

# Healthcare-associated Expenses Due to Injuries in the Philippines

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## ABSTRACT

**Background.** Injuries are common causes of hospital visits and deaths in the Philippines. The national healthcare-associated expenses due to these injuries have not been established.

**Objective.** To estimate the healthcare-associated expenses due to injuries in the Philippines.

**Methods.** Review of patient charts and patient interviews were conducted in 21 hospitals in the Philippines. A convenience sample of patients was interviewed to ascertain other direct medical and non-medical expenses.

**Results.** Median admission costs based on hospital bills were: road injuries: PhP10,192.25, poisoning: PhP4,402.00, burns: PhP6,521.53, animal-related: PhP5,105.92, other accidents: PhP7,545.71 and intentional injuries: PhP8,023.00. Based on survey, other expenses not stated in hospital bills include medical supplies (PhP4,000.00), diagnostic tests (PhP 2,000.00), and post-discharge expenses (PhP 1,000.00).

**Conclusion.** Expenses due to injuries varied according to cause. Admission expenses recorded in the bill were not the only healthcare-related expenses shouldered by the patient and accounted for 68.6-159.0% of the bill value.

*Key Words: healthcare expense, injury, Philippines, trauma*

## INTRODUCTION

Injuries are one of the most common causes of disabilities and premature deaths in the world. Unintentional injuries, transport injuries, self-harm, violence, and injuries from war and disasters are in the top 20 causes of disability-adjusted life years lost in 2010.<sup>1</sup> It is seen to disproportionately affect low to middle income countries. For example, in the Western Pacific Region, injury-related mortality rates are 78.4 per 100,000 in low-middle income countries (LMIC) compared to 56.2 per 100,000 in high income countries within that region.<sup>2</sup>

Injuries (or external causes of mortality) are in the top ten causes of registered deaths in the Philippines.<sup>3</sup> The Online National Electronic Injury Surveillance System (ONEISS) reports 10,000 to 11,000 injuries per quarter. These results managed by the Department of Health likely represents only the tip of the iceberg as the surveillance is present in only a limited number of hospitals and reporting is not complete.<sup>4-7</sup> The Global Burden of Disease (GBD) group has estimated that the Philippines lost 2.4 to 2.9 million disability-adjusted life years (DALYs) due to injuries in 2015.<sup>1</sup>

Injury is defined by the World Health Organization as “the physical damage that results when a human body is

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suddenly or briefly subjected to intolerable levels of energy.”<sup>8</sup> In hospitals, the International Classification of Disease (ICD) Code 10 may be used with injury diagnosis corresponding to codes from V00 to Y99 and those under S00 to T88.<sup>9</sup> The ONEISS also describes several injury categories identified by the Department of Health.

The healthcare-associated expenses due to these injuries have not been established. The Philippine Health Insurance Corporation (Philhealth) has set the amount of PhP9,000 as payment for admitted cases of injuries. One study has attempted to estimate the healthcare-associated expenses of injuries in the Philippines but it was limited only to road traffic injuries. The study estimated that “minor injuries” cost PhP3,957, “serious injuries” cost PhP88,530 and fatal injuries cost PhP63,159. This was limited to two urban training institutions and there was no definition provided for classifying injuries between serious and minor.<sup>10</sup> Thus, the objective of this study was to estimate the healthcare-associated expenses due to various categories of injuries in the Philippines.

**METHOD**

This was a cross-sectional study using two methods: records review and patient interviews. Injuries were grouped into six categories based on cause:

- a. Road traffic injury (RTI)
- b. Mechanical accidental trauma
- c. Mechanical intentional trauma
- d. Burns and blast injury
- e. Poisoning
- f. Animal-related injury.

