ORIGINAL ARTICLE

Patient Profiles and Cost of Otolaryngologic Surgeries in an LMIC Country

Karen Joyce S. Velasco, MD, RMT, Philip B. Fullante, MD and Christopher Malorre E. Calaquian, MD

Department of Otolaryngology – Head and Neck Surgery, Philippine General Hospital, University of the Philippines Manila

ABSTRACT

Objectives. This study aims to analyze the cost of patient care among ORL-HNS patients admitted in a tertiary, teaching government hospital in a low- to middle-income country.

Methods. This is a prevalence-based, prospective, bottom-up, cost-of-illness analysis among patients of the Department of Otorhinolaryngology-Head and Neck Surgery in a tertiary training government hospital admitted from July 2021 to March 2022. The value assessment method used is the human capital approach. The societal perspective is used for analysis to estimate and reflect payer *(insurance providers)* and patient perspectives.

Results. A total of one hundred fifty seven (157) patients were admitted for elective surgery under the service of ORL-HNS consisting of 75 females and 82 males. The average total overall cost was $3,851.10 (Php 199, 870.50 ± 164, 725.60). The total direct health care cost for all patients within the study period amounted to $3,712.18 (Php 192, 662.22 ± 159, 548.60) while the direct non-health care cost was $58.60. The workforce cost (58.5%) and medication cost (18.8%) comprised the majority of in-patient expenses with a mean cost of $2,221.36 (Php 37,083.66) and $714.51 (Php 44,363.14), respectively. In this study, an average of $80.29 was lost due to illness and hospitalization (± $81.74). The total PHIC coverage pays a range from zero to 67.5% with an average coverage of only 17%.

Conclusion. Our analysis has shown that workforce and medication expenses are the main cost drivers for the direct healthcare costs among Otolaryngology patients admitted for elective procedures. Stakeholders, such as the otolaryngologists and hospitals should coordinate closely to create a more encompassing coverage of Philhealth to prevent patients from suffering from financial crises due to their illness.

Keywords: Cost analysis, otolaryngology, Philhealth, Philippines, LMIC

INTRODUCTION

Health care costs have been placed on the forefront by health care policy makers over the years due to the increasing financial burden and socioeconomic impact brought about by illness. There have been numerous studies looking into the economic burden of specific otolaryngologic diseases. Most of these studies feature head and neck cancers, hearing loss, rhinitis, and thyroid surgeries as these are the common cases encountered worldwide.[1-6]

The Universal Health Care Act (RA 11223) in the Philippines has automatically covered all Filipinos under the National Health Insurance Program (NHIP) or also known as Philhealth. The goal of Philhealth is to register 96 million Filipinos by the year 2020.[7] Philhealth, through general taxation and premiums from its members, provide reimbursements to its health care providers through its services. The No Balance Billing was also mandated by the government, through Philhealth, for indigent patients

eISSN 2094-9278 (Online)
Published: June 14, 2024
https://doi.org/10.47895/amp.vi0.7540

Corresponding author: Karen Joyce S. Velasco, MD, RMT
Department of Otolaryngology - Head and Neck Surgery
Philippine General Hospital
University of the Philippines Manila
Taft Avenue, Ermita, Manila 1000, Philippines
Email: ksvelascomd@gmail.com
ORCiD: https://orcid.org/0000-0002-0607-2385

meeting the criteria to lessen the out-of-pocket expenses when availing health care services during confinement.[8]

Based on a search of HERDIN Plus, the ASEAN Citation Index (ACI), Global Index Medicus - Western Pacific Region Index Medicus (WHO GIM-WPRIM), Directory of Open Access Journals (DOAJ), MEDLINE (PubMed and PubMed Central) and Google Scholar using the following search terms "otolaryngology", "Philippines", "cost", "Philhealth", "Filipinos", "otology", "rhinology", "head and neck", "Craniomaxillofacial", "facial plastics", we found no local studies regarding the cost of otolaryngologic procedures performed among patients admitted in a hospital. There is only one local study by Ramos and Untalan which looked into the role of Philhealth in reducing out-of-pocket expenses among thyroidectomy patients.[9] However, this study only focused on a certain subset of Otolaryngology patients as do most international studies as well.

This study aims to examine the profiles and economic burden experienced by Otorhinolaryngology patients admitted in a tertiary government hospital which can serve as a guide for policy makers and decision makers of hospitals and Otorhinolaryngology departments on the proper and appropriate allocation of scarce resources in a low- to middle-income (LMIC) country. The direct and indirect health care costs per subspecialty of the Department of ORL-HNS will be computed and compared if there are significant differences.

METHODS

This is a prevalence-based, prospective, bottom-up, cost-of-illness analysis among patients of the Department of Oto-rhinolaryngology-Head and Neck Surgery of the Philippine General Hospital admitted from July 2021 to March 2022 for elective surgery. The value assessment method used is the human capital approach. The societal perspective is also used as the payer perspective since it will reflect costs incurred by insurer, patients, and society. Ethics approval was secured from the University of the Philippines Manila Research Ethics Board (UPMREB 2021-0318-01) before the study began.

All patients admitted under the Department of Otolaryngology Head and Neck Surgery (ORL-HNS) for elective surgery from July 2021 to March 2022 was included in the study sample. The study measured costs rather than test a specific hypothesis. Hence, no sample size was calculated as is usual practice in cost-of-illness studies.[10] Patients under the Department of ORL-HNS admitted for emergency procedures or referred for co-management were excluded from the study. Informed consent was secured from the patient and watcher. Consent was secured from the legal guardian or parent for patients less than 18 years of age.

