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Application of Failure Mode Effect Analysis (FMEA) to analyze the safety of medication dispensing in a tertiary care hospital

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Background: Failure Mode Effect Analysis (FMEA) is a prospective, team based, structured process used to identify system failures of high risk processes before they occur. Medicines dispensing is a high risk process that should be analyzed for its inherent risks.

Objectives: To identify possible failures, their effects and causes of the dispensing process of the study setting using Failure Mode Effect Analysis.

Methods: This prospective, cross sectional study was carried out for two months in the Pharmacy Department of a selected teaching hospital, Colombo, Sri Lanka. Thirteen pharmacists had discussions in two independent groups (Group A, n=06; Group B, n=07) to conduct a FMEA. Each group had one in-charge pharmacist, at least one senior pharmacist (>ten years of working experience), and one graduate pharmacist. Each group had five meetings of two hours each, where the dispensing process and sub processes were mapped, and possible failure-modes, their effects, and causes, were identified. A score for potential severity (S), frequency (F) and detectability (D) was assigned for each failure-mode according to specified guidelines. Risk Priority Numbers (RPNs) were calculated ($RPN = S \times F \times D$) to prioritize identified failure-modes. Feedback

was obtained from participants about the usefulness of FMEA.

Results: Group A identified 48 failure-modes while Group B identified 43. Among all 91 failure modes, 69 failure-modes were common to both groups. The 22 that were not in-common scored low RPNs. Considering the RPN, Group A prioritized one failure-mode, while Group B prioritized three failure-modes (having identical RPNs). Both groups identified overcrowded dispensing counters as a cause for 57 identified failure-modes. All participants accepted FMEA as an effective method to analyze the safety of the dispensing process.

Conclusions: FMEA was successfully utilized to identify and prioritize possible failure-modes of the dispensing process through active involvement of pharmacists. This prospective approach is useful to prevent dispensing errors before they occur.

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