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Disease and Economic Burden of Five ENT Procedures in a Teaching Hospital

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Introduction

- Malaysia has 32M multi-ethnic population with a dual healthcare system and heavily financed by tax with minimal social (for private industry) and private health insurance.
- The Finance Ministry allocate budget to the public hospitals which are mostly under the MOH (156 hospitals) versus 219 private hospitals, and each provide 45,000 beds and 17,000 beds, respectively – heavy workload on public side.
- The university hospitals which are 10 in total which complement the healthcare service delivery to the surrounding population beside provision of teaching, training and research.
- Case-mix implementation is new in MOH hospitals and similarly several university hospitals are establishing case-mix, except by the national university which had started implementing case-mix since 2014 – **no motivation to implement case-mix** until covid pandemic when there is a planning to transform the healthcare system which is in favor of introducing the social health insurance.
- The private hospitals are also into establishing DRG-based costing



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Introduction

- **UMMC (University Malaya Medical Centre)** is the first teaching public hospital in Malaysia having 1,617 beds, serving estimated 3M of the population surrounding it. Referral center for complicated cases including for Otorhinolaryngology (ENT) cases for the Selangor population.
- ENT cases accounted for 2% of the total cases admitted with tonsillectomy as the most common ENT procedures at MOH hospitals. (MOHE, 2018)
- ENT – one of the top global diseases (2015) with hearing loss and Otitis Media as the 4th and 3rd most common chronic and short-term diseases, respectively. While head and neck neoplasm incidence had also increased (Saunders et al., 2018).
- ENT procedures including the head and neck oncologic surgery has caused significant economic burden to healthcare providers.
- The procedure is time-consuming, intricate, and team-oriented - requires many resources from the hospital and a multitude of teams.



Aim of study

To establish the disease and economic burden of most common and expensive ENT procedures at UMMC, in 2020.

5 selected ENT procedures

1. Tonsillectomy
2. Tracheostomy
3. Functional Endoscopic Sinus Surgery (FEES)
4. Radical Neck Dissection
5. Cochlear Implant

1. To determine the diagnosis of cases for 5 selected ENT procedures performed at UMMC in 2020.

- a cross sectional study on statistics of admissions (from Jan to Dec, 2020)
- Extraction of data from eMR for WHO ICD 10 and ICD 9CM which were coded into the case-mix system to obtain the DRGs of ENT cases (MyDRG by Case-Mix solution)

2. To determine the cost of the 5 selected ENT procedures which underwent treatment and procedures at UMMC in 2020.

- a mixed top down and activity-based costing approaches to estimate the cost of treatment and procedures.
- establish the cost per diem at ENT ward and OT
- estimate resource utilization via Clinical Pathways (experts' consensus)

- Total episode of hospital admissions in 2020 was 42,804
- Total admission to ENT wards were 1099 with a total of 32 DRGs.
- Total cases underwent the 5 selected ENT procedures were 157 cases

#	Selected DRG	Number of cases	Mean Age (years)	ALOS (days)	Range (days)
1	Tonsil and Adenoid operations – Minor (U-1-15-1)	44 (56.8%M)	27.64	14.55	2 - 462
2	Ear Nose Mouth & Throat Operations Minor (U-1-20-I)	87 (63.2%M)	48.66	16.03	1 - 82
3	Other Head & Neck Operations – Minor (U-1-11-I)	22 (59.1%M)	43.59	8.82	3 - 35
4	FEES Other Ear Nose Mouth & Throat Operations - Minor (U-1-20-I) Ear Nose Mouth & Throat Neoplasms - Moderate (U-4-10-II) Other Factors Influencing Health Status - Mild (Z-4-12-I) Other Factors Influencing Health Status - Moderate (Z-4-12-II)	4(75%M)	72.25	5.5	3 - 7
5	Cochlear Implant	0	-	-	-

Results – ENT procedures and unit cost

#	Procedure	Number of cases had the procedure
1	Tonsillectomy	44
2	Tracheostomy	87
3	Radical Neck Dissection	22
4	FEES	4
5	Cochlear Implant	0

Activity	Cost item	Unit cost US\$
ENT ward	Cost per diem	1,212.97
Operation theatre (Maximum cost out of the 5 procedures)	Cost per OT use	141.57
Pre op investigations (ENT Ward)	Total cost	87.24
Post op care (ENT Ward)	Total cost	267.31
General overheads	Per admission	168.28

Results – Cost of selected ENT procedures

#	Procedure	Cost per patient US\$	Total hospital cost US\$
1	Tonsillectomy	755.39	33,237.16
2	Tracheostomy	1,106.96	96,305.52
3	Radical Neck Dissection	1,350.66	29,714.52
4	FEES	875.92	3503.68
5	Cochlear Implant	1,571.39	0.00

❖ LOS=3 days

ENT diseases which require surgery is a significant disease burden to the public hospital - Tonsillectomy with adenoidectomy (28.3%) and Tonsillectomy without adenoidectomy (28.2%) were among the top 5 in the list of all patients less than 18 years old) and both procedures were accounted for about 9% of the total procedure for below 18 (MOH, 2013).

The number of the selected ENT grouper is lower than expected – more refined ICD 10 and correct procedure coding should be emphasized. Also missing cases when they are as secondary diagnosis.

#	Procedure	Cost per patient US\$
1	Tonsillectomy	755.39
2	Tracheostomy	1,106.96
3	Radical Neck Dissection	1,350.66
4	FEES	875.92

❖ The cost for the selected ENT procedures at UMMC (2020) were cheaper than in other countries – lower cost per diem and equipment (extended use), and short LOS (diagnostic work up not included).

Country	Procedure	Cost (USD)
USA		
i. 2019	i. Tonsillectomy	i. 2,440
ii. 2020	ii. Central Neck Dissection	ii. 10,315
iii. 2020	iii. Tracheostomy (Respiratory)	iii. 708,559
iv. 2020	iv. Tracheostomy (Neurologic)	iv. 373,678
v. 2020	v. Percutaneous dilatational tracheostomy (PDT)	v. 1,753.01
vi. 2020	vi. traditional surgical tracheostomy (ST)	vi. 2,604
vii. 2017	vii. Uncomplicated FEES	vii. 8,968
viii. 2019	viii. Complicated FEES	viii. 16,877
UK (2010)	Tonsillectomy	996
Finland (2013)	Tonsillectomy	1,037
Hong Kong (2014)	i. Central Neck Dissection ii. Lateral Selective Neck Dissection	i. 2494 ii. 5219
China (2018)	Radical Neck Dissection i. Simultaneous, Bilateral ii. Two-stage, bilateral	i. 4145.30 ii. 7352.50



Conclusion

- ❖ The cost to perform ENT surgery in public hospital in Malaysia is not high as compared to other countries. Hence, more ENT cases can be treated at the public hospital if more ENT surgeons are trained.
- ❖ Costing studies combining the top-down and bottom-up costing provide a more accurate cost than the top-down costing alone.



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