THE PERFORMANCE OF THE MALAYSIANDRG CASEMIX SYSTEM AND FINANCIAL IMPLICATIONS OF INACCURATE DOCUMENTATION AND CODING ERROR

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THE PERFORMANCE OF THE MALAYSIANDRG CASEMIX SYSTEM AND FINANCIAL IMPLICATIONS OF INACCURATE DOCUMENTATION AND CODING ERROR

By

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DECLARATION

I, Sarah Saizan, declare that the work presented in this thesis is originally mine. Information which has been derived from other sources is clearly indicated in the thesis.

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LIST OF PAPERS AND CONFERENCES

During my Doctor of Public Health (DrPH) candidature, the following articles and abstracts were accepted for publication and/or presented in conferences of both national and international levels. Overall, this thesis comprises of the three following published papers, which corresponds to three specific objectives:

Publications:

1. The Performance of MalaysianDRG Casemix System. To be submitted in The Lancet Global Health.
2. MalaysianDRG Casemix System: Financial implications of inaccurate clinical documentation and coding error. **Published in Malaysian Journal of Medicine and Health Sciences 17(1): 83-87, Jan 2021**
3. The importance of clinical documentation in the MalaysianDRG casemix system: A sequential explanatory mixed-method study of MOH hospitals in Malaysia. **Published in Malaysian Journal of Medicine and Health Sciences. 17(1): 50-56, Jan 2021**

Conference Presentations:

1. Towards a sustainable future: Financial implications of coding error in MOH Hospitals **(The 5th International Conference of Public Health 2010: 10th-12th July 2019)**
2. Towards a better casemix system in Malaysia: Lessons learned from a case study of a public hospital **(The 8th International Casemix Conference: 29th-30th July 2019) Award: 1st in Oral presenter.**

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LIST OF ABBREVIATIONS

BMI	Body Mass Index
CI	Confidence Interval
CGW	Cost Group Weight
DRG	Diagnosis Related Group
EIS	Executive Information System
EMR	Electronic Medical Record
HIS	Health Information System
HO	House officer
ICD-9CM	International Classification of Diseases, Ninth Revision, Clinical Modification
ICD-10	International Classification of Diseases, Tenth Revision
IT	Information Technology
KKM	Kementerian Kesihatan Malaysia
KPI	Key Performance Index
MHMIS	Malaysian Health Mortality Information System

MO	Medical officer
MOH	Ministry of Health
MRO	Medical Record Officer
OR	Odd Ratio
PER-PD 301	Borang Daftar Masuk dan Keluar Hospital
PIC	Person Incharge
PPC	Price per case
P4P	Pay-for-Performance
RA	Research Assistant
SD	Standard Deviation
SEMM	Sequential Explanatory Mixed Method
SPSS	Statistical Package for Social Sciences
UK	United Kingdom
USA	United States of America
WHO	World Health Organization

ABSTRAK

PENCAPAIAN SISTEM CASEMIX MALAYSIANDRG DAN IMPLIKASI KEWANGAN DISEBABKAN KESALAHAN DALAM DOKUMENTASI DAN KOD

Pengenalan: Kementerian Kesihatan Malaysia (KKM) mengadakan sistem casemix MalaysianDRG di hospital – hospital KKM sejak tahun 2010 secara berperingkat, namun pencapaiannya masih belum dikaji. Sehubungan dengan itu, pencapaiannya tidak dapat dibandingkan dengan sistem casemix di negara lain dan dapat menghalang sebarang inisiatif untuk penambahbaikan.

Objektif: Terdapat tiga objektif kajian; 1) untuk menerangkan tren pencapaian casemix MalaysianDRG di hospital KKM dari tahun 2017-2018, 2) untuk meneroka faktor-faktor yang menyumbang kepada pencapaian casemix yang rendah di hospital KKM dan, 3) untuk menentukan potensi implikasi kewangan akibat dari kesalahan dalam dokumentasi dan pengekodan.

Metodologi: Kajian ini terdiri dari dua bahagian. Bahagian 1 dijalankan dengan kaedah campuran untuk menjawab objektif kajian pertama dan kedua. Ia dimulakan dengan kajian hirisan lintang menggunakan data sekunder untuk menggambarkan pencapaian casemix mengikut sasaran target indikator negara di lima hospital di Malaysia. Persampelan pelbagai peringkat diterapkan dalam memilih lima hospital yang mewakili lima zon di Malaysia. Semua laporan audit casemix antara tahun 2017 hingga 2018 di setiap hospital dianalisa secara deskriptif dan pencapaian bagi setiap indikator untuk setiap hospital dipamerkan. Bagi memahami faktor yang menyumbang kepada pencapaian casemix yang rendah, satu kajian kes dilakukan di hospital yang mempunyai pencapaian casemix yang paling rendah. Maklumat dikumpulkan dengan wawancara, pemerhatian, dan tinjauan dokumen. Bahagian 2 kajian ini melibatkan kajian keratan lintang menggunakan data sekunder dari 226 kes berkod dari dua hospital KKM yang menjalani audit kedua oleh Unit Casemix

