COST OF HOSPITALIZATION OF PEDIATRIC COVID-19 PATIENTS IN A TERTIARY PEDIATRIC HOSPITAL IN THE PHILIPPINES

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ABSTRACT

BACKGROUND:

Out of pocket expenses still comprises a major share in health financing. A reactive approach in COVID-19 treatment may be problematic for the patient's finances. National health insurance systems like PHIC have COVID-related care benefits, but whether these offer sufficient coverage is unknown.

OBJECTIVES:

This study aims to describe the hospitalization costs incurred by pediatric COVID-19 patients admitted at a Filipino tertiary pediatric hospital, to determine the major cost drivers of hospitalization, and to determine how various payment methods provide coverage in paying for hospitalizations costs.

METHODS:

Financial statements of pediatric COVID-19 patients were reviewed, from which costs were categorized. Deductions were also compared with total hospitalization to determine adequacy of various financial assistance programs.

RESULTS:

Fifty-six charts and financial statements were reviewed for a 9-month period. Majority of the patients are of the 1-month to 6-year-old group (39.3%), of critical severity (66.1%), and with comorbidities (76.8%). Aggregated hospitalization costs of all COVID-19 patients amounted to PHP 9.5 million; medical costs accounted for the majority of the hospital costs at 35.40%. Mean total hospitalization cost per patient was determined to be PHP 170,170 and mean daily cost was

PHP 16,870. PHIC COVID-19 packages may provide deducted as much as 90.56% of the overall costs, but only 28.6% of patients were able to avail of this privilege. Out-of-pocket expenditure remains at 33% of the total hospitalization cost.

CONCLUSIONS:

COVID-19 hospitalization in this institution mainly consists of the 1-month to 6 years old, and the costs in the average can reach up approximately PHP 170,000, as basic medical fees drive the majority of the costs. Patients with no known comorbids tend to have higher costs of care but more data is needed to elaborate on the trend. Availing PHIC packages can greatly ameliorate the financial burden of hospitalization. However, checks in timely and accurate filing of claims should be in place to assure those that can avail this assistance are rightfully supported.

RECOMMENDATION:

A larger patient base with equal representation of patient categories is recommended in order to determine more comprehensive cost patterns and make significant associations.

Keywords: COVID-19, hospitalization costs, PHIC, Health Financing

INTRODUCTION

Coronavirus Disease 2019 (COVID-19) is a lingering global pandemic that has afflicted millions of people worldwide, 1.14 million of which, as of writing of this study, are Filipinos. However, as all treatment and preventive approaches continue to be experimental, management of the disease continues to be reactive – positing a risk to order more tests and medicines, which could possibly then lead to overcharging.

There is a paucity of information when it comes to the costs of care of COVID-19 patients. The Kaiser Family Foundation, a non-profit organization that deals with health policy analyses, made a projection that the cost of treatment for COVID-19 patients can go as high as USD 20,000 (PHP 1 million) and over USD 88,000 (PHP 4.4 million) if this patient would require mechanical ventilation. FAIR Health, another non-profit organization, had a higher projection of USD 38,221 (PHP 1.9 million) (Rae, et al. 2020).

A Korean study made a comprehensive investigation on 145 pediatric COVID-19 admissions in 2020. The mean hospitalization period was noted to be at 10.38 days, which tend to increase with the age of the child: 4.63 days for 0-5 years old, 10.87 days for 6-10 years, 14.88 days for 11-15 years, and 15.81 days for 16-19 years (Lee, et al. 2020). Total medical cost for all 145 children summed to USD 317,802 (PHP 15.9 million), and mean individual cost was USD 2,192 (PHP 109,600). Mean individual cost also appeared to be lower in the younger age group where patients at 0-5 years spent an average of USD 749 versus patients aged 16-19 years at USD 3,655. Out of the total costs, 99.19% was comprised of medical costs and prescription drugs were less than 1%. Furthermore, 88.13% of the total medical costs was shouldered by the Korean National Health Insurance Service. Unfortunately, there is still no other locally published data on pediatric COVID-19 costs as of writing.

This study was undertaken to describe the hospitalization costs incurred by pediatric COVID-19 patients admitted at a Filipino tertiary pediatric hospital in Quezon City, Philippines. The objectives of this study included (1) describing the demographic and clinical characteristics of pediatric COVID-19 admitted at the said institution, (2) determining hospitalization expenses and its breakdown, (3) determining the association of demographic and clinical factors with the cost of hospitalization, and (4) determining cost coverage by payment schemes employed by patients.

