

Educators need to become conversant with dyscalculia and consider strategies for supporting student nurses through to registration

Dyscalculia: awareness and student support

In this article...

- › An explanation of the learning need called dyscalculia
- › A discussion of the difficulties faced by dyscalculic students
- › How to assist dyscalculic students with their training and ongoing practice

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Abstract Kirk K, Payne B (2012) Dyscalculia: awareness and student support. *Nursing Times*; 108: 37, 16-18. Dyscalculia is a learning need that requires assessment and provision of reasonable adjustments.

Although there have been numerous discussions about how to identify, assess and support dyscalculic children, there is less information available covering further and higher education, and even less concerned with the education of health professionals.

This article aims to address this deficit, to discuss the disparity often felt by educators, and to raise awareness of the impact of dyscalculia on student nurses.

While most people are familiar with dyslexia, dyscalculia is less well known. Simply defined as a lack of understanding or comprehension of maths (Chinn, 2006), it belongs to the family of specific learning needs and was first identified around 1974 (Kosc, 1974). Compared with dyslexia, which was defined over 100 years ago (Smythe, 2011), dyscalculia is a relatively new concept. This means that evidence to support pre-registration student nurses who have dyscalculia remains sparse.

The National Numeracy Strategy extends the definition of dyscalculia to include difficulties with the concept of numbers, or with the rote mechanism of

learning maths, such as number rules and facts (Department for Education and Skills, 2001). While the strategy focuses on primary school children, this may be relevant for adult learners too.

Given that dyscalculia was recognised only recently, most adult learners with dyscalculia will have experienced primary education without diagnosis or adjustment. This means they may struggle to bridge the gap in knowledge.

While dyslexia and dyscalculia are considered different learning needs, there is evidence to suggest that they can coexist in individuals, with one being more dominant than the other (MacDougall, 2009).

In addition to problems with understanding mathematical tasks, people with dyscalculia can also have difficulties with spatial processing, hindering their ability to “guesstimate” the size of a number (Mussolin et al, 2011). Some may have general numerical difficulties whereby they substitute one number for another. They may even do this when using a calculator; in this case, the answer to a calculation may be 5, but the individual may write 7.

The fact that there are often several terminologies for a single mathematical task can be an additional source of confusion for those with dyscalculia. For example, terms used in discussing addition include more than, add, plus, sum of and total.

For students on pre-registration nursing programmes, the use of medical terminology can compound these pre-existing difficulties.

The prevalence of dyscalculia is largely unknown. Butterworth (2002) suggested that 5-6% of the population have a diagnosis of dyscalculia; however, Desoete et al

5 key points

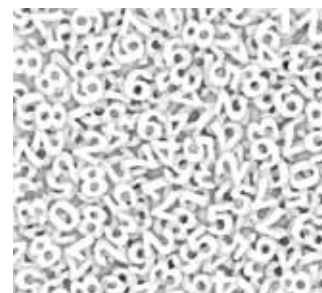
1 Dyscalculia is a difficulty with the concept of numbers

2 The condition has significant implications for pre-registration nurse education

3 Students with dyscalculia need to be identified and have their learning needs assessed

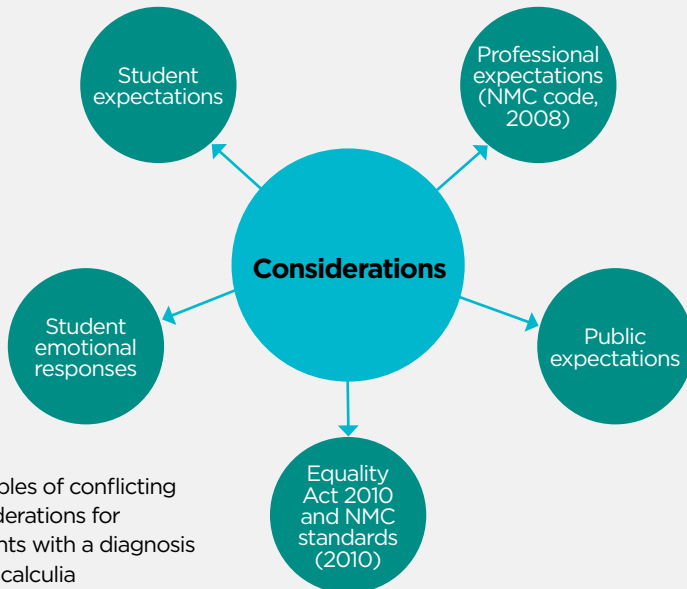
4 Through reasonable adjustments, a person with dyscalculia can successfully train to become a nurse

