lose their feeling for what would be considered a reasonable answer. This may lead to errors going unnoticed. Although 45% of nurses also performed poorly in the numerical ability test by achieving a score of 60% or less, they were still better at performing basic numeracy than students.

We can only speculate why this might be the case; one possible factor could be age. The nurses were significantly older than students and, in this study, participants aged 35 and over were more competent at performing numerical calculations than their younger counterparts. A possible reason why older participants performed better could be the type of mathematical education they received during their formative school years and, in particular, the absence of calculators during this period. Older participants, who did not use calculators when they were at primary and secondary school, obtained a great deal of practice in mental arithmetic.

Younger participants had been taught mental arithmetic at primary school without calculators, then started to rely increasingly on them, even for simple calculations, during secondary education. This increased reliance on calculators could have led them to lose proficiency in mental arithmetic and in their ability to determine what would be considered a reasonable answer. This problem with poor numerical ability is not only seen with student nurses but has also been reported with students following other university courses, such as engineering, pharmacy, psychology and medicine (for example, Sheridan and Pignone, 2002).

**DRUG CALCULATION ABILITY TEST**

Both students’ and nurses’ results in the drug calculation ability test were poor, with 92% and 89% respectively obtaining a mark of less than 60% (Table 2).

Similar results have been found in other studies in the UK and abroad. For example, Jukes and Gilchrist (2006) found that, on a 10 item drug calculation test, 64% of 37 second year student nurses achieved a score of less than 70%.

Closer analysis of the results showed a clear division in the scores according to the types of drug calculations that needed to be performed. In this study, both students and registered nurses were much better at performing calculations for solids, oral liquids and injections than drug percentages and infusion rates (Table 2).

In addition, although there was no statistically significant difference between students and nurses in their ability to perform drug percentage and infusion rate calculations, the latter were significantly more able to perform calculations for solids, oral liquids and injections.

A possible explanation is that calculations for drug percentages and infusion rates are generally conceptually more difficult than those for solids, oral liquids and injections. In our study, both students and registered nurses struggled with the conceptual nature of drug percentage and infusion rate calculations before getting to the numerical element of the task. Calculations for solids, oral liquids and injections were conceptually easier and the mistakes made here were mainly numerical errors. As registered nurses were significantly better at performing arithmetic, they made fewer errors and therefore had fewer problems with these calculations than student nurses.

The question remains as to why registered nurses had problems performing (and conceptualising) the drug percentage and infusion rate calculations. Studies have shown that registered nurses tend to become “rusty” in performing calculations that they do not need to do on a daily basis in their work (Preston, 2004).

In this study, the majority of registered nurses worked mainly in primary care and therefore had no need to perform many infusion rate calculations in their daily work. As a result, they became rusty in these types of calculations and, without practice, lost their expertise.

In addition, nurses can become deskilled because they use technology that performs calculations for them in clinical areas, such as intravenous pumps. However, this technology might not always be available and, even if it is, to rely unquestionably on it could be dangerous. Nurses also have to input the data and interpret the results. However, if they are unable to do this, due to a lack of drug calculation skills and experience, mistakes may go unnoticed, placing patients’ lives at risk.

**RECOMMENDATIONS**

To obtain proficiency in performing numerical and drug calculations and to develop a “feeling” for what could be considered a “reasonable” answer, student nurses should initially learn to perform calculations without calculators. Although calculators may be useful in...