METHODOLOGY

A list of patients of age 1 month to <19 years old admitted for symptoms of COVID-19 and confirmed with a positive SARS CoV 2 RNA via RT-PCR admitted at PCMC from March 1 to December 31, 2020 was obtained from the hospital Infection Control Committee for inclusion in the study. Excluded were patients discharged against medical advice, transferred to other institutions, those who were asymptomatic during the time of admission, had healthcare associated COVID-19 infection, and neonatal COVID-19 infection.

Account statements were accessed via Bizbox™ with permission from the hospital's Billing Section. Disease severity was based on PIDSP Interim COVID-19 Guidelines wherein:

- Moderate COVID – is defined as symptomatic patients with clinical signs of non-severe pneumonia.
- Severe COVID – defined as symptomatic patients with clinical signs of pneumonia with one of the following, age-specific tachypnea, cyanosis or hypoxia, lethargy or unconsciousness, or inability to drink or feed.
- Critical pneumonia – symptomatic patients consistent with severe COVID, along with signs of acute respiratory distress syndrome (ARDS) or sepsis.

On the other hand, sources of payment were classified as follows:

- COVID Case Rate / Package – coverage provided by PhilHealth specifically for patients diagnosed COVID-19 disease, under the guidelines published in PhilHealth's Circular 2020-0009
- Non-COVID Case Rates – coverages by PhilHealth that are granted based on the final diagnosis written on the Claim Form 2 (CF2), other than those pertaining to COVID-19 disease
- C3 Discounts – discounts given to indigent patient as per classification of the hospital's Social Service Office. Although there are no actual payments made in the case of "discounts" granted to patients, it will be defined as "a mode of payment" for the purposes of this study.
- Guaranteed Hospital Bills – coverages granted to patients by funding entities functioning externally from the hospital, such as government agencies, non-government organizations, charity institutions, and the likes.

The Institutional Research Ethics Committee (IR-EC) approved all study-related procedures. Patient confidentiality in accordance with data privacy laws throughout the study duration was observed.

Data was encoded using Microsoft Excel 2019. Statistical analysis such as measures of central tendencies and analysis of variance were done using the same program, and verified using GraphPad Prism 8.

RESULTS

Fifty-six patients were included based on set inclusion and exclusion criteria. Demographic and clinical profile are listed below in Table 1. There was an equal proportion of male and female patients. Majority were below 6 years of age (39.3%), had Critical COVID-19 (66.1%), had comorbid illnesses prior to admission (76.8%), and encountered severe complications during admission (71.4%). Mean length of stay was 12 days, ranging from overnight admissions to long admissions of approximately 44 days.

Table 2 describes the composition of costs based on specific cost categories. The aggregated hospitalization cost of all 56 admitted patients during the 9-month study period amounted to PHP 9,529,738.14. Median total hospital costs per patient approximated to PHP 98,000.

Majority of the expenditures were from the medical costs category which included room rates, professional fees, and use of nursing facilities. It is then followed by laboratory and pharmacy costs which covers all laboratory tests and pharmaceutical agents respectively. Other costs, comprised of radiologic and other subspecialized care only accounted a minor percentage of the total costs.

Table 3 below describes the total and daily hospital costs of pediatric COVID-19 patients categorized by demographic and clinical characteristics. Middle adolescent groups appear to have the highest hospital costs among different age groups, but due to a high p-value, a further representation of each group should be done so as to establish significance. As for disease severity, progressing severity follows an increasing trend of costs, which is similarly found with the data obtained in regards to presence of complications. On the other hand, the absence of a comorbid illness tends to incur higher costs than having a known comorbid (p-value = 0.001).