Twenty-five hospitals (21 government and 4 private) agreed to participate in the study. At least two hospitals were invited each from Luzon, Visayas, Mindanao and the National Capital Region (NCR) for inclusion in the study. Hospitals with the largest authorized bed capacities in urban areas were first recruited followed by selection of hospitals located in rural areas near the participating urban facilities. A random sample of cases due to injuries which were seen from 1 January 2014 to 31 December 2014 was retrieved. The sample size targets were computed assuming a variance of 1,000 at alpha of 0.05 and margin of error of 5%. The number of charts per facility was then proportionately distributed across the participating hospitals based on authorized bed capacity. In each hospital, an equal number of charts of admitted and

emergency room (ER) only patients were targeted to be reviewed. Charts were selected by generating a list of random dates then sampling one chart per injury category per date. Classification according to injury category was done based on the diagnosis written in admission or emergency room logbooks. A chart was included if the diagnosis contained a reference to any injury category written above or described by ONEISS. This was used since ICD 10 codes were not written in logbooks. Once charts were retrieved, clinical data were extracted. If upon review, a sampled chart was determined to be from a non-injury admission, the chart was replaced. Billing statements were also requested and expenses were extracted.

For the patient survey, a convenience sample of 423 patients previously seen for injuries from 1 January 2014 to 30 June 2016 was recruited. Recruiters approached individuals who were consulting at the outpatient or emergency departments, or who were admitted in the facility and were invited to join the study. If invited individuals agreed, phone interviews were conducted regarding the injury and the associated healthcare costs.

Standard forms were used. Data were encoded in Microsoft (MS) Access. Data cleaning was done in MS Excel. Analysis was conducted using Stata 12. The protocol for this study was reviewed by the University of the Philippines (UP) Manila Ethics Review Board as well as by accredited review boards of participating health facilities.

**RESULTS**

**Cost of Admitted Cases**

Charts of 1,853 admitted and 1,976 ER only cases were reviewed. The average ages for each sex and category ranged from 16.9 to 31.8 years. Burn victims and poisoning victims had noticeably lower average ages compared to other categories. Average ages of burn victims were 21.8 years for male and 16.9 for females. Poisoning victims, on average, were 24.8 years for males and 20.7 years for females. Patients in the other categories had average ages ranging from the late 20s to the early 30s. (Table 1).

Of the 1,853 admitted cases, 1,482 had available bills. To obtain a single value for average cost of an injury, an average value was computed by applying weights to the obtained average cost per category. Weights were obtained from the distribution of injuries reported in the ONEISS 2014. The weighted average cost of injury was PhP8,479.69.

**Table 1.** Sex and average age of patients seen due to injuries in 21 hospitals

Category	Male			Female		
	n	Average Age	SD	n	Average Age	SD
Road Traffic Injury	999	28.8	15.99	333	27.8	19.19
Mechanical Accidental Trauma	497	27.9	19.35	187	31.5	27.48
Mechanical Intentional Trauma	418	30.4	14.10	89	31.8	16.38
Poisoning	242	24.8	18.70	141	20.7	17.84
Burns and Blast Injuries	289	21.8	17.81	138	16.9	19.01
Animal-related Injuries	225	26.5	19.56	189	28.7	22.25
<b>Total/Weighted Averages</b>	<b>2,670</b>	<b>27.6</b>	<b>17.33</b>	<b>1,077</b>	<b>26.6</b>	<b>21.55</b>

**Table 2.** Gross Bill of Injury Patients According to Injury Category Based on Chart Review

A. Admitted	n	Average	SD	Median	Min	Max
Road Traffic Injury	608	20,665.87	33,409.80	10,192.25	360.00	352,202.60
Mechanical Accidental Trauma	269	17,713.08	27,861.58	7,545.71	382.00	164,295.00
Mechanical Intentional Trauma	180	17,638.07	24,614.82	8,023.00	500.00	165,448.80
Poisoning	178	5,771.88	5,938.73	4,402.00	345.50	50,069.40
Burns and Blast Injuries	185	14,258.90	22,547.84	6,521.53	552.60	206,358.00
Animal-related Injuries	62	7,102.14	7,742.22	5,105.92	800.00	40,391.50
B. ER only	n	Average	SD	Median	Min	Max
Road Traffic Injury	150	899.23	1,339.69	450.00	50.00	8,546.40
Mechanical Accidental Trauma	22	731.44	1,176.27	183.90	6.66	3,724.00
Mechanical Intentional Trauma	42	395.98	722.82	197.65	24.00	3,607.50
Poisoning	15	699.20	987.95	265.00	100.00	3,055.00
Burns and Blast Injuries	12	390.04	803.77	114.50	67.00	2,915.00
Animal-related Injuries	13	192.00	161.66	169.00	30.00	668.00