Data were collected from the hospital records, through interviews with the patient and watchers, and from the billing section. From the hospital records, data extracted were the following: demographic profile, diagnosis, procedure performed, and length of stay. Patients and watchers under the working age population (15-64 years old) were interviewed and the following data were collected: employment status, occupation, daily basic pay wage, transportation expenses going to and from the hospital. For unemployed patients or watcher within the working age group, their daily basic pay wage was based on the published rates of the Department of Labor and Employment National Wages and Productivity Commission for the year 2021 in the National Capital Region.[11] The patient's billing statement was obtained from the billing section to record the actual confinement cost and Philhealth coverage case rate. For this study, costing was converted to US dollars, based on the published exchange rate at the last month of data collection.

All of the data were encoded using Microsoft® Excel for Mac (Version 16.54). R Programming (R Foundation for Statistical Computing, Vienna, Austria, 2022) was used for data analysis.

Categorical variables from the demographic profile such as sex, ORL subspecialty, classification of diagnosis were summarized using frequencies and proportions. Numeric variables were summarized using means and standard deviations. Patients were also classified under the subspecialties recognized by the department: (1) Cranio-maxillofacial, Plastic, and Restorative Surgery (CMFS), (2) Laryngobronchoesophagology and Neck (LBEN), (3) Head and Neck Surgery (HNS), these also includes patients under the Oral Cavity, Pharynx, Salivary Gland and Sleep Surgery service, (4) Otology, Neuro-otology, Audiology, Lateral Skull Base Surgery (Otology), (5) Rhinology, Paranasal Sinus, Anterior Skull Base Surgery (Rhinology). Significant differences between subspecialties with respect to direct healthcare costs, direct non-healthcare costs, daily-per-patient costs, indirect costs, and total costs were analyzed using ANOVA test (or the nonparametric Kruskal-Wallis if the data is not suited for ANOVA). The tests were used to determine if there was at least one significant difference between costs in the subspecialties. A difference was considered significant if p-value was <0.05.

RESULTS

Demographics

During the 8-month period, a total of one hundred fifty seven (157) patients were admitted for elective surgery under the service of ORL-HNS consisting of 75 females and 82 males. The demographic profile of both patients and watchers are shown in Table 1. The median age was 38 years and mean age of 38.34 years (range of 4 months to 82 years old). There were only eight pediatric patients out of the 157 patients included in the study. The watchers were mostly females (75.79%).

Admissions per Subspecialty

In Table 2, the number of patients per subspecialty is reported. LBEN service had the most number of patients

Table 1. Demographic Characteristics of Patients and Watchers (n=157)

Characteristic	Patient	Watcher
Sex, No.		
Female	75	119
Male	82	38
Age at admission, y		
Mean (SD)	38.34 (20.49)	38.83 (12.69)
Median	38	36
Employment Status, No.		
Employed	57	70
Unemployed	92	87

Table 2. Patients per Subspecialty (n=157)

Characteristic	Patient
Subspecialty, No.	
CMFS	23
LBEN	66
HNS	35
Otology	12
Rhinology	21

(42.03%) followed by the Oral Cavity service (22.29%) while the Rhinology service had the least number of admitted patients (13.37%). The mean length of stay was 8.65 days (range of 1 to 41 days). During the time of study, the Department of ORL HNS was assigned 15 beds at the ward but additional beds were acquired from other surgical wards when needed.

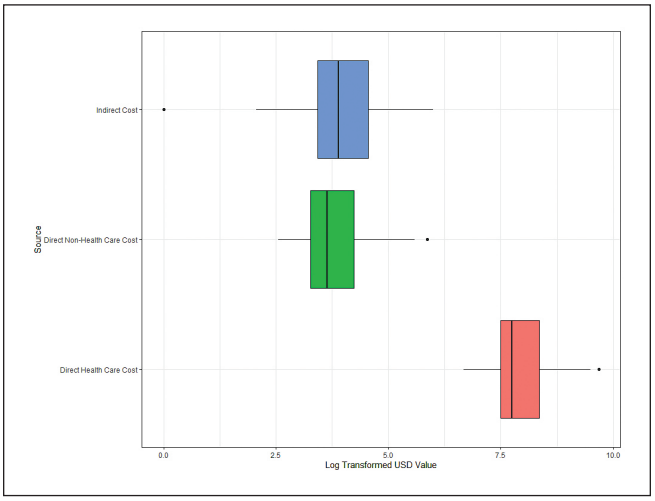
Cost analysis

At the last month of the study period, the Philippine peso to US dollar conversion rate was $1 to Php 51.90.[12] The average total overall cost was $3,851.10 (Php 199, 870.50 ± 164, 725.60). The total direct health care cost for all patients within the study period amounted to $3,712.18 (Php 192, 662.22 ± 159, 548.60) while the direct non-health care cost was $58.60 (Php 3041.24 ± 2748.59). As shown in Boxplot 1, direct health care costs are by far the largest cost ranging anywhere from $787.70 to $15,952.70. In fact, a Kruskal – Wallis test on the three cost sources returns significantly with a p-value < 0.05. Multiple comparisons performed using the Dunn Test reveal that direct health care costs are indeed significantly larger than the other two cost sources.

