Designing for Redundancy: Nurses Experiences with the Wireless Nurse Call System

Joakim Klemets (PhD cand.)
Department of Telematics and
Norwegian Research Center for Electronic Patient Records (NSEP)
Norwegian University of Science and Technology (NTNU)
• Introduction
• Methods
• Results
• Discussion
Former Work

- The nurse call system allows patients to call for help and nurses to coordinate work
- Effective nurse call systems can improve patient care
- Wireless phones to support mobile nurses
- Wireless nurse call systems are however associated with challenges such as interruptions
- Interruptions has a negative impact on patient care and therefore also patient safety

Theoretical Foundations

• High Reliability Organizations (HROs)
  – Handles unexpected and harmful situations better than other organizations\(^1\)
  – Redundancy is a key principle in HROs in order to ensure safe operations\(^2\)
  – We assume that HRO principles can be transferred to the hospital environment

• Functional Redundancy
  – Level of knowledge and situational awareness is distributed and overlapping\(^3,4\)
  – Flexibility as to perform colleagues' work\(^3\)

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Method

• **Qualitative**
  – Several departments included in the study
  – Inductive and deductive approach
  – Theoretical concepts used as sensitizing tools in the later part of the analysis

• **Four workshops (~12 h)**
  – Held at the hospital (in an empty bed area)
  – Ordinary and student nurses (22 in total)
  – Scenarios and focus group interviews

• **Observations (~22 h)**
  – Used to inform the workshop design
• Introduction
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• Discussion
How the system works
Responsibility Allocation

• Nurses divide the responsibility of patients
  – Uses the term “primary nurse”
• Responsibility allocation happens during a handover meeting
  – Occurs at the start of a work shift
  – Patient information is shared orally
  – Responsibility allocation updated in the system
    • System state reflects reality
• Tries to keep some consistency
  – Same nurse responsible for the same patient during the stay
  – Nurses tries to respond to their assigned patients
    • But also states that “…we respond to all…”
Responsibility Reallocation [1]

- Continuous need to reallocate patient responsibility during a work shift
- Lunch routine
  - Different practices but always a nurse present at the department that is responsible for responding to nurse calls
  - At the thorax department nurses gives a short oral report and updates the system
    - Cumbersome procedure
  - At the orthopedic department the system state is not updated
    - Causes a lot of ringing in the lunch room
    - Additional delay before the call reaches an available nurse
Responsibility Reallocation [2]

• Changing a wound dressing
  – “… always, if you are going into an isolation room and you will be there for a while, you always tell the others (..), so that they can answer the nurse calls”
  – “…if this [the procedure of changing a wound dressing], was not planned [i.e. no arrangements made], I would have felt stressed to get out of the room as quickly as possible”

• Visiting a patient
  – “I would not have gone from the patient. I’d rather put out my head into the hallway and asked someone else to take the nurse call”
Responsibility Reallocation [3]

• Nurses make informal arrangements during work in order to be able to act as back up for each other
• The responsibility of a patient switches between nurses during a work shift
  – E.g. lunch, changing wound dressing
• Although “primary nursing”\(^1\) seem to be advocated, the practice sometimes leans more towards “team nursing”
  – Current system use enforces a “primary nursing” mode as nurse calls are always delivered to the primary nurse

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Implications for Design [1]

• System state does not reflect reality
  – Available when unavailable

• Nurse calls are delivered anyway
  – After responsibility shift
  – While busy

• Causes unwanted interruptions
  – A nurse notes that it “takes out on the communication between her and the patient”

➔ Is it possible to reduce these unwanted interruptions through system design?
Implications for Design [2]

• Allow nurses to make themselves unavailable in the system
• Allow oral responsibility hand-over agreements to directly be reflected in the system
  – “… when I make such an agreement where the responsibility of a patient is transferred from me to you, then also the phone responsibility should be transferred to you (.), but it doesn’t work like that today”
The Role of Redundancy

• Redundancy of function is a key denominator across departments
  – Nurses rely on each other in order to meet patient needs
• Handling of co-occurring and sometimes conflicting needs of several patients is challenging
  → How can we involve nurses in each others work without causing unwanted interruptions for any of them?
• Utilizing the existing redundancy of function in the system design could
  – Ensure effective handling of a nurse call as quickly as possible
  – Increase the departmental robustness in line with a major HRO principle
• Improve patient safety and the quality of care