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論文要旨

THESIS SUMMARY

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要旨 (英文 800 語程度)
Thesis Summary (approx.800 English Words)

The objective of this dissertation includes research on reliability and operations management in healthcare based on failure mode and effects analysis (FMEA) and key performance indicators (KPIs).

The first interest highlights on reliability management in healthcare which is an important component of healthcare management. FMEA is a prospective risk assessment tool that mitigates potential failures in systems, processes, designs or services and has been widely used within a wide range of industries. The conventional risk priority number (RPN) method has been criticized to have many deficiencies and various risk priority models have been proposed in the literature to enhance the performance of FMEA. Therefore, we reviewed 75 FMEA papers published between 1992 and 2012 in the international journals and categorized them according to the approaches used to overcome the limitations of the conventional RPN method. The intention of this review is to address the following three questions: (a) which shortcomings attract the most attention? (b) which approaches are the most popular? (c) is there any inadequacy of the approaches? The answers to these questions will give an indication of current trends in research and the best direction for future research in order to further address the known deficiencies associated with the traditional FMEA.

With increasing deployment, complexity, and sophistication of equipment and related processes within the health care environment, system failures are more likely to occur. These failures may have varying effects on the patient, ranging from no harm to devastating harm. FMEA is a tool that permits the proactive identification of possible failures in complex processes and provides a basis for continuous improvement. However, the crisp RPN method has been criticized to have several deficiencies. For this reason, linguistic variables were used to assess the ratings and weights for the risk factors occurrence (O), severity (S) and detection (D). For selecting the most serious failure modes, an extended VIKOR method was used to determine risk priorities of the identified failure modes. As a result, a fuzzy FMEA based on fuzzy set theory and VIKOR method was proposed for prioritization of failure modes, specifically intended to address some limitations of the traditional FMEA. A case study, which assesses the risk of general anesthesia process, was presented to demonstrate the

application of the proposed model under fuzzy environment.

Based on KPIs, the second stream of this research focuses on operations management in healthcare. Because no indicator system has yet been developed for measuring performance of dialysis facilities under the Japanese context, we would like to develop a theoretical framework of holistic hospital management based on performance indicators which can be applied to dialysis hospitals or clinics in Japan. Selection of a key indicator set and its validity tests were performed primarily by the use of a systematic review of literature and a questionnaire survey to dialysis experts. The systematic survey searched PubMed and PubMed Central, and 24 papers were elicited as relevant. The expert questionnaire asked respondents to rate the “usefulness” for each of 66 indicators on a three-point scale. Applying the theoretical framework, we selected a minimum set of performance indicators for dialysis management which can be used in the Japanese health care setting. Finally, we established the theoretical framework of performance measurement for holistic dialysis management from primary healthcare stakeholders’ perspectives. In this framework, performance indicators were largely divided into healthcare outcomes and performance shaping factors. Indicators of the former type may be applied to detection of operational problems or weaknesses in a dialysis hospital or clinic, while latent causes of each problem can be more effectively addressed by the latter type of indicators in terms of process, structure and culture/climate within the organization.

In addition to the investigation on dialysis experts, a questionnaire survey was also performed to another active player within healthcare that was healthcare management. The objective is to investigate current usage of performance indicators that can be potentially applied to dialysis management and managers’ views of their usefulness based on the framework of holistic dialysis management. The questionnaire survey was conducted to ask usage, usefulness and organizational level of performance measurement for 44 potential indicators. By applying principal component analysis to the entire sample, eleven performance measures were extracted from perspectives of patient, employee and management. Among them, six measures were frequently used and nine measures were rated highly useful for measurement of performance in dialysis hospitals or clinics in Japan. General hospitals and hospitals with more dialysis beds used the performance measures more common and the perceptions of usefulness were more positive. Managers’ perceptions of usefulness were significantly associated with the usage of indicators in the current hospitals. Our results demonstrate that it is necessary to develop a limit number of important indicators for measuring and managing the dialysis system in Japan, and tailored strategies are needed to implement performance indicators in daily practice.

備考：論文要旨は、和文 2000 字と英文 300 語を 1 部ずつ提出するか、もしくは英文 800 語を 2 部提出してください。

Note : Thesis Summary should be submitted in either a copy of 2000 Japanese Characters and 300 Words (English) or 2 copies of 800 Words (English).