Figure 1 shows the distribution of cost sources contributing to direct health care cost. As illustrated in the graph, the workforce cost (58.5%) and medication cost (18.8%) comprised the majority of in-patient expenses with a mean cost of $2,221.36 (Php 37,083.66) and $714.51 (Php 44,363.14), respectively. The next highest cost was from the surgical procedures performed with a mean cost of $341.37 (Php 17,717.14 ± 48,863.27). This was followed by laboratory examinations which included pre and post-operative blood tests, 12-Lead ECG, and RT PCR tests for COVID-19. Radiologic examination contributed to 3.6% to the mean direct health care cost.

Cost Analysis by Subspecialty

Figure 2 shows the distribution of direct health care cost components by subspecialty. The workforce cost comprised majority of the expenses across all subspecialty services. The highest total cost amounting to $4,268.80 was from the CMFS service which had higher costs for surgical procedures compared to the other subspecialties. The LBEN service incurred the second highest total health care cost $3,992.83. Unlike the CMFS service, the LBEN service spent more



Boxplot 1. Comparison of 3 cost sources (Direct healthcare cost, Direct non-healthcare cost, Indirect healthcare cost).

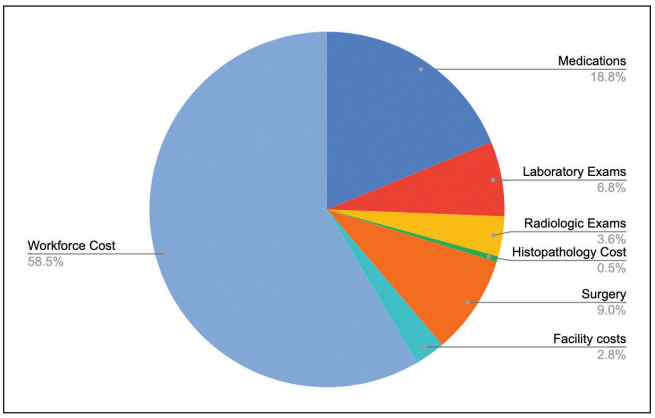


Figure 1. Distribution of cost sources contributing to Direct Healthcare Cost.

on medication cost. The Head and Neck service spent most on the medications and diagnostic exams among all subspecialties which comprised 24.3% and 8.5% of its total health care cost, respectively. The Rhinology service had the highest percentage spending on radiologic exam (7.4% of the total health care cost). The facility cost and pathologic exam costs were more or less the same among all subspecialties.

Kruskal Wallis test was used to analyze if there are significant differences between the cost components and among the subspecialties. To further confirm the results, post-hoc tests where run using the Dunn Test. The Dunn test results showed if there are differences between each pair of subspecialty per cost component. The mentioned cost components in the following paragraph are those which yielded significant differences between subspecialties.

The LBEN service was significantly different to CMFS, Otology, and Rhinology with respect to total serum chemistry cost. Boxplot 2 shows the comparison of mean serum chemistry costs between subspecialties. LBEN had the highest mean serum chemistry cost across all specialties.

In terms of blood typing and cross matching costs, Otology is significantly different to Rhinology, and Head and Neck but not significantly different to other specialties. Boxplot 3 illustrates the comparison of mean blood typing and cross matching cost between the subspecialties. Otology had the lowest blood typing costs.