Table 1 Demographic and Clinical profile of subjects (N=56)

Demographic and Clinical Characteristics	Frequency	%
Sex		
Male	28	50.0
Female	28	50.0
Age Groups (y)		
1mo to <6	22	39.3
6 to < 11	15	26.8
11 to < 16	12	21.4
16 to < 19	7	12.5
Social Classification		
Pay / Private	1	1.79
Charity	55	98.21
Disease Severity**		
Mild	10	17.9
Moderate	7	12.5
Severe	2	3.6
Critical	37	66.1
Presence of Comorbid Illness		
Without	13	23.2
With	43	76.8
Presence of Complications		
Without	16	28.6
With	40	71.4
Discharge Status		
Discharged	43	76.8
Expired	13	23.2
Source of Payment		
PhilHealth (COVID Case Rate)	16	28.6
C19I P2 (Moderate)	11	19.6
C19I P3 (Severe)	5	8.9
PhilHealth (Non-COVID Rates)	28	50
C3 Discounts	40	71.4
Guaranteed Hospital Bills	21	37.5
	Mean	**Range**
Length of Stay (days)	12	1 – 44

Table 2 Breakdown of hospitalization costs of pediatric COVID-19 patients (n = 56)

Cost Categories	Amount (x1000PHP)		Percentage of Hospitalization Costs
	Mean	Range	
Medical Cost	60.24	2.87 – 216.86	35.40
Other Cost (Radiology, ICU, etc)	51.24	0 – 218.60	30.10
Laboratory Cost	38.04	1.02 – 169.96	22.36
Pharmacy Cost	20.65	0.65 – 661.44	12.14
Total Hospitalization Cost	170.17	4.54 – 1029.12	100

Table 3 Mean total and daily hospitalization costs of pediatric COVID-19 admissions based on demographic and clinical diagnosis. (n=56)

Demographic/ Clinical Characteristics	Mean Hospital Costs X1000 PHP (Range)	p value	Mean Daily Hospital Costs (Range)	p value
Age Groups (y)				
1mo to < 6 (n=22)	118.35 (21.20 – 506.50)	0.38	17.14 (5.37 – 40.30)	0.46
6 to < 11 (n=15)	195.21 (4.54 – 781.12)		14.26 (4.54 – 29.70)	
11 to < 16 (n=12)	233.54 (25.17 – 1029.12)		22.09 (6.98 – 102.91)	
16 to < 19 (n=7)	170.78 (28.28 – 400.72)		12.64 (5.88 – 28.28)	
Disease Severity				
Mild (n=10)	83.24 (4.54 – 219.28)	0.24	12.48 (4.54 – 22.31)	0.20
Moderate (n=7)	142.73 (75.35 – 245.13)		10.41 (7.65 – 17.54)	
Severe / Critical (n=39)	197.33 (16.94 – 1029.12)		19.15 (5.39 – 19.15)	
Presence of Comorbid Illness				
Without (n=13)	220.19 (25.17 – 1029.12)	0.32	27.66 (5.39 – 102.91)	0.001
With (n=43)	155.05 (4.54 – 781.112)		13.61 (4.54 – 40.30)	
Presence of Complications				
Without (n=16)	102.86 (4.54 – 102.86)	0.10	11.18 (4.54 – 21.20)	0.18
With (n=40)	197.10 (16.94 – 1029.12)		16.36 (8.75 – 40.30)	
Overall	170.17 (4.54 – 1029.12)		16.87 (4.54 – 102.91)	

Table 4 and Figure 1 below describes the various payment sources available to pay for the hospital's COVID-19 admissions. Approximately PHP 3.14 million (33%) of this was accounted from receivables from PhilHealth reimbursements, consisting of combined COVID and non-COVID case rates. On the other hand, about 20% of these costs were granted as C3 discounts, on which no receivables are to be expected. The remaining 47% are classified as patient-shared expenses, which were shouldered by the patients, either as out-of-pocket payments (34%) or guaranteed hospital bills (14%).

Table 4 Breakdown of payment sources for overall hospitalization costs for pediatric COVID-19 admissions.

Reimbursement Source	**Patients availed n (%)**	**Hospitalization Cost Covered (x1000PHP)**
Total PHIC Coverage	44 (78.57%)	3,142.37
COVID Case Rates	16 (28.57%)	2,422.51
Non-COVID Rates	28 (50.00%)	719.86
C3 (Social Service) Discounts	40 (60.61%)	1,862.39
Guaranteed Hospital Bills	21 (37.50%)	1,326.83
Actual Payments (out of pocket)	33 (58.93%)	3,198.15
TOTAL		***9,529.74***