5 Ongoing mentorship helps dyscalculic nurses cope with learning



Students with dyscalculia may have difficulties with drug calculations

FIG 1. **CONFLICTING REQUIREMENTS**



(2004) and Geary (2004) placed this at over 8%. Since these statistics are taken from children, it could be argued that the incidence could be greater because many adult learners may not have been assessed or diagnosed. As dyscalculia becomes more widely recognised and assessed, the number may increase.

Implications for nursing and education

The difficulties associated with dyscalculia can significantly affect everyday living; becoming a pre-registration student nurse can multiply those difficulties.

First, students with dyscalculia may have difficulties with drug calculations and medicines management (Table 1), and educators may feel this could compromise patient safety. For example, if a nurse completes a drug calculation but writes the numbers incorrectly, the implications for the patient are clear.

There are concerns that miscalculation may cause errors in medication administration, or initial dose calculation, but a review by Wright (2010) found insufficient evidence to support the concern that nursing errors in calculations are responsible for medication errors in practice. However, as highlighted in the review, this conclusion was limited, as no research studies that met the inclusion criteria directly examined drug errors by nurses in clinical practice. The issue of dyscalculia was also not addressed within the review.

Another issue of concern is how nurses assess patients, including basic

observations. Those with dyscalculia may miscalculate some assessments such as fluid balance or nutrition, or the calculation may be correct but be inaccurately documented. It could be argued, however, that this remains a concern whether an individual has a diagnosis of dyscalculia or not. Such concerns relating to dyscalculia as a pre-registration student can be remedied through mentoring.

QUICK FACT 5-8%
Estimated prevalence of dyscalculia within the general population

The key issue for those with dyscalculia is early and timely recognition and assessment of their learning need. It is also vital that education providers adhere to their duty under the Equality Act (Home Office, 2010) to apply reasonable adjustments so that people with a disability are not disadvantaged or discriminated against intentionally or unintentionally; examples of reasonable adjustments are discussed below.

The Nursing and Midwifery Council (2010) standards for pre-registration education specifically state that higher education institutions must ensure that students can display basic numeracy skills as well as be able to use a calculator on admission to pre-registration nursing programmes. Students with dyscalculia will need to know this beforehand so that they can access reasonable adjustments for any entry requirement assessments. However,

as stated above, many adult learners have been through primary education without this assessment, and many students may go through assessments before their dyscalculia is diagnosed. In this instance, they may either be unsuccessful at academic assessment or need further attempts once they have been assessed and reasonable adjustments are in place.

Another challenge faced by students with dyscalculia is that healthcare focuses on evidence-based practice, which requires them to be able to critically appraise the evidence. It could be argued that these students may have difficulty in critical evaluation when primary research reports often include a variety of complex mathematical calculations. Table 1 shows some examples of the difficulties faced by nurses, pre-registration students, and to those wanting to enter programmes.

On qualification, nurses with dyscalculia should be reassessed to see whether any reasonable adjustments continue to be sufficient to enable them to practise safely and meet professional and public expectations of nurses.

To qualify as nurses, all students must complete all outcomes of a pre-registration nursing programme, which include the requirement to reach a baseline level of numeracy, and to achieve academic assessments throughout their period of study. While the NMC (2010) has incorporated numeracy throughout all five of the essential skills clusters (ESC) required of nurses, students must achieve a 100% pass mark in, among others skills, numeracy at the point of entry to the register. The guidance to support the ESCs focuses on the application of numeracy to patient care, including the ability to assess which calculations are required, application of the right mathematical concepts and evaluation.

It is the responsibility of the programme provider, however, to decide how this is taught and assessed. For those with dyscalculia, it would be beneficial to avoid being over-reliant on traditional teaching and learning strategies for numeracy and encourage a blended learning approach with multiple teaching strategies.