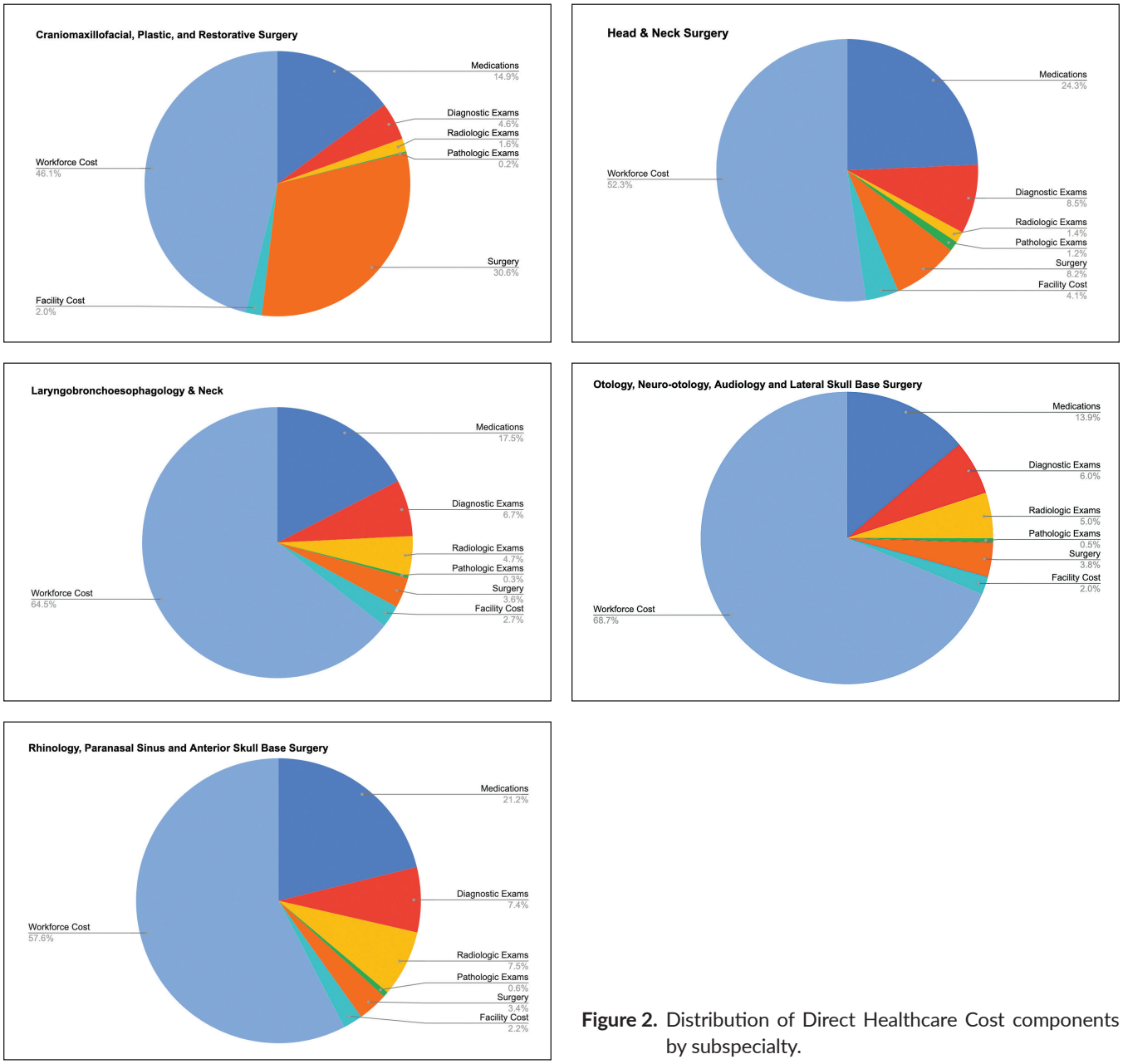
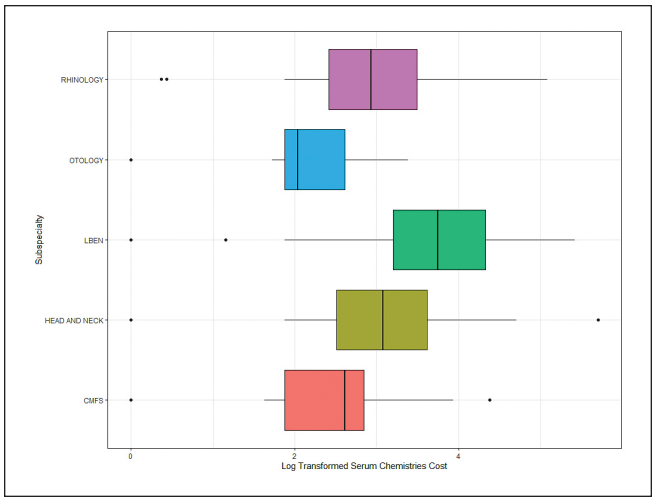
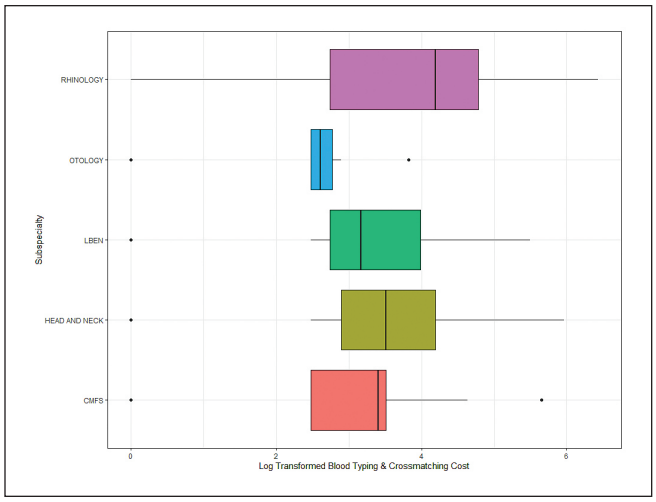


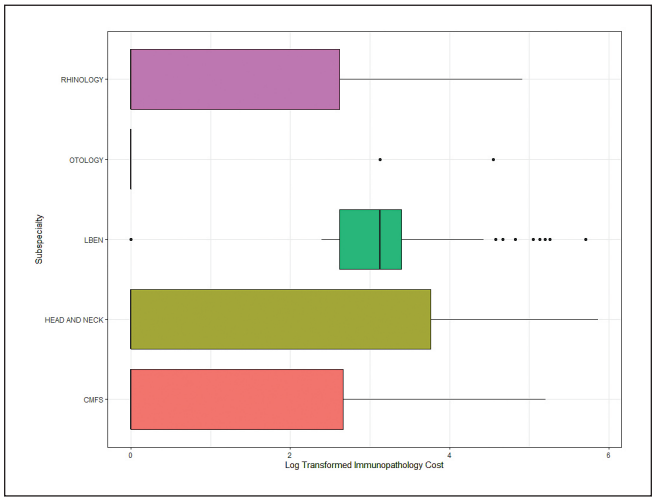
Figure 2. Distribution of Direct Healthcare Cost components by subspecialty.



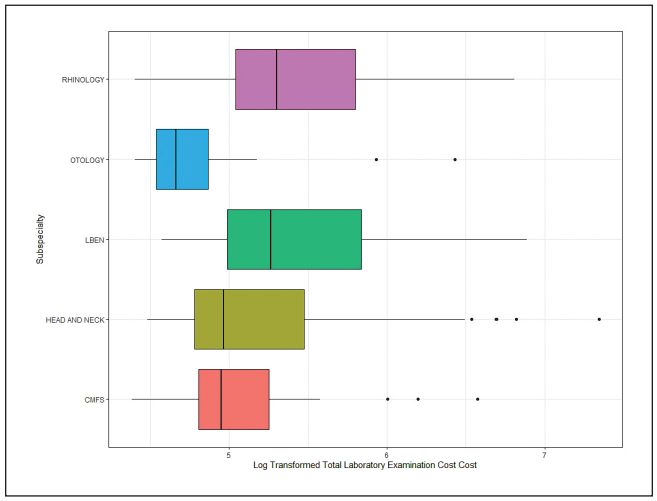
Boxplot 2. Comparison of mean serum chemistry costs between subspecialties.



