



Drug Calculation Skills of Nurses: an issue for patient safety.

Aim: To evaluate the drug calculation skills of nurses commencing employment in 5 major academic teaching hospitals in the Irish Republic.




Methodology

- A cross sectional survey design incorporating mixed methods was utilised
- The 30 item questionnaire consisted of two sections;
 - section one, on participant background information and
 - section two, a four part 20-item drug calculation test of metric conversions, tablet and fluid dosages and IV infusion rates.
- Sampling Strategy:
 - Five study sites were selected to represent the major academic teaching hospitals in the Irish republic. All registered nurses (approx n=120) commencing employment in the five designated sites over a six-month period were invited to participate in the study.
- Data Analysis
 - Descriptive and inferential statistics were used to test associations between the categorical variables represented in the questionnaire and to test differences on drug calculation scores between groups (e.g chi square test; t-tests).
 - All qualitative data generated from the two open-ended questions was transcribed and subjected to coding and thematic analysis.




- Mathematical and conceptual competency of registered nurses in relation to
 - metric conversion,
 - drug dosages and
 - infusion rates
- Nature of drug calculation education
- Recommendations to improve medication safety




Findings (n=120)

- Majority aged between 21 and 30 years (n=74, 61.7%).
- Majority school leavers on entry to nursing (n= 117; 97.5 %).
- Majority of those participated (n=115; 93.3%) attained leaving certificate or equivalent mathematics.




Findings

- Academic level degree graduates (n=52; 43%); diploma (n=40;33%)and certificate (n=28,23%) routes.
- A significant proportion of job entrants had completed their undergraduate nursing education overseas (n=41, 34%).
- The mean years of experience working as registered nurse was 7 years (*standard deviation 7; minimum 0 and maximum 30 years*)



Findings

Calculation	N	Mean	%	Minimum	Maximum	Std. Deviation
Metric conversions	120	2.56	64.00	.00	4.00	1.54
Tablet dosages	120	3.24	81.00	.00	4.00	0.93
Fluid dosages	120	4.11	68.50	.00	6.00	1.48
Drip rates	120	2.17	36.17	.00	6.00	1.66
Overall score	120	12.08	60.03	3.00	20.00	3.91



Findings: Reason for error



- Conceptual errors rather than mathematical calculations i.e. participants failed to extract the correct information to enable accuracy.
- The proportion who used standardized formulae to calculate drip rates varied between 20-31%.

Recommendations



- Emphasis on drug calculation competency as a key outcome of the degree to include formal testing
- **Practical ward based education on drug calculation**
- **Mandatory updates on drug calculation for all staff**