**Table 3.** Comparison of Gross Bill and OOP Across Different Injury Categories of Admitted Patients

Category	n	Gross Bill		OOP Expenses	
		Average	Median	Average	Median
Road Traffic Injury	529	21,109.24	10,452.88	7,665.87	1,910.50
Mechanical Accidental Trauma	155	5,943.62	4,413.70	1,624.90	207.00
Mechanical Intentional Trauma	172	15,096.80	6,662.06	3,489.87	625.00
Poisoning	59	7,354.49	5,225.00	1,751.89	0.00
Burns and Blast Injuries	237	17,949.34	8,055.00	7,225.74	1,140.00
Animal-related Injuries	157	17,563.43	8,599.00	6,541.18	1,064.00

The average and median gross bills of the different injury categories were also computed. Median was presented due to skewed data. RTI had the highest average (PhP20,665.87) and median (PhP10,192.25) costs while the lowest average (PhP5,771.88) and median (PhP4,402.00) costs were poisoning cases. (Table 2A).

A sub-analysis of comparing out-of-pocket (OOP) expenses as reported in the bill and the gross bill was done for admitted individuals with available bills and OOP information. The median OOP ranged from zero for animal-related injuries to PhP1,404.50 for RTI. In all injury categories, the median OOP expenses were lower than the gross bill. (Table 3).

Another sub-analysis for average and median expenses according to the GBD injury categories were computed. Since there were numerous categories, cost data of only those with 30 or higher number of cases were analyzed and presented. The injuries with the highest median cost were abdominal injuries at PhP27,318.25 while the lowest median cost was for poisoning at PhP4,425.00. (Table 4A).

Healthcare costs of the cases admitted at private hospitals were found to be higher than those of government cases. The average and median bills for private cases (n = 94) were PhP23,073.06 and PhP12,381.35 while those of government hospitals (n = 1,397) were on average PhP16,345.36 with a median of PhP7,285.00. However, the difference between averages was not statistically significant using Welch t-test (df = 100.282, t = 1.8167, p = 0.0722). The average OOP expenses was significantly higher in private hospitals at PhP10,206.61 (SD = PhP18,428.80) compared to government hospitals at PhP5,596.70 (SD = 532.93) (df = 105.812,

t = 2.3120, p = 0.0227). Medians were also higher in private hospitals compared to government at PhP12,381.35 and PhP4,358.95, respectively.

The average bills and out-of-pocket expenses according to area (NCR, Luzon, Visayas, and Mindanao) were also obtained and compared. One-way ANOVA detected a difference in the averages of both bills and OOP expenses. Post hoc tests showed the average bill in NCR was significantly different compared to Mindanao and that the OOP expenses in the NCR were significantly different compared to all other areas. No other pair-wise comparisons were significantly different. (Table 5).

### Cost of ER only cases

Only 254 ER bills (out of 1,976 cases) were retrieved as many hospitals did not keep billing statements of ER patients. Overall, the average cost of an ER only case was PhP729.42 (SD = 1,181.43) and the median was PhP269.00. Weighted average cost of injury seen at the ER was PhP262.53.

There was some variation in the average depending on the injury category. RTI had the highest average (PhP899.23) and median (PhP450.00) costs while burn injuries had the lowest average (PhP390.04) and median (PhP114.50) costs. (Table 2B).

Costs of selected GBD categories seen at the ER only were also computed. The median cost of the most common type, open wounds, was PhP220 while the next most common, sprains and strains, had a median cost of PhP530. (Table 4B).

Due to the limited sample, costing of common conditions were done with key informants from health facilities.