Boxplot 3. Comparison of mean blood typing and cross-matching costs between subspecialties.



Boxplot 4. Comparison of mean immunopathology costs between subspecialties.



Boxplot 5. Comparison of mean total laboratory examination costs between subspecialties.

Head and Neck Surgery was significantly different to CMFS only in terms of arterial blood gas costs. Moreover, Head and Neck has higher average ABG costs compared to the rest of subspecialties.

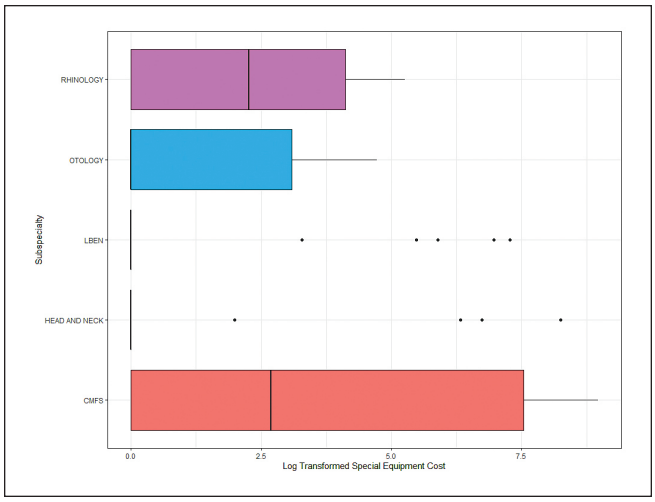
Boxplot 4 shows the comparison of mean immunopathology costs among the subspecialties. LBEN was significantly different to CMFS, Head and Neck, Otology, and Rhinology. LBEN also incurred a greater cost compared to CMFS, Otology, and Rhinology.

The comparison of mean total laboratory examination costs are shown in Boxplot 5. LBEN was significantly different to Otology in terms of mean total laboratory costs but not significantly different to other subspecialties. The box plot shows that Otology had the lowest average total laboratory costs while LBEN and Rhinology had the higher cost compared to the other services.

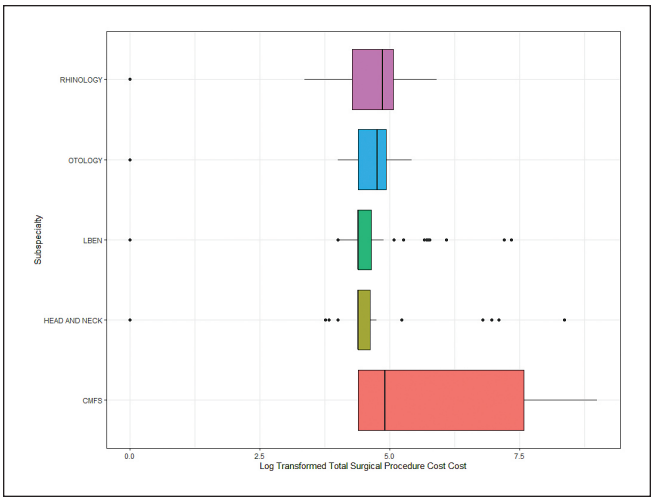
Comparison of special equipment costs is shown in Boxplot 6. Multiple comparisons for special equipment costs reveal that CMFS and Rhinology had higher median costs compared to LBEN and HNS. Boxplot 7 shows the mean surgery cost comparison between subspecialties. Although CMFS service is not significantly different to any of the subspecialties in terms of surgical cost, as Boxplot 7 shows, it had the highest cost for surgery compared to the other services.

Direct Non-Health Care costs

The direct non-health care costs included the transportation costs to the hospital on the day of their admission and discharge incurred by the patient and watcher. It also included the caregiving cost which was computed based on the watcher's daily wage for those 15-64 years old



Boxplot 6. Comparison of special equipment costs between subspecialties.



Boxplot 7. Comparison of mean surgery costs between subspecialties.

multiplied by length of stay. The average transportation cost was $19.89 (Php 1,032.36 ± 1,882.67). The caregiving cost had a mean cost of $38.83 (Php 2,015.38 ± 1,931.64.

Indirect Health Care costs

The indirect health care cost was computed based on the patient and watcher's salary or daily minimum wage rate (if unemployed) multiplied by the length of stay in the hospital for those within the age group of 15 to 64 years old. In this study, an average of $80.29 was lost due to illness and hospitalization (± $81.74).

Philhealth Coverage

As stated in Philhealth Circular No.2017-0017, the No Balance Billing policy directs hospital/service providers to issue no other fee or expense will charged among indigent patients.[8] Patients are chosen according to the Philhealth guidelines. Among the 157 patients included in the study, only thirty two patients were classified under the *No Balance Billing*, 112 patients where non NBB, while 8 had no classification based on their billing statement. The LBEN service had the most number of NBB patients with twenty-two cases followed by eight patients under the Head and Neck service.

