



Clinical Data Analysis and Compliance Auditing in Hospital Quality Management

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ABSTRACT

This technical report details an analytical and observational study conducted within the Bahagian Pengurusan Klinikal (Clinical Management Division) at Hospital Banting. The study aimed to evaluate and improve hospital quality through data-driven methodologies across three specialized units: Public Health, Infection Control, and Quality Management. Initially, a health screening analysis was performed on hospital staff using Microsoft Excel, identifying critical risks such as a 70% prevalence of overweight or obese classifications and significant borderline cholesterol levels among employees. Concurrently, a clinical audit evaluating hand hygiene compliance rates from 2022 to 2024 was analyzed. The audit revealed that nurses maintained the highest compliance (93%), while adherence was lowest prior to patient contact (89%), emphasizing selective compliance based on perceived risk. Furthermore, patient discharge data was verified and entered into the MyCasemix system utilizing ICD-10 coding, managing over 128,000 cases to extract top diagnoses like Chronic Kidney Disease. The findings demonstrate that systematic data visualization and rigorous clinical auditing are imperative for identifying health trends, mitigating hospital-acquired infections (HAIs), and supporting evidence-based resource planning in public healthcare facilities.

Keywords: Casemix system, Clinical audit, Hand hygiene, Hospital Banting, Public health data.

INTRODUCTION

Hospital Banting is a government healthcare institution operating under the Ministry of Health Malaysia. Situated in the Kuala Langat district of Selangor, it serves as a secondary referral hospital equipped with 212 beds. The hospital provides comprehensive services to a large, diverse population through its emergency services, outpatient clinics, inpatient wards, surgery, and diagnostics departments. To maintain high standards of patient-centered care and administrative efficiency, the hospital actively engages in health promotion, disease prevention, and continuous quality improvement (CQI) programs.

The Bahagian Pengurusan Klinik (Clinical Management Division) is central to overseeing the quality and safety of these clinical services. Within this division, three primary units operate synergistically. The Infection Control Unit focuses on preventing hospital-acquired infections (HAIs) through stringent monitoring. The Clinical Audit Unit ensures adherence to clinical standards through structured evaluations, and the Quality Unit drives CQI initiatives across the hospital.

This study outlines the execution of three analytical tasks within these units to support hospital operations. The first task involved cleaning and visualizing staff health screening data to identify prevalent chronic risks. The second task required the analysis of historical hand hygiene compliance audit data to pinpoint behavioral gaps among healthcare workers. The final task focused on accurately entering and interpreting patient diagnoses within the MyCasemix system. Together, these tasks highlight the crucial role of data management and statistical evaluation in improving healthcare delivery.

THE PROPOSED METHOD

Staff Health Screening Data Analysis

To support the Public Health Unit, raw health screening data from hospital staff—comprising blood pressure, blood glucose, total cholesterol, and Body Mass Index (BMI)—was extracted and analyzed. Microsoft Excel was utilized to clean and categorize the data. Simple statistical functions were applied to calculate percentages and averages. The structured data was then translated into visual charts (pie, bar, and column charts) to clearly illustrate the distribution of health risks, such as metabolic syndrome indicators and mental health flags (using the Whooley and GAD-2 screening tools).

Hand Hygiene Compliance Audit

The Infection Control Unit conducted a clinical audit evaluating adherence to the WHO's "5 Moments for Hand Hygiene". Historical compliance data from 2021 to 2024 was collected and categorized by profession (e.g., Doctors, Nurses, Medical Assistants) and indication (e.g., before patient contact, after body fluid exposure) (See Table 1, Table 2 and Table 3). The raw data was structured in Microsoft Excel to calculate the compliance rates (Compliance Actions divided by Opportunities Observed) and visualized using line graphs and bar charts to track year-on-year performance trends.

Casemix Data Entry and Verification

To support hospital financing and performance monitoring, patient discharge records were systematically entered into the MyCasemix system. Each case required accurate clinical coding based on the International Classification of Diseases (ICD-10) for diagnoses and ICD-9-CM for medical procedures. Demographic data and treatment details were verified before entry to ensure the integrity of the hospital's clinical database.

Table 1

Annual Compliance Rate

Year	Opportunities Observed	Compliance Actions	Compliance Rate (%)
2022	250	226.5	91%
2023	250	221.5	89%
2024	250	217.5	87%

Table 2

Compliance Rate by Profession

Staff Category	Opportunities Observed	Compliance Actions	Compliance Rate (%)
Medical Officer (MO)	81.5	72.2	89%
Nurse	97.5	90.5	93%
Specialist	33.2	29	87%
Others	38	30.2	79%

Table 3

Compliance Rate by Indication

Staff Category	Opportunities Observed	Compliance Actions	Compliance Rate (%)
Before Patient	78.2	69.8	89%
Before Aseptic Procedure	16.8	16.8	100%
After Body Fluid	21.2	21.2	100%
After Patient	80.0	72.5	91%
After Surrounding	53.8	41.5	77%

EVALUATION AND RESULTS

Health Screening Insights

The data visualization of the staff health screenings revealed significant health risks within the hospital's workforce. While 91% of staff exhibited normal blood pressure, the BMI analysis was concerning; only 30% of employees maintained a normal weight. The data showed that 198 staff members were overweight, 112 were categorized as Obese Class I, and 47 as Obese Class II. Furthermore, 62% were at risk for abdominal obesity. Cholesterol screenings indicated that a combined 311 staff members had borderline or high total cholesterol levels. These empirical findings provide the health promotion team

with targeted data to design specific wellness and weight management interventions.

Hand Hygiene Audit Trends

The analysis of the clinical audit demonstrated a progressive, albeit gradual, improvement in overall hand hygiene compliance from 2022 to 2024. Nurses consistently recorded the highest compliance rate at 93%. Conversely, doctors and support staff (PPKs) exhibited lower rates, though slight improvements were noted by 2024. Crucially, the data revealed a behavioral trend: compliance was impeccable (100%) *after* exposure to body fluids, yet it dropped to 89% *before* patient contact. This indicates that healthcare workers practice selective compliance based on perceived personal risk rather than patient safety protocols, highlighting a specific gap for future training.

Casemix System Utilization

The meticulous entry of ICD-coded data into the MyCasemix system successfully contributed to a comprehensive real-time dashboard (See Figure 1). The system successfully captured over 128,000 historical cases, with 926 recent cases processed. The analytics dashboard identified Chronic Kidney Disease Stage 5 as a top diagnosis, directly supporting the hospital's resource planning and funding allocations.

Figure 1

Casemix System Dashboard Overview



CONCLUSION

The analytical and administrative tasks executed at Hospital Banting underscore the critical importance of data management in enhancing public healthcare delivery. By systematically cleaning and visualizing staff health data, the hospital can now deploy evidence-based wellness programs to combat rising obesity and cholesterol levels among its workforce. Furthermore, the statistical analysis of the Hand Hygiene Compliance Audit provided actionable insights into behavioral gaps, proving that targeted re-education is required for pre-patient contact protocols to effectively reduce HAIs. Finally, the accurate

coding and verification of Casemix data highlighted the vital role of medical informatics in modern clinical governance. It is recommended that the hospital continues to leverage data visualization tools to monitor these clinical key performance indicators dynamically, ensuring continuous quality improvement and optimal patient safety.

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Conflict of Interest

The authors have no conflicts of interest to declare.

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