**Table 4.** Average and Median Cost of Selected GBD Injury Types Based on Charts Reviewed

Injury Type	Count	Average	SD	Median	Min	Max
<b>A. Admitted</b>						
Open wound(s)	229	10,185.35	15,292.75	5,812.50	360	156,866.00
Minor TBI	216	10,237.80	18,402.37	6,772.00	857	241,323.00
Poisoning requiring urgent care	179	5,716.06	6,016.27	4,392.85	345.5	50,069.40
Mod-Severe TBI	161	23,641.72	38,526.36	11,277.50	880	336,561.00
Burns, <20% total burned surface area	106	8,026.83	10,558.14	5,431.50	552.6	68,385.00
Leg fracture	80	27,415.45	31,255.78	17,974.00	461	156,493.00
Thigh fracture	63	25,755.34	24,958.10	16,174.55	1350	99,936.75
Internal hemorrhage in abdomen and pelvis	60	35,355.66	32,415.75	27,075.90	1800	165,448.80
Burns, >=20%	50	19,895.19	18,326.68	13,358.67	921	70,976.00
Forearm fracture	46	18,339.85	27,454.74	8,342.48	972	153,784.90
Sprain and strain	40	12,137.83	19,440.65	5,886.10	400	91,858.79
Severe chest Injury	38	25,526.44	32,468.19	12,442.50	1750	159,049.20
Shoulder/Arm Fracture	30	19,953.19	32,862.34	13,246.62	571	182,139.90
<b>B. ER only</b>						
Open wound(s)	145	644.09	967.43	220.00	24.00	4,795.94
Sprain and strain	28	1,169.84	1,840.25	530.00	6.66	8,546.40
Contusion	19	334.12	271.54	226.15	48.00	930.00
Poisoning requiring urgent care	16	888.25	1,217.71	277.50	100.00	3,724.00
Burns, <20% total burned surface area	8	158.64	133.97	114.50	67.00	482.50

**Table 5.** Average reported bills and OOP expenses of admitted patients according to area

	Gross Bill			OOP Expenses		
	n	Average	SD	n	Average	SD
NCR	151	20,483.97	41,738.73	122	16,020.62	38,426.59
Luzon	504	15,955.90	28,602.29	431	7,221.64	20,731.93
Visayas	429	16,055.64	22,654.66	388	4,039.68	11,961.68
Mindanao	398	16,551.31	24,609.82	368	3,031.93	6,716.20

Based on the costing done, the cost for open wounds ranged from PhP180 to 1,300 if no suturing was done and increased to PhP320-1,900 if with suturing. Fractures treated at the ER would cost from PhP690 to 3,200. Other conditions with cost estimates were bites (PhP230-2,000), traumatic brain injury (PhP380-8,200), burns (PhP230-2,000) and alcohol intoxication (PhP30-1,130).

**Patient survey**

Four hundred twenty-three (423) patients were successfully followed-up and interviewed in 15 study hospitals. Almost 70% were males and the average age was 29.07 years (SD: 17.79). Sixty-one percent (61.6%) of the respondents were admitted in a study hospital. Majority of the respondents were RTI victims; other respondents were distributed as follows: mechanical accidental trauma: 26.5%; animal-related injuries: 17.26%; mechanical intentional trauma: 9.22%; burn: 3.31%; and poisoning: 2.36%. The data were analyzed as a whole due to the limited number of respondents.

For expenses in the study site of recruitment, the average reported bill of admitted patients was at PhP34,733.01 (n = 134, SD: 58,517.25) with a median of PhP20,000.00. Among ER patients, the average was PhP4,271.98 (n = 121, SD: 16,584.21) with a median of PhP 500.00. The OOP was lower in both groups at an average of PhP7,487.99 (n = 189,

SD: 14,865.80) and median of PhP0.00 for admitted patients and an average of PhP2,332.81 (n = 95, SD: 11,669.91) and median of PhP100.00 for ER only patients.

Sixty-three percent (63.0%) of admitted cases (n = 262) and 40.4% of ER cases (n = 161) were seen in other hospitals prior to the study hospital. The number of additional facilities prior to the study site was 1.21 (SD: 0.69) among admitted cases and 1.12 (SD: 0.33) among ER only cases. The average and median OOP of admitted patients (n = 134) in these other facilities was PhP13,520.61 (SD: 46,322.85) and PhP730.00. For ER only patients (n = 67), the average and median values were PhP3,571.27 (SD: 24,301.81) and PhP0.00.

