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Role Conflict: Occupational Stressors vs. Patient Safety

Effect of Workload & Pharmacy Staff Stress on Prevented Dispensing Incidents in Hospitals with Manual and Automated Dispensing Systems

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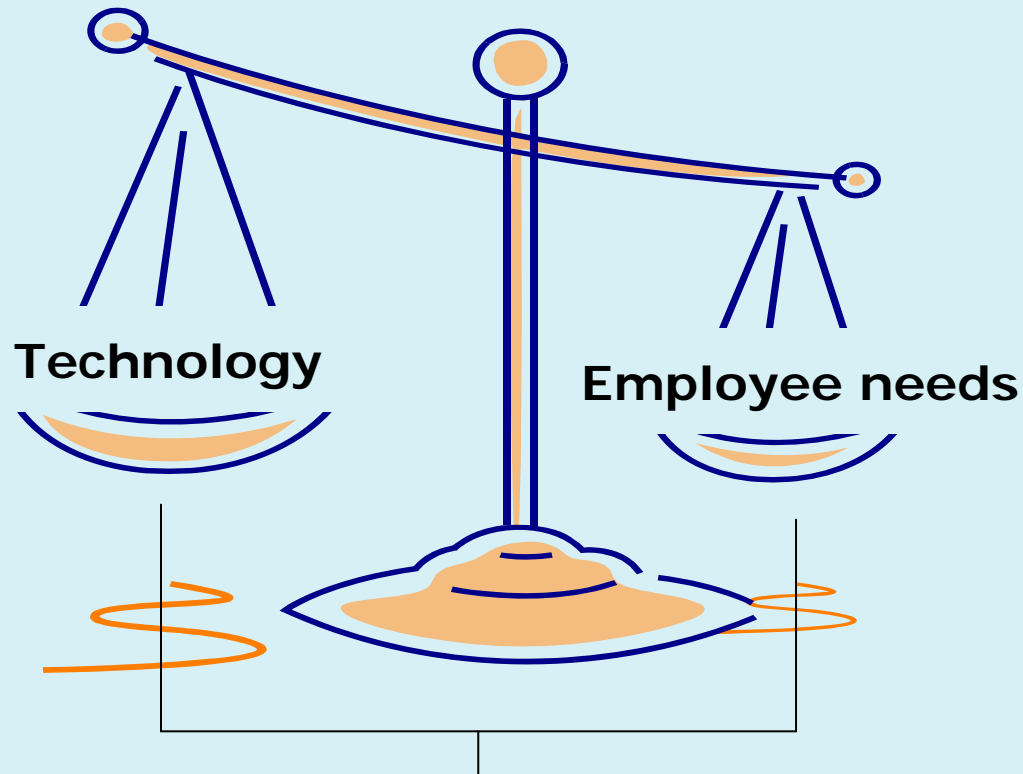
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Dispensing Errors

- **Dispensing errors**
 - Deviation from written Rx occurring during stock selection, medication assembly, label generation, affixing labels & issue of medication to patients.
- **Unprevented dispensing incidents (errors)**
 - Incidents detected and reported after medication has left pharmacy.^{1,2,3,4}
- **Prevented dispensing incidents (near-misses)**
 - Incidents identified during dispensing before medication has left pharmacy.^{1,2,4,5}
- **Causes**
 - Subjective research – look alike sound alike, workload, design of dispensary^{2,3,6,7}
 - Objective – workload, interruptions^{8,9}

Socio-Technical Theory

- Interaction of technology and human needs in improving efficiency and job performance.^{10,11}



Reduced turnover, safety, quality, poor staff performance, low morale, job dissatisfaction, absenteeism, high stress levels

