	40.7
	Extended District Patients	5	15.6	-0.3	6.6	3.6	29.7

The bootstrap technique has been judiciously employed to examine the prevalence AE of COPD across various patient demographics due to the limitations posed by a relatively small sample size (Scali et al., 2020) of 32 cases. This method involves generating 1000 resampled datasets from the available data, thereby facilitating robust statistical inferences.

Gender-based analysis reveals that the prevalence of AE of COPD is distributed fairly evenly between females (53.1%) and males (46.9%). Age-based investigation uncovers a higher prevalence among patients aged 65-84 years (75%) compared to those above 85 years (25%). A breakdown by caste group highlights varying prevalence rates, with the Brahman caste group exhibiting a prevalence of 56.3%, while the Chhetri, Dalit, and Janajati groups show prevalence rates of 6.3%, 18.8%, and 18.8%, respectively. When

considering the district of origin, patients from the same district (59.4%) appear to have a relatively higher prevalence of AE of COPD compared to those from neighboring districts (25%) and extended districts (15.6%) (Table 4).
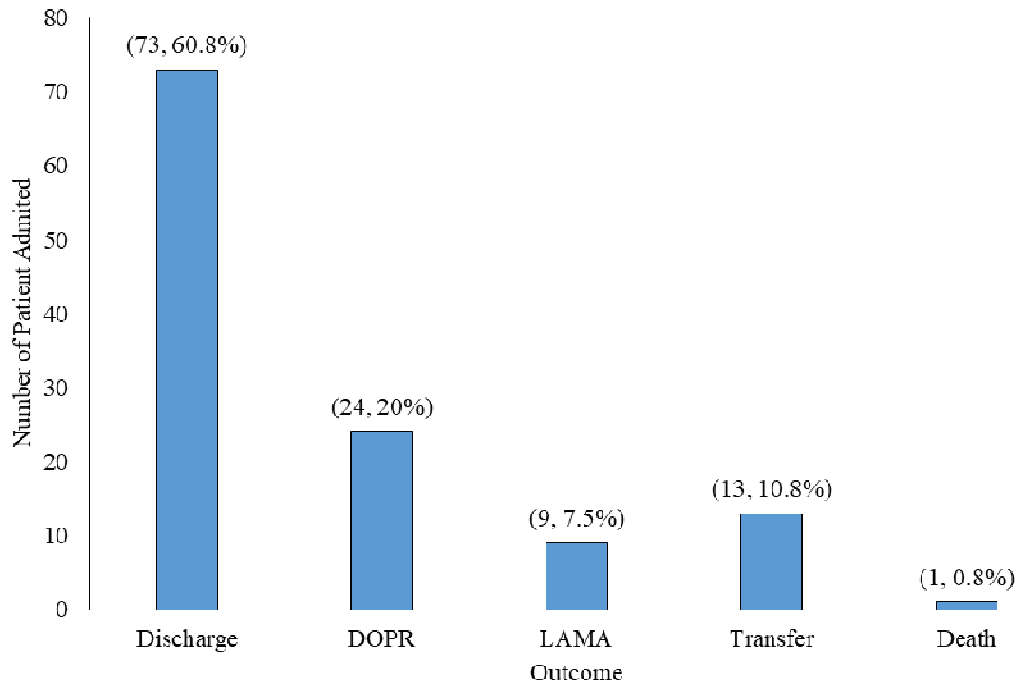
Figure 2: *Outcome of Patient after Hospital Stay*

Bar diagram to utilize to visually depict the various outcomes experienced by patients admitted to the PICU at Bharatpur Hospital. The diagram provided a clear breakdown of these outcomes. Notably, the majority of patients (60.8%) were successfully discharged and returned home after their recovery, reflecting the hospital's effective care. An additional 20% get discharged over personal requests (DOPR), while 7.5% leaved against medical advice (LAMA), likely planning to resume recovery at home. Moreover, 10.8% were transferred to hospital for improved medical facilities for specialized treatment, and unfortunately, a small fraction (0.8%) experienced mortality. Despite this, the PICU demonstrated a commendably low overall monthly mortality rate of 0.4%. These findings emphasize the PICU's positive impact on patient outcomes (Figure 2).

To know whether the patient from diverse demographic profiles has the same chance of being discharged from the PICU of Bharatpur hospital, a binary logistic regression is

applied. The dependent variable was outcome having the outcome of discharge or not and the independent variables were gender, age, caste and district.