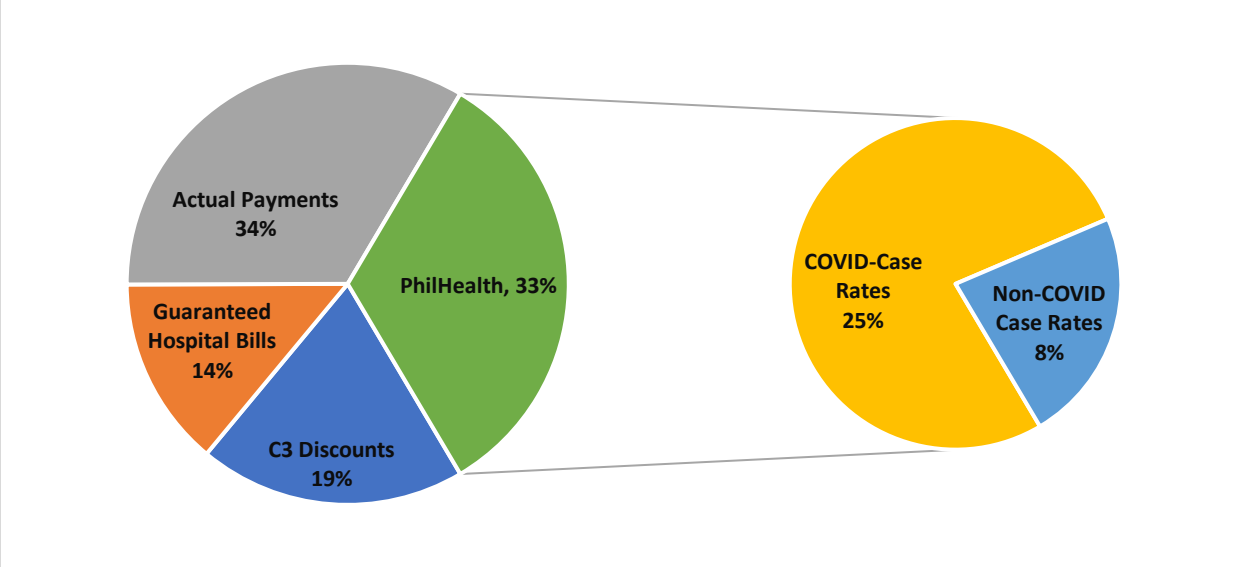

Figure 1 Breakdown of payment sources to compensate for overall hospitalization costs for pediatric COVID-19 admissions.

Table 5 describes how these available payment schemes can potentially contribute in financing the hospitalization costs of each patient. PhilHealth's COVID-19 case rates, on the average, can provide for about 90% coverage in the patient's total hospital costs. In some cases, wherein the expenses were relatively lower, PHIC COVID-19 packages can even reach full coverage of hospitalization expenses. Non-COVID rates by PhilHealth, on the other hand, can only provide for about a quarter of the hospitalization costs. Social service or C3 discounts take away approximately a third of the total costs, while guaranteed bills or non-institutional financial aids provide about a 45% coverage. Fortunately for the patient, these payment modes and deductions are not mutually exclusive, and can concurrently be availed by one patient.

Table 5 Mean percentage of hospitalization cost covered by each payment source per patient account.

Payment Source	**Mean Percentage of Hospitalization Cost Covered per Patient (%)**
PhilHealth	
COVID Case Rate (n=16)	90.56
Non-COVID Case Rate (n=28)	23.22
C3 Discounts (n=40)	32.36
Guaranteed Hospital Bills (n=21)	43.43

Discussion

The mean total hospitalization costs of admitted pediatric COVID-19 patients in this institution was PHP 170,170.00 (USD 3,403.40; PHP 50 = USD 1) which appears higher than the computed results of Lee et. al. of USD 2,192. Medical cost was noted to be the major cost driver as COVID-19 disease requires a specialized type of care as per hospital's infection control guidelines. This is similar to the outcomes in the study of Lee et. al. The cost of personal protective equipment (PPE), tedious sanitation requirements, among others fall into this cost category. Other costs which are comprised of subspecialty care charges (such as Radiology, Pulmonology, and Intensive Care) comes second in the overall costs. Charges falling

into category are mostly found in patients with severe or critical course of the disease – those that required ICU admission and mechanical ventilation. Laboratory costs rank third as minimal laboratory tests are done on COVID-19 patients after obtaining baseline laboratory parameters. Higher laboratory costs seem are more apparent on patients with complicated course of disease, especially those who are candidates for Multisystem Inflammatory Syndrome in Children (MIS-C) – requiring specialized, thus more expensive, tests that may need to be sent out to an off-site laboratory. As the backbone of management of COVID-19 disease is still supportive care, medicines were only prescribed based on patient-specific problems, which is mostly related on the patient's comorbid disease, rather than COVID-19 disease itself. Hence pharmacy costs are relatively taking a lower share of the costs.