Study Design

Case study design¹²

- Case hospital A - Manual
- Case hospital B - Automated

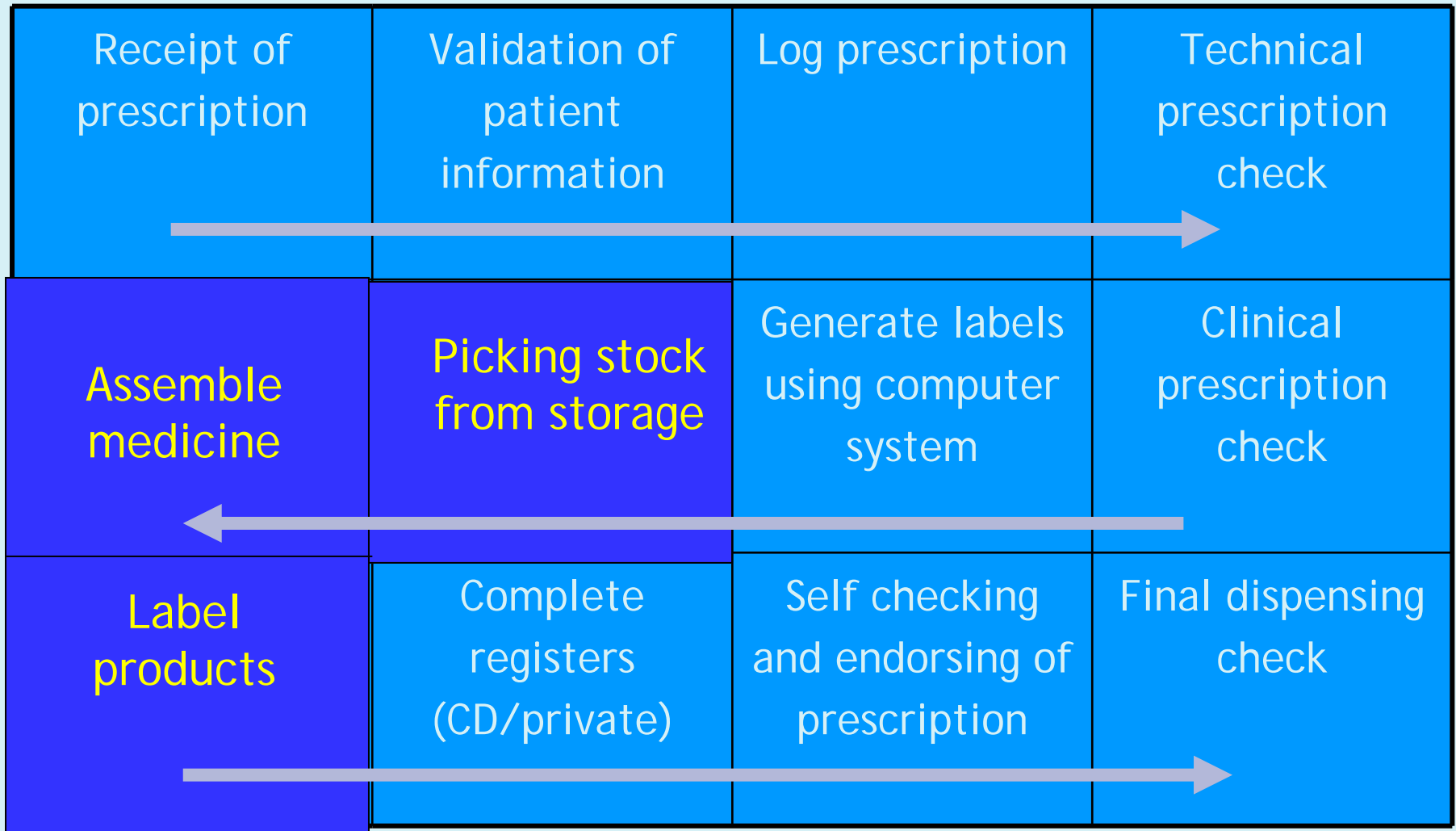
Comparison of hospital characteristics

- Hospital type
- Bed number
- Specialties

Comparison of pharmacy characteristics

- Dispensary staff

Dispensing Process



Data Collection

Workload Measurement

- Non-participant observation
 1. Direct time method¹³
 2. Event recording/modified Welsh benchmarking method¹⁴

Prevented Dispensing Incidents

- Self-reported by staff
- Standardised UKDEAS forms

RPSGB Pharmacy Workforce Behaviour Survey¹⁵

- Anonymous, validated occupational stressor survey
 - Job control/autonomy, work overload, psychological contract, job stress, job satisfaction, organisational commitment, work-life conflict etc.

Data collected over each working day for 6 weeks. Survey administered fourth week of workload data collection.

Results – Workload

	Case hospital A	Case hospital B
Direct time • Mean workload	7.27 items/person/hour (SD±7.16)	11.93 items/person/hour (SD±8.38)
Event recording/benchmarking • Mean workload	9.57 items/person/hour (SD±10.64)	12.60 items/person/hour (SD±8.80)
Comparison of direct time and event recording/benchmarking workload measurement technique	No difference t=0.02, p=0.99	No difference t=0.004, p=0.1

Significant difference between the workload at hospital A and hospital B

- Direct time: $t=5.23$, $p=2.73 \times 10^{-7}$
- Benchmarking method: $t=4.41$, $p=1.15 \times 10^{-5}$

Prevented Dispensing Incidents

	Number Prevented Dispensing Incidents	Number of Items Dispensed	Incident Rate (per 100,000 items dispensed)
Case hospital A Manual dispensing	235	36,719	637
Case hospital B Automated dispensing	85	25,747	338

Significant difference between prevented dispensing incident rates of participating hospitals $p=0.003$