Around half of admitted patients (45.8% or 120) reported receiving donations or financial assistance for their care. The average amount was PhP20,414.35 (n = 115, SD: 43,659.69) with a median value of PhP5,000.00. In contrast, around a quarter (23.0% or 37) of ER only patients received financial assistance with an average amount at PhP 5,941.89 (n = 37, SD: 11,130.93) and a median of PhP 2,000.00.

In terms of costs not reflected in the bill, there were two types: treatment-related and non-treatment related. Treatment-related included medicines, medical supplies, and diagnostic tests done outside the health facility. Non-treatment-related expenses included food, transportation, and other expenses (e.g. toiletries, etc).

Among admitted patients, 56.9% or 149 had to pay for medicines or medical supplies not reflected in the hospital bill. The average and median cost of these items were PhP11,276.47 (n = 141, SD: 21,511.99) and PhP4,000.00, respectively. In the same group, 11.8% or 31 had to pay for diagnostic tests done outside the facility, at an average of PhP4,451.38 (n = 29, SD: 7,569.75) and median of PhP2,000.00.

Meanwhile among those treated at the ER setting only, 46.0% or 74 had to pay for medicines or medical supplies not reflected in the study site bill and 10.6% or 17 had to pay for diagnostic tests not reflected on the bill. The average and median cost of the extra supplies were PhP2,973.26 (n = 70, SD: 7,596.224) and PhP750.00, respectively. The average and median cost of the laboratory tests were PhP1,959.29 (n = 14, SD: 2,561.78) and PhP1,025.00.

The average and median non-treatment-related expenses of admitted patients were PhP5,589.76 (n = 253, SD: 7,775.00) and PhP4,040.00. For ER patients, the value was at PhP561.46 (n = 146, SD: 1,840.84) and PhP73.00. Median food expenses were PhP2,430.00 for admitted and PhP0.00 for ER patients. Median transportation expenses were PhP349.00 for admitted and PhP58.00 for ER patients. These expenses included those for the bantay or carer such as their food and the travel to and from home to facility.

There were also post-discharge costs which included follow-up, transportation, medicines and supplies, and rehabilitation. Follow-up was done by 69.6% of admitted patients and 62.7% of ER only patients. The average number of follow-ups were 2.28 (n = 166, SD: 2.19) for admitted patients and 2.44 (n = 81, SD: 1.43) for ER patients. The price of follow-up ranged from PhP0.00 to 2,000.00 with an average of PhP246.49 (n = 247, SD: 978.92); the median was PhP0.00. The duration spent to do follow-up check-ups including travel and wait times ranged from 20 minutes to 21 hours with an average of 4.98 hours (n = 247, SD: 3.59). Transportation fees from home to follow-up ranged from PhP0.00 to 6,000.00 with an average of PhP178.86 and a median of PhP76.00.

Post-discharge medicines and supplies for admitted patients were PhP2,406.98 on average (n = 243, SD: 4,751.79) with a median of PhP1,000.00. For ER only patients, the average was PhP835.84 (n = 156, SD: 2,944.193) with a median of PhP0.00. For post-discharge diagnostic tests, the average expenses were PhP525.53 (n = 102, SD: 2,366.33) for admitted patients and PhP52.59 (n = 56, SD: 207.04) for ER only patients. Median values in both cases were at PhP0.00. There were only 21 patients who reported utilizing rehabilitation services. The average cost of rehabilitation services was PhP2,299.29 (n = 21, SD: 5,812.50). There were also 23 patients who were re-hospitalized but none were able to report the cost of their re-hospitalization.

Around a third (31.0%) of ER only patients and half (53.5%) of admitted patients reported securing a loan due to the injury. The average amount of the loans was PhP1,657.20

(n = 54, SD: 2,623.95) with a median of PhP512.50. The average reported interest of the loans was 9.22% (n = 66, SD: 13.77) with a median of 6.00%.

Patients were asked if they experienced any mental health problems due to the injury. Majority (69.9%) of admitted patients said yes while almost half (47.2%) of the ER patients said yes. They were also asked if this led to missing work days and this occurred in 20.61% of admitted patients and 6.21% among ER patients. Despite these, only 4 cases consulted for mental health services.