Pediatric COVID-19 patients belonging to the early and middle adolescents appear to incur higher hospitalization costs as shown in Table 3. However, due to the uneven distribution of patients per age group, significant associations cannot be statistically established. Hospitalization costs appear to follow an increasing trend as the course becomes more complicated.

The presence of comorbid illnesses ironically has a negative correlation to the hospitalization costs than those with known comorbid illnesses ($p=0.001$). However, this finding may have been confounded by other patient factors. One notable feature of these patients, who had no known comorbidities, is that most of these had a severe or critical course of COVID-19 disease. Alternatively, one reason why patients with known comorbids had lower costs, may have been due to the fact that these are old, or known, patients of the study institution, hence these patients already had established baseline workups which may compel the care team to treat more conservatively rather than an all-out approach to diagnostics and therapeutics. Unfortunately, cost breakdown studies are lacking at the time of writing of this study, further probing on this is recommended.

Inconsistencies become apparent when the focus of the discussion is shifted towards the payment of these hospitalization costs. As described in Table 5, PHIC's COVID-19 packages have the potential to provide an almost 90% coverage of the

patient's bills, reducing patient-shared expenses to only 10%. Unfortunately, this only applies to the 16 (28.57%) patients who were able to successfully avail of the said care package. Twenty-eight (50%) patients, though eligible to claim, were not able to avail of the privilege, and was granted a different case rate which had a lower cost coverage that only covers approximately 23% of their hospitalization expenses. This explains the findings in Table 4 – that despite great sum of coverage offered by PHIC COVID-19 case rates, it only paid for PHP 2.42 million (25%) of the actual aggregated hospitalization costs for COVID-19 admissions. As for those patients that were not able to rightfully claim COVID-19 packages, their case rates only provided for 8% of the aggregated hospitalization costs.

Upon further investigation, these inconsistencies rose from the logistic lapses in the filing of PHIC's claim forms during the period when the COVID-19 case packages were fairly new. As COVID-19 disease is mainly a disease that affects the respiratory system, and PHIC claim forms rely on a "per diagnosis" system, majority of unsuccessful COVID-19 package claims ended up being written off as "pneumonia, unspecified" or whichever comorbid condition the patient had prior to acquiring COVID-19. Unfortunately, the coverage rates for these diseases were significantly lower than the COVID-19 packages. One example is the case rate for moderate risk pneumonia which is PHP 10,500 according to PHIC's updated rates as of 2017, compared to moderate COVID-19-related pneumonia which is PHP 143,267 (Philippine Health Insurance Corporation 2017).

Fortunately for patients, they are not confined in subscribing only to one form of payment source when financing their hospital bills. Table 5 above summarized how much each payment scheme can potentially cover for a patient's expenses. By mixing and matching one payment source and another, with the exception of PHIC benefits as they can only subscribe to one package per admission – oftentimes based on the diagnosis with the highest case rate, a patient can potentially achieve full coverage for his hospitalization, without even paying a single peso. However, that is not always the case in all patients. Going back to Table 4, out-of-pocket (OOP) costs of COVID-19 admissions were found to be at 34%, even slightly higher than what PHIC was able to

cover. Even with the capability to concurrently subscribe to multiple payment sources, some patients still ended up paying a significant share of their bills. On a positive note, a 34% out-of-pocket spending is still relatively lower to the 44.7% OOP payments for financing health expenditures in 2020, as recently reported by the PSA (Philippine Statistics Authrority 2021).

CONCLUSION

COVID-19 hospitalization in this institution mainly consists of the 1-month to 6 years old, and the costs in the average can reach up approximately PHP 170,000, as basic medical fees drive the majority of the costs. Patients with no known comorbids tend to have higher costs of care but more data is needed to elaborate on the trend. Availing PHIC packages can greatly ameliorate the financial burden of hospitalization. However, checks in timely and accurate filing of claims should be in place to assure those that can avail this assistance are rightfully supported.

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