KKM pada tahun 2017. Kod lama dan kod baru diambil dari borang audit casemix dan dimasukkan ke dalam modul kewangan MalaysianDRG untuk menghasilkan kumpulan diagnosis (DRG) dan pemberat kos kumpulan (CGW). CGW kemudiannya didarab dengan National Base Rate 2016 untuk mendapatkan harga setiap kes (PPC) untuk setiap DRG. Kos deskriptif digunakan untuk menganalisa implikasi kewangan sebelum dan selepas koding kembali semasa audit kedua. Perbezaan PPC diukur dengan menggunakan ujian t sampel berpasangan.

Keputusan: Kesemua lima hospital didapati mencapai target untuk indikator ketiga dan keempat iaitu ketepatan koding dalam diagnosis utama dan diagnosis lain. Walau bagaimanapun, empat hospital masih mempunyai pencapaian yang sangat rendah dalam ketepatan dokumentasi bagi diagnosis utama dan kelengkapan dokumentasi dalam diagnosis lain. Hasil daripada analisa tematik, terdapat empat tema dan 14 sub-tema yang merupakan faktor yang menyumbang kepada pencapaian casemix yang rendah iaitu; komitmen organisasi yang lemah, masalah pengurusan sumber, kegagalan sistem maklumat, dan pengurusan yang lemah dalam mengendalikan casemix. Bahagian akhir kajian mendapati terdapat perbezaan kos rawatan disebabkan oleh dokumentasi klinikal yang tidak tepat adalah sebanyak RM227,657 dan RM 68,216 untuk kesalahan dalam pengekodan. Perbezaan antara kos min (SD) bagi setiap kod asal berbanding kod baru kerana dokumentasi klinikal yang tidak tepat [RM10,208.19 (12273) berbanding RM11,244.53 (13785.27), $p < 0.05$], dan ralat pengekodan [RM10,208.19 (12273.04) berbanding RM11,215.52 (13798.03) $p < 0.05$] adalah signifikan. Hasil ini dapat membuktikan bahawa akan terdapat implikasi kewangan akibat daripada dokumentasi klinikal yang tidak tepat dan kesalahan pengekodan dalam sistem casemix MalaysianDRG.

Penutup: Kesimpulannya, pencapaian sistem casemix MalaysianDRG agak sederhana, namun tren pencapaian menunjukkan terdapat peningkatan. Sistem

casemix MalaysianDRG merupakan langkah kedepan dalam pengurusan hospital dan jika digunakan secara optimum, akan membawa manfaat kewangan yang besar kepada KKM. Walau bagaimanapun, sebelum manfaat ini boleh dicapai, faktor-faktor kejayaan dan kelemahan yang mengakibatkan implikasi kewangan perlu diatasi. Hasil kajian ini boleh digunakan untuk meningkatkan kesedaran dan merancang penyelesaian ke arah kecemerlangan masa depan sistem casemix MalaysianDRG.

Kata kunci: casemix, dokumentasi klinikal, kesalahan pengekodan, MalaysianDRG, pembiayaan kesihatan, ekonomi kesihatan, kajian kes

ABSTRACT

THE PERFORMANCE OF THE MALAYSIANDRG CASEMIX SYSTEM AND FINANCIAL IMPLICATIONS OF INACCURATE DOCUMENTATION AND CODING ERROR

***Introduction*:** The Ministry of Health (MOH) implemented the MalaysianDRG casemix system in 2010, yet its achievement has not been studied. To date, there have been no other study on the performance of the MalaysianDRG casemix system in MOH hospitals. Therefore, its performance cannot be determined and benchmarked against other casemix system elsewhere, thus hindering future improvement initiatives.

***Objectives*:** There were three study objectives; 1) to describe the trend of the MalaysianDRG casemix performance in MOH hospitals from 2017-2018, 2) to explore factors contributing to poor casemix performance in a MOH hospital and, 3) to determine the financial implications due to inaccurate documentation and coding error

***Methodology*:** This study consisted of two parts. Part 1 utilized a sequential explanatory mixed method design to answer the first and second study objectives. It began with a cross-sectional study using secondary data to describe the trend of casemix performance according to national target indicators in five MOH hospitals in Malaysia. Multistage sampling was applied in selecting five hospitals representing five regions in Malaysia. All casemix audit reports between 2017 to 2018 in each hospital were analysed descriptively. The performance of the four national target indicators were presented for each hospital. To further understand the factors of poor casemix performance, a case study was conducted at the hospital with the lowest casemix performance. Data collection was carried out using in-depth-interviews, observation, and document reviews, and were analysed using thematic analysis. Part 2 of the study involved a cross-sectional study using secondary data of 226 audit and re-audit forms of

two MOH hospitals which underwent re-audit by the Casemix Unit, MOH in 2017. The data collection involved obtaining old and new codes from the re-audit forms to be entered in the MalaysianDRG casemix costing module to produce a specific Diagnosis Related Group (DRG) and Cost Group Weight (CGW). The CGW was multiplied by the latest National Base Rate 2016 to derive the price per case (PPC) for each DRG. A descriptive cost analysis was conducted to measure financial implications before and after the re-coding process in the re-audits. The statistical differences in PPC were measured using paired sample t-test.

