Review of Medication Errors: A Human Factors Approach

Helen de Chavez, Abigail Linsey-Rimalos, Annellee Came, Mary Rose Malinao and Pang Nguk Lan

Introduction

Root Cause Analysis (RCA) was integrated in the Risk Management System (RMS) to provide a framework for the evaluation of medication error incidents. However, the key root causes identified through RCA for medication errors rarely addressed the human factors aspects of contributory factors such as adverse mental state, personal readiness, physical mental limitations etc.

Our primary aim is to classify the human causative factors of medication error caused by wrong drug based on the Human Factors Analysis Classification System (HFACS) framework.

Methodology

- A 3-year retrospective review of medication errors secondary to wrong drug were extracted from the RMS for the period 01 January 2011 to 31 December 2013.
- Review of the existing root cause classification and framework of the 80 medication related errors was conducted.
- A pilot evaluation of the root causes of 10 random cases of wrong drug were classified using the HFACS Checklist for Operational Factors by Shappell and Wiegmann as shown in Figure 1.
- However, some codes/items in the Shappell and Wiegmann HFACS checklist were not applicable to healthcare.
- Drawing up a Modified Human Factors Checklist for Medication Error (Figure 2).
- The modification made were mainly on the contributory factors of unsafe acts and preconditions for unsafe act.
- The Modified HFACS checklist was used to classify the 52 incidents of wrong drug errors identified.
- Classification of each incident according to the levels of failure and the contributory factors were evaluated by counting the number of times it was occurred as the cause factor.

Results

The HFACS framework describes the human factor causes of accidents in 4 tiers. The 1st tier begins with unsafe acts which is defined as the actual action that led to the incident. The preconditions for unsafe acts explained why the incident happened by understanding the environment and the circumstances leading to the error. The 3rd tier is the unsafe supervision, which contributed to the active failure committed by staff. The final level of HFACS is organisational influences which are conditions left unnoticed that may affect the supervisor and frontline staff.

Depicted in Figure 3 are the level of failure and causal categories identified for wrong drug whereby unsafe acts has the highest number of occurrences. The causal categories were further categorized into causal factors. The highest causal factors identified are routine violation (71%), followed by adverse mental state (32%), skill-based error (29%), decision error (27) and communication / coordination / planning (21%).

Detailed analysis showed majority of the wrong drug incidents occurred due to failure to adhere to work instructions and policies and procedures as reflected in Figure 4. These findings will give the organization the opportunity to relax at the policies and provide mitigating solutions targeted to correct failures occurring at any level.

The plans for phase 2 are in the process to conduct a prospective study of medication errors using the modified checklist to validate the comprehensiveness, reliability and usability of the checklist.

Conclusion

In general, the HFACS framework by Shappell and Wiegmann can be used as an alternative or adjunct tool for RCA for investigating incidents or adverse events in healthcare.

The creation of the Modified Human Factors Checklist for Medication Errors in KKH provided the opportunity to clearly classify the root cause of wrong drug incidents. HFACS framework can be customised to the healthcare system of the individual organization.

Looking at causal factors for medication errors, the organisation could anticipate the problems and work on specific interventions to help improve human performance and reduce the risk of errors.

References:
3. KKH Guide to Root Cause Analysis for Incident Management