学 位 論 文 の 要 旨

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学 位 論 文 名　Diagnostic Errors in Japanese Community Hospitals and Related Factors: A Retrospective Cohort Study

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論 文 内 容 の 要 旨

INTRODUCTION

Diagnostic errors have long been recognized as a critical issue in clinical practice, and in recent years have gained increasing international attention from the perspective of patient safety. Breakdowns in the diagnostic process not only have a significant impact on patient outcomes but also contribute to increased medical costs and psychological burden on healthcare providers. Understanding the actual conditions and contributing factors of diagnostic errors is therefore essential.

In particular, regional hospitals in Japan differ from urban hospitals in terms of staffing patterns, availability of specialists, and medical resources. However, the influence of these contextual factors on the diagnostic process has not been sufficiently investigated. An analysis of diagnostic errors that reflects the realities of community healthcare settings is indispensable for developing practical patient safety strategies.

This study aimed to clarify the incidence of diagnostic errors and their associated factors in a regional hospital in Japan.

MATERIALS AND METHODS

This retrospective cohort study was conducted in the emergency department of Oda Municipal Hospital, a key regional hospital located in central Shimane Prefecture, over a 10-month period from January to October 2021. The hospital provides care to a broad range of patients in the community.

From patients who were admitted or transferred to another hospital, we excluded cases involving surgical diseases, minor dermatologic conditions, vaccine-related adverse events, and young children (under 6 years old), resulting in a total of 924 cases for analysis.

A diagnostic error was defined as (1) inconsistency between the admission and discharge diagnoses, (2) failure to reach a definitive diagnosis, or (3) discrepancy between the primary diagnosis at transfer and that determined at the receiving hospital.

Patients were divided into two groups based on the presence or absence of diagnostic error,

and multiple factors—including patient characteristics, physician-related factors, and environmental factors—were compared. Fisher's exact test, Student's t-test, and Welch's t-test were used for statistical analyses, followed by logistic regression to identify independent predictors of diagnostic error.

The study protocol was approved by the Ethics Committee of Oda Municipal Hospital.

RESULTS AND DISCUSSION

Diagnostic errors were identified in 121 of the 924 eligible cases (13.1%), demonstrating that such errors occur with a non-negligible frequency even within community hospital emergency departments. This incidence is broadly consistent with previously reported diagnostic error rates of 10–20% in general medical settings, while slightly exceeding the 0.6–12% range documented in studies focusing strictly on emergency departments. These findings suggest that regional hospitals, which often operate under unique structural and staffing limitations, may be particularly vulnerable to certain types of diagnostic failures.

A detailed classification of the errors revealed a diverse pattern: delayed diagnoses accounted for 37 cases (30.6%), wrong diagnoses for 45 cases (37.2%), and missed diagnoses for 40 cases (33.1%). The prominence of wrong and missed diagnoses highlights the complexity of clinical reasoning in time-constrained environments, and aligns with international literature noting that interpretive and judgment-related failures constitute the majority of diagnostic errors.
Univariate analysis demonstrated significant associations between diagnostic error and several patient factors, including age, consciousness level, systolic blood pressure, BMI, and the absence of oxygen administration. These findings suggest that presentations perceived as less severe—or those involving subtle or atypical symptoms—may predispose clinicians to cognitive shortcuts. Logistic regression further identified male sex ($p = 0.029$) and the absence of oxygen supplementation ($p = 0.010$) as independent predictors of diagnostic error. Taken together, these observations raise two important considerations: (1) the potential presence of sex-related diagnostic bias, and (2) a tendency among clinicians to prematurely narrow diagnostic hypotheses in cases initially assessed as mild.

The association with male sex is noteworthy, as sex bias in diagnostic processes has traditionally been discussed in the context of women being underdiagnosed or misdiagnosed in several clinical domains. However, the present findings suggest that men, within this regional hospital context, may instead be at higher risk of diagnostic oversight. This may reflect implicit cognitive assumptions regarding disease severity or symptom interpretation across genders, and highlights the need for further investigation into how sociodemographic factors influence diagnostic pathways in Japanese community hospitals.

The second major finding—higher error rates among patients not requiring oxygen—appears to reflect a form of cognitive bias, particularly premature closure. In emergency settings with high patient turnover and limited specialist availability, clinicians may be more likely to anchor on an initial impression of mild illness and devote proportionally fewer resources to reassessment or diagnostic reconsideration. This mechanism is consistent with prior

studies showing that cognitive biases account for the majority of diagnostic errors in emergency medicine, and that errors disproportionately occur in patients with stable vital signs or nonspecific complaints. In this study, cases judged as “mild at first glance” may therefore have been more susceptible to errors in information synthesis, hypothesis testing, or diagnostic follow-up.

Moreover, the structural characteristics of regional hospitals likely amplified these vulnerabilities. The absence of emergency medicine specialists, limited access to subspecialty consultation, and insufficient feedback loops regarding diagnostic outcomes may have contributed to both individual and system-level challenges. Without routine case reviews or formal mechanisms to reflect on diagnostic discrepancies, cognitive patterns such as anchoring, confirmation bias, and heuristic-based decision-making may remain uncorrected. This highlights a broader issue in community healthcare settings: diagnostic performance is shaped not only by clinician expertise but also by organizational culture, resource availability, and workflow design.
These findings underscore the importance of situating diagnostic error analysis within the specific realities of regional hospitals. Unlike large urban centers, where specialized teams and rapid consultation pathways are commonplace, community hospitals depend heavily on generalists managing wide-ranging presentations with varying degrees of complexity. Such environments may necessitate tailored strategies—such as structured cognitive debiasing training, implementation of diagnostic checklists, or enhanced interdepartmental communication—to mitigate the multifactorial contributors to diagnostic error.

Overall, this study highlights that diagnostic errors in regional hospitals arise from a complex interplay of patient characteristics, clinician cognitive processes, and environmental constraints. Understanding these interdependent factors is essential for designing sustainable and context-appropriate interventions to improve diagnostic safety.

CONCLUSION

This study identified the incidence of diagnostic errors and their associated factors in a regional Japanese hospital, revealing two notable contributors: gender-related bias and cognitive bias in clinically mild cases. Because diagnostic errors arise from complex interactions among patient-, physician-, and environment-related factors, each institution must analyze its own diagnostic processes and implement context-appropriate interventions.

Furthermore, this study demonstrates that unique structural and cognitive factors inherent in regional healthcare settings contribute to diagnostic errors, providing important insights for developing future diagnostic safety strategies.

In conclusion, this research offers foundational knowledge for improving diagnostic safety in community healthcare and is expected to contribute to the enhancement of diagnostic systems and medical education programs.