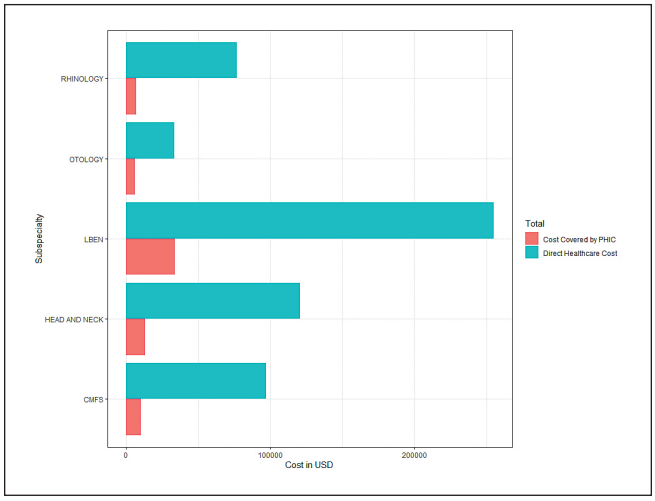


Figure 3. Direct health care cost compared to PHIC coverage.

Figure 3 is a bar graph comparing direct health care cost to PHIC coverage. Using the summary statistics, the difference between the total direct health care cost and total PHIC coverage ranges from $432.16 to $13,192.27. The average PHIC coverage in this study was $3,262.20 (Php 169,308). The total PHIC coverage pays a range from zero to 67.5% with an average coverage of only 17%. This shows that PHIC does not cover for the majority of the total health costs for admitted patients. None of the cases included in the study had 100% coverage. Figure 3 illustrates the total health care cost per subspecialty compared to the PHIC coverage.

DISCUSSION

It is challenging to assess the true cost of patient care in the hospital as there are numerous factors involved which may or may not be truly associated with the cost of care and treatment. This study attempts to get a general idea of the cost of performing otolaryngologic elective procedures in patients in a multispecialty training tertiary institution. There have been many studies looking into the cost of specific otolaryngologic disease or subspecialty but few comparing the various subspecialties.[1-6,9] More importantly, there are currently no studies on this matter involving those in low- to middle-income countries, areas where access to healthcare and especially a subspecialty such as Otolaryngology is difficult due to cost. This study is a first in the country to

aid not only otolaryngologists but also all the stakeholders (hospitals, patients, and health policy makers) in the costing and resource allocation among Otolaryngology – Head and Neck Surgery patients.

In this study's cost analysis, the total overall cost amounted to $3,851.10 (Php 199,871.00) for the 157 patients included in the study. A large portion of the total direct health care costs were from the workforce and medication expenses. It has been a debate whether incorporating training into an institution will increase cost or lead to lower expenses in the long term for hospitals. For surgical residency programs, it has been shown that the "cost" of a surgical trainee is usually a 'time cost' rather than monetary cost. The burden is also on the attending physician teaching the trainee.[13,14] A study made in the US where a residency program was eliminated also resulted in higher cost of care.[15] Access to skilled health workers is difficult especially in low- to middle-income countries and these lack of accessibility can result to complications which subsequently lead to higher health care expenditures for patients.[16] Another disadvantage for LMIC countries like ours is the constant brain drain of skilled health workers, most being hired by high resource countries where offered income is much higher. This awareness of the cycle of fewer skilled health workers leading to increasing health care cost can aid health institutions and policy makers create programs to improve retention of health workforce in the country.[17]

The most number of surgical procedure performed was under the LBEN service but the highest cost was from the CMFS service. The CMFS service makes use of special equipment such as titanium plates and screws for patients undergoing open reduction and internal fixation of facial fractures. In this study's sample, only eight patients underwent this procedure but due to the high cost of these plates which are provided for by the hospital this may explain the resulting total cost under this service. In a study by Balakrishnan et al, procedures performed under the Facial Plastic service (same as our CMFS) may predict higher cost of care compared to other subspecialties.[18] The provision of the hospital with these expensive implants have made it more accessible to more patients especially those belonging in the lowest income status who are mostly the subset affected by facial fractures from vehicular crash or trauma.[19,20]

The LBEN service, which had the second highest in terms of total cost, spent more on medication costs. Patients under this service are those who have undergone thyroidectomies, laryngectomies, and laser procedures for vocal cord diseases. Post operatively these patients were prescribed with post-operative calcium and thyroid hormone replacement aside from antibiotics and pain medications. It is also understandable that the highest cost on medications was from the Head and Neck Service as majority of these patients are undergoing surgery for tumor extirpation or cancer-related management. According to a local study, patients who undergo treatment for cancer experience financial catastrophe and poses a heavy economic burden among Filipino families. As also mentioned in other studies, the presence of co-morbid conditions which is the usual case among the elderly with head and neck malignancies, may also predict higher cost of care.[18,21,22]

In terms of radiologic examination cost, Rhinology service had the highest spending and this may be due to the need for high resolution imaging for patients undergoing endoscopic sinus surgery. Possession of high resolution computed tomographic or magnetic resonance imaging aids the surgeon in performing these minimally invasive but challenging endoscopic sinus surgeries along with the advent of technology, image-guided consoles are now accessible in our institution. Moreover, most of the patients do not have enough monetary resources to access these imaging modalities which are paid through out-of-pocket expenses prior to admission.