***Results*:** All five hospitals achieved the targets for the third and fourth indicators pertaining to coding accuracy in main and other condition. However, four hospitals achieved below the intended targets for the accuracy in documentation of main condition, and completeness in documentation of other condition. Thematic analysis of the case study discovered four themes with 14 subthemes detailing the factors contributing to poor casemix performance at Hospital E. The themes were poor organizational commitment, resource management issues, information system failure, and poor stewardships in leading casemix initiatives. The final part of the study revealed the difference in costs of RM227,657 due to inaccurate clinical documentation and RM 68,216 for coding error. The differences between mean (SD) cost per case of the original vs. new codes due to inaccurate clinical documentation [RM10,208.19(12273) vs. RM11,244.53(13785.27), $p<0.05$], and coding error [RM10,208.19(12273.04) vs. RM11,215.52(13798.03) $p<0.05$] were statistically significant.

***Conclusion*:** It can be concluded that even though the performance of the MalaysianDRG casemix system in MOH hospitals is moderate, the trend of the national target achievements is showing positive signs of improvement. The MalaysianDRG casemix system is the way forward in hospital management and if utilized optimally, may yield great financial benefits to MOH. However, before this can be achieved, factors that hamper its success and flaws that result

in costly financial implications must be overcome. The study findings may be used to spread awareness and formulate targeted solutions towards future excellence in the MalaysianDRG casemix system.

Keywords**:** casemix, clinical documentation, coding error, MalaysianDRG, health financing, health economics, case study

CHAPTER ONE: INTRODUCTION

1.1 Introduction to casemix system

Casemix systems are classifications of patient treatment episodes designed to create classes which are relatively homogeneous in respect of the resources used and which contain patients with similar clinical characteristics (Palmer and Reid, 2001). It provides the healthcare industry with a consistent method of classifying types of patients, their treatment, and associated costs. It is a patient classification system that groups and clinically codes patients according to their clinical conditions into homogenous Diagnosis Related Groups (DRGs) that consume similar amounts of resources. Each DRG is allocated a 'cost weight', which is dependent on the average cost of inputs example emoluments, pharmacy, radiology, allied health, nursing, diagnostic services, procedures and other hospital costs required to achieve the appropriate patient outcome (HIMAA, 2015). The DRG allows policy makers to understand the nature and complexity of health care delivery and the facility will be reimbursed a predetermined amount for each patient episode. This system also can be utilized as hospital performance measurement tool in aiming to reward initiatives that increase efficiency in hospitals.

The final output of casemix is the data on the actual costs of treatment rendered. There are multiple uses of these data; for government-funded hospitals, it can be used for budgeting and funding application. Whereas for private (or semi-private) hospitals, it is used to set hospital tariffs for billing patients and to obtain payments reimbursement from payers (i.e. social and private health insurance provider) and managed care organizations. Under this prospective payment mechanism, the DRGs are used to predetermine payment charges for each patient episode (Jacobs, 2014).

The benefits of casemix are many with most pertaining to clinical coding and DRGs produced. Clinical coding in casemix is the process of converting

information about diseases or procedures into numeric or alphanumeric format. It standardizes the recording of clinical information and has a major impact on monitoring of health services, assessing patients, morbidity and estimating the need for health services (Khwaja *et al.*, 2002). Additionally, clinical coding assists hospital managers and administrators to compare between different medical facilities and to define trends for morbidities that interest them at different times. Quality coding allows access to complex information that can be presented in a consistent and universally accepted form for each institution, hence the continuity in the system ensures an increased quality and safety of care (Alin *et al.*, 2012). Clinical coding is also important in planning health systems. Resources allocated must consider real problems of patients based on types of morbidity and actual need for resources (Aljunid *et al.*, 2012; Moshiri *et al.*, 2010). Improvement of clinical processes can be directly influenced by increasing the quality of coding related to general indicators (e.g. length of hospital stay, waiting times) and specific indicators (e.g. side effects, complications, episode of hospitalization, iatrogenic diseases) (MOH, 2013).

The other important value of clinical coding is in research. It offers great research opportunities on big data of patients casemix as information are readily available at the fingertips. For example, Srinivasan and Arunasalam (2013) conducted a research on big data of patients casemix and used two novel applications to detect any claim anomalies for private health insurance provider to recover hidden cost overruns that were not detectable using transaction processing systems. If data coding was performed correctly, researchers would be able to observe trends and analyse incredible amounts of information on an unprecedented scale (Morrow, 2013). It involves the development and implementation of a patient classification system that groups patients according to their clinical conditions.