No significant difference between categories of dispensing error types reported by each hospital $p=0.276$

Relationship between workload and occurrence of prevented dispensing incidents

Event recording/Welsh benchmarking technique

Effect of Interruptions on Prevented Dispensing Incidents

Workforce Planning Models

- 1) Direct time
- 2) Event recording

1) Direct Time Technique

- Based on Plumridge & Dickson¹³

Staffing requirement (FTE) = Time/item/dispensed x Number of items dispensed

- Assumptions
- Time spent dispensing required correction for
 - Staff personal, rest & fatigue (17%)
 - Time spent by staff dealing with incoming telephone calls
 - No correction for time spent by staff replenishing stock and drug information queries
 - Full time staff contracted to work 37.5 hours
 - Mean annual leave entitlement of 30 days & 8 days public holiday (5.85 hours/week).

Direct Time – Hospital A

- Mean dispensary workload = 8.25 minutes/person/item
- Items dispensed over 6 week data collection period = 36, 719 items

$$\frac{8.25 \text{ minutes/person/item}}{60 \text{ minutes/hour}} \times \frac{36719 \text{ items}}{6 \text{ weeks}} = 841.48 \text{ hours/week}$$

- Correction for
 - personal, rest & fatigue = 17%
 - Staff time spent on incoming telephone calls = 7 hours/week
- Standard hours dispensing = 991.53 hours/week
- Productive hours/week = contracted hours (37.5) - annual leave = 31.5 hours/week

$$\text{FTE requirement} = \frac{\text{Standard hours/week}}{\text{Productive hours/FTE}} = \frac{991.53}{31.5} = 31$$

Direct Time – Hospital B

- Mean dispensary workload = 5.03 minutes/person/item
- Items dispensed over 6 week data collection period = 25,747 items

$$\frac{5.03 \text{ minutes/person/item}}{60 \text{ minutes/hour}} \times \frac{25747 \text{ items}}{6 \text{ weeks}} = 359.74 \text{ hours/week}$$

- Correction for
 - personal, rest & fatigue = 17%
 - Staff time spent on incoming telephone calls = 2 hours/week
- Standard hours dispensing = 422.9 hours/week
- Productive hours/week = contracted hours (37.5) - annual leave = 31.5 hours/week

$$\text{FTE requirement} = \frac{\text{Standard hours/week}}{\text{Productive hours/FTE}} = \frac{422.9}{31.5} = 13$$

Stressor Survey

- Response rate
 - Hospital A: 78%, n=35
 - Hospital B: 88%, n=22
- Background characteristics
 - Age
 - Hospital A: 36 years; hospital B: 31 years; $p=0.124$
 - Gender
 - Hospital A: 89% female; hospital B: 77% female; $p=0.255$
 - Occupation
 - Hospital A: 40% pharmacists; hospital B: 36% ACTs
 - Contract
 - Hospital A: 71% full-time; hospital B 100% full-time
- Statistically significant results
 - No control over work
 - Work overload
 - Job stress
 - Job dissatisfaction
 - Organisational commitment

Socio-technical Perspective

- Impact of automation on
 - Workload
 - Automation associated with higher workload (items/person/hour)¹⁶⁻¹⁹
 - Prevented dispensing incidents
 - Automation associated with fewer prevented dispensing incidents^{16,17,19}
 - Occupational stressors
 - Automation = ↓ job stress, work overload, autonomy, organisational commitment & job satisfaction
 - Manual = ↑ job stress, work overload, job satisfaction, organisational commitment & job control
 - ? Job control mediating variable as reported by Woods & colleagues²⁰

Impact of Workplace Stressors on Prevented Dispensing Incidents

- Workload
 - ↑ dispensary workload – ↑ prevented dispensing incidents
 - Manual dispensing – max incidents at moderate workload²¹
 - Involuntary automaticity²²
 - Automated dispensing – max incidents immediately after peak in workload²¹
 - Fatigue after-effects²³
 - Risk reduction strategies: short breaks and/or task rotation^{24,25}
- Interruptions
 - ↑ telephone interruptions/distractions – ↑ prevented dispensing incidents²⁶
 - Risk reduction strategy: remove telephones from dispensary²⁷
- Occupational stressors
 - ↑ job stress - ↑ prevented dispensing incidents
 - Stress can lead to burnout, absenteeism and job turnover²⁸
 - Risk reduction strategies: improve job control & provide opportunities for enhancing professional knowledge²⁸

Workforce Planning Models

- Two models
 1. Direct time
 - Calculation of FTEs
 - Could be used to determine if extra dispensary staff needed
 2. Event recording
 - Determine staffing level required to maintain an acceptable workload, whereby prevented dispensing incidents maintained below a specified threshold
- Envisage use as routine risk management procedure within hospitals

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