This study also evaluated the direct non-health care and indirect health care costs among the patients. The caregiver average cost was $38.83 (Php P2,015.38), an amount that most if not all, low socioeconomic class patients cannot afford. The indirect health care cost also gives us a perspective on the economic burden that these patients, especially those who are within the working age group and considered as the breadwinner, carry with their families. An average of $80 (Php 4,167.05) was lost due to admission from otolaryngologic procedures was found in this study. This computed possible loss of income among patients and caregivers who accompany patients during their admission may mean less resources for other household expenses in their families. The minimum daily wage in the region where this study was performed was Php 508.02.[11] Comparing this with the average wage lost due to their admission, this reveals that these families may suffer from financial catastrophe even if they are not suffering from serious conditions such as cancer.

In the Philippines, Philhealth is the primary insurance provider for all citizens and aimed to provide Universal Health Coverage. The government-owned corporation is attached to the Department of Health and has claimed 100% coverage rate due to the signing of the UHC Act (RA 111223). The act automatically makes all Filipinos beneficiaries of Philhealth.[22-24] The results of our study interestingly showed that Philhealth only covers an average of 17% of the total direct health care cost among all patients with a range of 0% to 67% coverage. Across all ORL-HNS subspecialties, the total cost covered by Philhealth is consistently low when compared to the total direct health care cost. One study by Ramos et al., showed that the Philhealth case rate system is effective in preventing out-of-pocket expenses among patients who underwent thyroidectomy.[9] Although incomparable to our subset of patients, our study results reveal that most of the health care costs incurred by the health institution for these in-patient admissions are shouldered by other funding sources available in a tertiary government hospital like ours.

The cost analysis study performed has several limitations. First, the subset of patients included in the study may not represent the usual number of elective surgical cases in the institution since data collected was during the period in the pandemic when the hospital was starting to increase elective surgeries once again but still with limited operating room slots after complete closure of elective procedures at the height of the COVID-19 pandemic. Second, due to the pandemic restrictions, the true clinical picture of some patients may not have been reflected as some have had chronic or worsening conditions which may affect their length of stay, complication rates, and medications taken during admission which could have subsequently affected their health care costs. Third, the charging of various cost sources are not standardized in all areas of the hospital hence some cost sources may not have been accounted for. **Moreover, the direct costs and amount of subsidy by our institution may not necessarily be the same as other government-subsidized hospitals throughout the country. Hence, we recommend that future studies may also aim to compare the health coverage and costing of public and private hospitals.** Fourth, our costing data was obtained from a single institution's specific department with its distinct approach to patient selection and referral system. This may not be generalizable to all tertiary training institutions hence we recommend conducting your own analysis if your institution have varying patient population. Lastly, other out-of-pocket expenses by the patient and watchers were not included such as purchase of medications prior and after discharge from the hospital. We recommend future studies to evaluate the possible predictors of increased cost among Otolaryngology cases. Identification of these predictors may help in cost-effective patient management while still providing the best care possible.

Despite these limitations, this study provides a preliminary overview of the cost in managing Otolaryngology cases in the Philippines. Being a tertiary training hospital, the patients not only come from the National Capital Region but also from various regions of the country. Hence, this can serve as a basis and guide for training institutions in the proper allocation of funds. The management of otolaryngology patients is expensive and insurance or coverage especially among indigent and low income patients is essential to prevent pushing them into financial catastrophe.

CONCLUSION

Our analysis has shown that workforce and medication expenses are the main cost drivers for the direct healthcare costs among Otolaryngology patients admitted for elective procedures. These two cost sources are an integral part in the provision of proper care among these patients. Our study findings have also shown that Philhealth has a limited coverage for all in-patient procedures. Hence, financial benefits gained are limited and may increase out-of-pocket spending for these patients even for those belonging to indigent groups or low income households. Future studies should focus on identifying predictors or associated factors that can increase health care costs among these subset of patients. Stakeholders, such as the otolaryngologists and hospitals should coordinate closely to create a more encompassing coverage of Philhealth to prevent patients from suffering from financial crises due to their illness.

Acknowledgments

The study was funded by the University of the Philippines – Philippine General Hospital Expanded Hospital Research Office 2021 Residents' Research Grant. The authors would also like to acknowledge the following: Ms. Mary Jane Yapo, for her assistance in the data collection of the study, and Mr. Jose De Vera, for his invaluable contribution in the statistical analysis of the study.

Statement of Authorship

All authors certified fulfillment of ICMJE authorship criteria.

Author Disclosure

All authors declared no conflicts of interest.

Funding Source

This study was funded by the Resident Grant 2022 under the Expanded Hospital Research Office of UP-PGH.

REFERENCES

1. Kulthanan K, Chusakul S, Recto MT, Gabriel MT, Aw DCW, Prepageran N, Wong A, et al. Economic burden of the inadequate management of allergic rhinitis and urticaria in Asian countries based on the GA2LEN Model. Allergy, Asthma Immunol Res. 2018 Jul;10(4):370-8. doi: 10.4168/aair.2018.10.4.370.
2. Crowson MG, Ramprasad VH, Chapurin N, Cunningham CD, Kaylie DM. Cost analysis and outcomes of a second-look tympanoplasty-mastoidectomy strategy for cholesteatoma. Laryngoscope. 2016 Nov;126(11):2574-9. doi: 10.1002/lary.25941.
3. Yin LX, Padula WV, Gadkaree S, Motz K, Rahman S, Predmore Z, et al. Health care costs and cost-effectiveness in laryngotracheal stenosis. Otolaryngol Head Neck Surg. 2019 Apr;160(4):679-86. doi: 10.1177/0194599818815068.
4. Rudmik L. Economics of chronic rhinosinusitis. Curr Allergy Asthma Rep. 2017 Apr;17(4):20. doi: 10.1007/s11882-017-0690-5.
5. Wissinger E, Griebsch I, Lungershausen J, Foster T, Pashos CL. The economic burden of head and neck cancer: a systematic literature review. Pharmacoeconomics. 2014 Sep;32(9):865-82. doi: 10.1007/s40273-014-0169-3.
6. Massa ST, Osazuwa-Peters N, Adjei Boakye E, Walker RJ, Ward GM. Comparison of the financial burden of survivors of head and neck cancer with other cancer survivors. JAMA Otolaryngol Head Neck Surg. 2019 Mar;145(3):239-49. doi: 10.1001/jamaoto.2018.3982.
7. Philhealth Stats and Charts 2022 (First Semester) [Internet]. 2022 [cited 2023 Jan]. Available from: https://www.philhealth.gov.ph/about_us/statsncharts/snc2022_1stSem.pdf.
8. Philhealth circular No.2020-0024: Governing Policies on No Co-Payment/No Balance Billing for Philhealth Benefit Packages [Internet]. 2020 [cited 2023 Jan]. Available from: https://www.philhealth.gov.ph/circulars/2020/circ2020-0024.pdf