Table 5: *Coefficients of Binary Logistic Regression*

	B	S.E.	Wald	df	Sig.	Exp(B)
Male	-0.108	0.387	0.078	1	0.780	0.897
Age up to 64 years			4.400	2	0.111	
Age 65-84 years	0.679	1.057	0.413	1	0.521	1.971
Age 85 years and above	1.068	0.511	4.371	1	0.037	2.911
Caste			0.429	3	0.934	
Chhetri	-0.091	0.441	0.042	1	0.837	0.913
Dalit	0.012	0.823	0.000	1	0.989	1.012
Janajati	0.311	0.639	0.238	1	0.626	1.365
Intra-District Patients			0.082	2	0.960	
Neighboring District Patients	0.055	0.512	0.012	1	0.914	1.057
Extended District Patients	-0.078	0.587	0.018	1	0.894	0.925
Constant	-0.391	0.709	0.304	1	0.581	0.676

The results of binary logistic regression revealed significant findings. The Omnibus test underscored the meaningful impact of the predictors on the outcome variable (P-value<0.05), indicating the overall significance of the fitted model. This result aligns with the Classification Table, demonstrating a 64.2% accurate prediction rate. However, the Nagelkerke R square, at 0.055, suggests a modest proportion of variation explained by the independent variables in relation to the outcome variable. Upon closer examination of individual predictors, it is evident that the age group "Age above 85 years" is a significant explanatory factor (p-value < 0.05), with a notable impact on the odds of discharge compared to the reference category "age up to 64 years" (Exp(B) = 2.911). Conversely, variables such as gender, caste, and district are found to be statistically insignificant contributors to the outcome variable (p-value > 0.05) (Table 5). The significance of the age group "Age 85 years and above" as a contributor to the outcome variable could be attributed to the prolonged hospitalization duration often experienced by elderly individuals, possibly due to the extended recovery time needed. Additionally, the higher

vulnerability of this age group to critical health situations compared to the reference age group (up to 65 years) might contribute to its significant impact on the outcomes.

5. Conclusion

The investigation into the patient flow patterns within the PICU of Bharatpur Hospital has yielded noteworthy insights. The analysis of demographic trends indicates that patient admission does not significantly differ based on gender. However, distinctions are observed among various age groups, castes, and districts of origin. Furthermore, a matching analysis between the primary diagnosis and the final diagnosis reveals cent percent alignments for conditions like Severe Anemia, AFI, COPD, and Hypertension urgency, corroborating initial medical assessments. Notably, the secondary diagnosis of COPD exhibits a strong correspondence (96.77%) and represents the highest admission count, while Bill Pneumonia demonstrates a lower match rate of 33.33%. This lower match rate, however, is influenced by a limited sample size of merely three cases, limiting generalizability. Overall, 89.09% of primary diagnoses concur with the final diagnoses.

Examining the average duration of hospital stays across various demographics, it is evident that the average stay of 5.39 ± 3.46 days remains consistent, regardless of patient characteristics. This finding is statistically supported by a 90% confidence interval ranging from 4.77 to 6.02 days. Focusing on COPD-related cases, a notably elevated prevalence (26.7%) emerges, particularly within the 65 to 84 year age group (75%) this result was further validated by bootstrap analysis. The prevalence of COPD-related cases transcends demographics, stabilizing at 26.7%. Encouragingly, a favorable discharge rate of 60.8% underscores positive recovery outcomes. Equally noteworthy is the low mortality rate of 0.4% per month, a testament to the hospital's commendable performance.

Binary logistic regression underscores that individuals aged 85 and above face a higher risk of PICU admission at Bharatpur Hospital compared to other age groups. These findings align with similar research conducted by Shrestha et al. (2020), wherein respiratory ailments constituted a significant proportion of PICU admissions (27.7%), akin to the admission rate of COPD-related cases in this study (26.7%). Similarly, the average length of stay approximated 6.27 days, mirroring the current study's 5.39 days. Nevertheless, a marked divergence in mortality rates exists, as Shrestha et al. reported a 22.7% mortality rate. This variation is noteworthy, given that the present study focuses on a specific hospital within Nepal's territory, thus reflecting a more favorable outcome. It's also pertinent to mention that the mortality rate here remains notably lower compared to Herd et al. (2012) research in Bihar, India, where a 2% mortality rate was observed. Regarding patient demographics, distinct proportions emerge compared to studies by Kumari et al. (2020),

Gupta et al. (2015) and Kumar et al. (2020) where male admissions surpassed females. Conversely, this study reveals a nearly balanced distribution of male and female admissions. The divergence in admission patterns likely arises from unique regional circumstances. Despite the hospital's evident strengths, including low mortality and a high discharge rate, a notable fraction (20%) of patients seeking improved treatment options elsewhere warrants attention from the hospital administration.