## DISCUSSION

This is the first comprehensive national study to estimate the healthcare-associated costs due to various causes of injuries in the Philippines. The study collected data from multiple hospitals in various provinces. It demonstrated that actual out-of-pocket expenses of patients due to injuries were much lower than the bills charged to them partially due to the coverage by the national health insurance system and through the no balance billing policy. Patients, however, reported needing to buy supplies or medicines or pay for services that were not reflected in the bill. These costs were not reported in the bill since these are not available in the hospital. This stresses the need to include patient interviews when conducting healthcare costing studies in the Philippines. Patients also spent an additional PhP2,000.00 post-discharge. This value could be higher if they would need rehabilitation services or diagnostic tests or a second admission for definitive treatment. Other healthcare-related expenses documented due to injuries were travel to health facilities, missing days of work, and obtaining loans.

This study resulted in much lower values compared to the expenses reported by De Leon, Cal and Sigua but match the Philhealth case rate for injuries which is set at PhP8,000.00.<sup>10</sup> One factor is that this study included hospitals in both urban and rural settings and did not limit to tertiary hospitals only; De Leon, Cal and Sigua only included two tertiary hospitals in Metro Manila. The sample also included more injury types and not just road injury types. Hospitals in certain areas also have limited capacities to provide services (e.g. no CT scan in the hospital) and thus result in lower costs. The cases sampled were also first admissions of the patients. Some patients got discharged without receiving definitive treatment such as surgery leading to lower costs.

However, these costs validate the current rates provided by the national insurance for injuries since the median cost is close to the capitation value. Injuries are a very heterogeneous group as evidenced by the different median costs depending on the most severe form of injury experienced by the patient. For example, open wounds such as stab wounds in extremities or cuts cost PhP10,000.00 compared to thigh fractures, which cost PhP25,000.00.

This study used billing statements by hospitals and may not necessarily be equivalent to the true cost of the injury

especially in terms of cost from the hospital's perspective. Several hospitals do not charge patients for emergency department visits; hence, there was limited data on billing statements of ER patients and ER only data does not reflect the true cost. An alternative costing approach was done to estimate the value of these expenses. The method yielded wide ranges of cost estimates. This was likely due to the variability of the availability of tests and medicines in the facility. For example, some do not have CT scan machines hence the treatment of brain injury would cost less.

The patient survey suffered from a low response rate and utilized a convenience sample which limits its generalizability. The assumption for variance was also too low which implies a need for a bigger sample size to obtain more precise measurements. The results should thus be interpreted as baseline data to guide future studies. Despite this limitation, we observed that there are additional expenses not listed in the bill in majority of patients. A prospective study can address this generalizability issue.

Another factor affecting generalizability is the low participation of private hospitals in this study as well as non-random selection of health facilities. The dataset suggests that the median bill in private hospitals is almost two times higher than that of government hospitals although the averages were not significantly different. The ideal scenario would be to include a number private hospitals in accordance with the national distribution of hospital types. Additional surveys could be conducted to validate the observations and get a more representative value. An analysis of insurance claims can also be used to validate the data.

Despite these limitations, the results showed that injuries have significant cost implications to patients. For example, a road injury leading to admission can readily deplete a month's income of a minimum wage earner given that a minimum wage income is around PhP10,000.00 per month and weighted average cost of admission due to injury is PhP8,479.69. Fortunately, policies exist to protect poor patients from experiencing this. As reported in the patient survey, the median OOP expenses of admitted patients is zero due to coverage by the no balance billing policy of Philhealth. However, a proportion of patients still have to contend with additional expenses such as tests done outside facilities. There is a need to ensure that the no balance billing policy is strictly implemented especially for these patients as these events occur suddenly and a person living day-to-day would find it difficult to cope with the unexpected health expenses.

More importantly, a primary prevention program for injuries should be delivered in order to avoid these healthcare expenses. These preventable health expenses will not just benefit individual patients but also the health system. The implication of the existing no balance billing policy is that

costs exceeding Philhealth reimbursements will be shouldered by hospitals which already have limited operating expenses. If these do not occur, hospitals will have more funds to allocate for other cases they cater. Fewer admissions due to injuries will also allow freeing up more funds of the national health insurance program that can be allocated to other diseases.

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### Statement of Authorship

All authors approved the final version submitted.

### Author Disclosure

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