9. Ramos JAP, Untalan FMB. Effectiveness of the Philippine Health Insurance Corporation Case Rate System for thyroidectomy in a tertiary government hospital. Philipp J Otolaryngol Head Neck Surg. 2020 May;35(1):51–5. doi:10.32412/pjohns.v35i1.1289
10. Simoens S, Hummelshoj L, Dunselman G, Brandes I, Dirksen C, D'Hooghe T; EndoCost Consortium. Endometriosis cost assessment (the EndoCost study): a cost-of-illness study protocol. Gynecol Obstet Invest. 2011;71(3):170-6. doi: 10.1159/000316055.
11. Department of Labor and Employment – National Wages and Productivity Commission [Internet]. 2021 [cited 2023 Jan]. Available from: https://nwpc.dole.gov.ph/stats/current-real-minimum-wage-rates/Current Real Minimum Wage Rates.
12. The Philippine Central Bank Financial Markets Reference Exchange Rate Bulletin [Internet]. 31 March 2022 [cited 2023 Jan]. Available from: https://www.bsp.gov.ph/statistics/rerb/31Mar2022.pdf
13. Kane R L, Bershadsky B, Weinert C, Huntington S, Riley W, Bershadsky J, et al. Estimating the patient care costs of teaching in a teaching hospital. Am J Med. 2005 July;118(7):767–72. doi: 10.1016/j.amjmed.2005.02.011.
14. Babineau TJ, Becker J, Gibbons G, Sentovich S, Hess D, Robertson S, et.al. The "cost" of operative training for surgical residents. Arch Surg. 2004 Apr;139(4):366-9; discussion 369-70. doi: 10.1001/archsurg.139.4.366.
15. DeMarco DM, Forster R, Gakis T, Finberg RW. Eliminating residents increases the cost of care. J Grad Med Educ. 2017 Aug;9(4):514–7. doi: 10.4300/JGME-D-16-00671.1.
16. Mills A. Health care systems in low- and middle-income countries. N Engl J Med. 2014 Feb;370(6):552–7. doi: 10.1056/NEJMra1110897.
17. Makuku R, Mosadeghrad AM. Health workforce retention in low-income settings: an application of the Root Stem Model. J Public Health Policy. 2022 Sep;43(3):445–55. doi: 10.1057/s41271-022-00361-x.
18. Balakrishnan K, Moriarty JP, Rosedahl J, Driscoll CL, Borah BJ. Predictors of high costs of care among Otolaryngology patients. Otolaryngol Head Neck Surg. 2019 Aug;161(2):271-7. doi: 10.1177/0194599819838843.
19. Lu JL, Herbosa TJ, Lu SFD. Epidemiologic profile of vehicular accident patients in the largest hospital in the Philippines covering ten years. Acta Med Philipp. 2021 Sep;55(6):703-14. doi:10.47895/amp.v55i6.3412.
20. Sehat M, Naieni KH, Asadi-Lari M, Foroushani AR, Malek-Afzali H. Socioeconomic status and incidence of traffic accidents in Metropolitan Tehran: a population-based study. Int J Prev Med. 2012 Mar;3(3):181–90.
21. Patterson RH, Fischman VG, Wasserman I, Siu J, Shrime MG, Fagan JJ, et al. Global burden of head and neck cancer: economic consequences, health, and the role of surgery. Otolaryngol Head Neck Surg. 2020 Mar;162(3):296-303. doi: 10.1177/0194599819897265
22. Ngelangel CA, Lam HY, Rivera AS, Kimman ML, Real IO, Balete SL. Philippine Costs in Oncology (PESO): Describing the economic impact of cancer on Filipino cancer patients using the ASEAN costs in oncology study dataset. Acta Med Philipp. 2018 Apr;52(2):125-33. doi:10.47895/amp.v52i2.418.
23. Querri A, Ohkado A, Kawatsu L, Remonte MA, Medina A, Garfin AMC. The challenges of the Philippines' social health insurance programme in the era of Universal Health Coverage. Public Health Action. 2018 Dec;8(4):175–80. doi: 10.5588/pha.18.0046.
24. Tabuñar SMS, Dominado TMP. Hospitalization expenditure of COVID-19 patients at the University of the Philippines-Philippine General Hospital (UP-PGH) with PhilHealth coverage. Acta Med Philipp. 2021 Apr;55(2):216-23. doi:10.47895/amp.v55i2.2809.