Expectations and balancing disparity

Dyscalculia can present a complex situation with many conflicting requirements and considerations (Fig 1). The NMC (2010) standards for pre-registration education and Equality Act (Home Office, 2010) make it clear that students with a disability should be included and supported through reasonable adjustments. These are

alterations and support that can enable individuals to access education as if they did not have a disability. The adjustments must, however, be reasonable to all: the student, the profession, the employer and in the case of nurses, the patient. There is often concern that those with dyscalculia may be more likely to make errors that compromise patient safety, but it could be argued that this situation can be avoided through appropriate and timely reasonable adjustments.

The public and professional expectations of nurses may also conflict with the perceptions of student nurses with dyscalculia; at the same time, students may have conflicting expectations of themselves and of the adjustments that can be offered.

In addition, White (2007) and Richardson and Wydell (2003) suggest that those with a learning need may experience higher levels of anxiety and stress, which can inhibit and obstruct their ability to progress. While these authors focus upon dyslexia, it is reasonable to assume that those with dyscalculia may suffer similar emotional responses.

Reasonable adjustments

Pre-registration student nurses with dyscalculia need timely and appropriate assessment. It is essential that they receive an early educational psychology assessment and that appropriate reasonable adjustments soon follow. The impact of their dyscalculia on clinical practice should also be considered. Some of the reasonable adjustments for theoretical components may include:

- » Tutorial support for exam techniques. This may be problematic if the educational institution does not have expertise in supporting people with dyscalculia. There are also funding and time implications for this service.
- » Additional time in exams. Time management in a formal exam setting may be an issue so giving students more time can address this.
- » Additional time for academic assignments. Extra time to complete assignments allows students with dyscalculia to process the information they are presented with and to organise their thinking, particularly when considering primary research and making sense of it through critical appraisal.
- » Use of a calculator in exams. This helps counter problems with number substitution and spatial processing. However, it is imperative that this is not an isolated reasonable adjustment – it

TABLE 1. KEY ACTIVITIES THAT MAY BE AFFECTED BY DYSCALCULIA

Key activity	Example of dyscalculic difficulty
Drug calculations and medicines management	Fractions, decimals, addition and subtraction, multiplication, spatial processing, general number difficulties including number substitution
Assessments such as fluid balance	Addition, subtraction, number substitution
Numeracy at pre-registration programme entry and academic assessment throughout	Fractions, decimals, addition and subtraction, multiplication, spatial processing, general number difficulties including number substitution

should be used in conjunction with tutorial support to enable students to understand their particular difficulties and the techniques for using the calculator to address them.

- » Use of a reader in exams. This may help an auditory learner with dyscalculia to process the correct numbers and minimise the risk of number substitution.
- » Access to assistive devices and utensils. For example, students who find it difficult to understand the arithmetic concepts of multiplication, may find it helpful to use flexible number grids. These enable the student to fold the grid and visualise an answer quickly and easily. Alternatively, the use of a computer with voice-recognition software may help those who substitute numbers visually. Another assistive technology may be online, or computerised, software packages for drug calculations.

In practice, the level of supervision for pre-registration students is such that all calculations and number work can be cross-checked by qualified staff. This may encourage students to develop their reasonable adjustments and become increasingly independent as they near registration. However, on registration, the expectations of the nurse change and it would be essential for the employer to reassess and provide appropriate reasonable adjustments, specific to the practice area. It would be the responsibility of the registered nurse, under the code of conduct (NMC, 2008) to disclose the learning need if there were implications for the safety of patients.

Conclusion

Dyscalculia, although a relatively newly recognised learning need, has significant implications for pre-registration nurse education. It is reasonable to assume that, with the development of assessment strategies and expertise in dyscalculia, the incidence of diagnoses will rise over the

coming years. It is essential, therefore, that educators are aware of this learning need and consider strategies for supporting students with it. Students require early assessment and reasonable adjustments to comply with both the Equality Act 2010 and the Standards for Education (NMC, 2010). However, it remains contentious within nursing as to whether reasonable adjustments may be enough to balance the conflicting requirements of legislation, and duty of the profession to safeguard the public. Clearly, more evidence and research are required to address this deficit in nurse education today. **NT**

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