The overarching significance of this research lies in the comprehensive understanding of patient patterns and outcomes at Bharatpur Hospital. The insights garnered offer invaluable guidance for healthcare administration, facilitating enhanced service provision within the country. Scholars and relevant stakeholders stand to benefit from these findings. For future researchers venturing into this domain, collaboration with medical experts is strongly recommended to ensure a more in-depth exploration.

References

Adhikari, P. (2018). Pattern of Pediatric Morbidity in Hospital Admitted Patients in Western Region of Nepal. *Journal of Gandaki Medical College-Nepal*, *11*(1), 61–63.

Adhikari, S., Rao, K. S., K, B., G., & Bahadur, N. (2017). Morbidities and Outcome of a Neonatal Intensive Care in Western Nepal. *Journal of Nepal Health Research Council*, *15*(2), 141–145. https://doi.org/10.33314/jnhrc.v15i2.1052

Bagchi, N. R., Das, G., & Guha, A. (2020). Demographic profile and outcome analysis in paediatric intensive care unit at tertiary care hospital in the sub-Himalayan region. *International Journal of Contemporary Pediatrics*, *7*(9), 1897–1900.

Bhavari, V., Ambike, D., & Pawar, N. (2019). Study of morbidity pattern and outcome of patients admitted in paediatric intensive care unit in a tertiary care rural teaching hospital. *Internation Jounal of Contemporary Pediatrics*, *6*(5), 2064–2067.

Boundaoni, I. A. (2015). *Health care access and utilization among African-immigrants in the district of Columbia metro area in the united states: A comparative analysis*. University of Baltimore.

Dhungana, S. P., Panta, P. P., Shrestha, S. K., & Dhungana, S. (2019). Performance of Pediatric Index of Mortality-2 in a Pediatric Intensive Care Unit of a Tertiary Care Hospital of Nepal. *Nepal Med College Journal*, *21*(2), 89–94.

Egan, K. J., & Beaton, R. (1987). Response to symptoms in healthy, low utilizers of the health care system. *Journal of Psychosomatic Research*, *31*(1), 11–21. https://doi.org/10.1016/0022-3999(87)90093-6

Gupta, S. K., Sarmah, B. K., Tiwari, D., & Thapa, S. (2015). Pattern of Pediatric Admissions in a Tertiary Care Hospital of Central Nepal. *JNMA; Journal of the Nepal*

Medical Association, *53*(198), 118–122.

Herd, F., Sastry, J., & Kidson, C. (2012). Overview of patients with malignancy admitted to PICU. *Archives of Disease in Childhood*, *97*(Suppl 1), 82 3-83. https://doi.org/10.1136/archdischild-2012-301885.199

Hippler, K., & Klicpera, C. (2003). A retrospective analysis of the clinical case records of 'autistic psychopaths' diagnosed by Hans Asperger and his team at the University Children's Hospital, Vienna. *Philosophical Transactions of the Royal Society of London. Series B: Biological Sciences*, *358*(1430), 291–301.

Joshi, P., Agrawal, S., & Sah, U. P. (2020). Study of morbidity and mortality pattern of children admitted in paediatric intensive care unit of tertiary care children's hospital. *Journal of Nepal Paediatric Society*, *40*(3), 232–240.

Kalraiya, A. (2016). Mortality pattern in pediatric intensive care unit patients of a tertiary care teaching hospital: A retrospective analysis. *Pediatric Review: International Journal of Pediatric Research*, *3*(12), 896–899.

Kumar, B., Gupta, N. P., Laheriasarai, D., & Kumar, R. (2020). A study to evaluate the clinical characteristics and outcome of patients admitted in PICU at tertiary care facility. *European Journal of Molecular & Clinical Medicine (EJMCM*, *7*(08).

Kumari, S., Kumar, R., Kumar, R., & Bhushan, S. (2020). A retrospective study on clinico-demographic and outcome profile of patients admitted in PICU. *European Journal of Molecular & Clinical Medicine (EJMCM*, *7*(10).

National Research Council. (2010). *Improving health care cost projections for the medicare population: Summary of a workshop*.

Nepal, D., Agrawal, S., Shrestha, S., & Rayamajhi, A. (2020). Morbidity pattern and hospital outcome of neonates admitted in tertiary care hospital, Nepal. *Journal of Nepal Paediatric Society*, *40*(2), 107–113.

Oberstein, S. G. (2012). *Hospital-based Educational Services and the Well-being of Children with Chronic Illness: A Self-study* [(Doctoral dissertation,]. DePaul University.

Shrestha, A. K., Bhattarai, S., Paudel, P., & Basel, P. L. (2020). Morbidity and mortality pattern of patients admitted into paediatric intensive care unit of tertiary level hospital of Nepal. *Journal of Nepal Paediatric Society*, *40*(1), 28–33.