RESEARCH ARTICLE

The effect of specific learning difficulties on general practice written and clinical assessments

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Abstract

Background: Substantial numbers of medical students and doctors have specific learning difficulties (SpLDs) and failure to accommodate their needs can disadvantage them academically. Evidence about how SpLDs affect performance during postgraduate general practice (GP) specialty training across the different licencing assessments is lacking. We aimed to investigate the performance of doctors with SpLDs across the range of licencing assessments.

Methods: We adopted the social model of disability as a conceptual framework arguing that problems of disability are societal and that barriers that restrict life choices for people with disabilities need to be addressed. We used a longitudinal design linking Multi-Specialty Assessment (MSRA) records from 2016 and 2017 with their Applied Knowledge Test (AKT), Clinical Skills Assessment (CSA), Recorded Consultation Assessment (RCA) and Workplace Based Assessment (WPBA) outcomes up to 2021. Multivariable logistic regression models accounting for prior attainment and demographics were used to determine the SpLD doctors' likelihood of passing licencing assessments.

Results: The sample included 2070 doctors, with 214 (10.34%) declaring a SpLD. Candidates declaring a SpLD were significantly less likely to pass the CSA (OR 0.43, 95% CI 0.26, 0.71, p = 0.001) but not the AKT (OR 0.96, 95% CI 0.44, 2.09, p = 0.913) or RCA (OR 0.81, 95% CI 0.35, 1.85, p = 0.615). Importantly, they were significantly more likely to have difficulties with WPBA (OR 0.28, 95% CI 0.20, 0.40, p < 0.001). When looking at licencing tests subdomains, doctors with SpLD performed significantly less well on the CSA Interpersonal Skills (B = −0.70, 95% CI −1.2, −0.19, p = 0.007) and the RCA Clinical Management Skills (B = −1.68, 95% CI −3.24, −0.13, p = 0.034).

Conclusions: Candidates with SpLDs encounter difficulties in multiple domains of the licencing tests and during their training. More adjustments tailored to their needs should be put in place for the applied clinical skills tests and during their training.

1 | INTRODUCTION

Specific Learning Difficulties (SpLDs) are neurological conditions that affect the way information is learned and processed and can have a significant impact on learning and education.[1] SpLD is an umbrella term that encompasses various learning difficulties with reading (dyslexia), writing (dysgraphia), coordination (dyspraxia) or calculation (dyscalculia).[2] These affect approximately 20% of the UK population, with dyslexia being the most frequent condition, affecting up to 12%.[3]

SpLDs can affect memory, writing and reading as well as giving rise to organisational, time-management or sensory (e.g. heightened sensitivity to visual/auditory stimuli) problems.[4] These can have extensive impacts on individuals, affecting not only learning but also mental health, social skills and daily life.[5] Adults with dyslexia report having low self-esteem and anxiety due to problems with time-management, task prioritisation and concentration.[6]

The extent to which medical students or doctors have a SpLD is not very well known. A study published over 10 years ago suggested that the percentage of medical students with dyslexia was higher than 3.2%.[7] Precise numbers of medical students or trainee doctors with dyslexia in the last five years are lacking, but this percentage is believed to have increased with the introduction of more systematic records at the assessment centres (C. Elfes, national assessment lead for the MCGP-AKT, personal communication, October 6, 2022).

Failure to accommodate candidates' needs can be disadvantageous in academic, clinical and examination settings. Moreover, even after providing reasonable adjustments, performance of candidates with disabilities can still be affected in certain examinations such as the national Prescribing Safety Assessment (PSA).[8] A previous study has shown that SpLD students who benefitted from the use of laptops and visual aids in academic settings met resistance from staff when using this equipment in clinical settings due to safety concerns.[9] In examination settings, they may benefit from reasonable adjustments, including extra time, but these may not be sufficient.[10] The format of the exams can also influence the outcome for SpLD candidates.[11]

Studies conducted on medical students have shown that medical knowledge tests do not systematically discriminate against those with dyslexia,[7,11] but evidence coming from licencing tests is mixed. Previous studies have shown that candidates declaring dyslexia did not have a poorer performance on the Applied Knowledge Test (AKT) after adjusting for covariates such as gender and ethnicity,[12] but they were less likely to pass the Clinical Skills Assessment (CSA) test.[13] This suggests having a SpLD affects performance, not only on tests that require reading, writing and comprehension (e.g. AKTs) but also in clinical skills tests that require data gathering and interpersonal skills.

Whilst there is published evidence on doctors with SpLD performance on the AKT and CSA, evidence for the Recorded Consultation Assessment (RCA) and Workplace Based Assessment (WPBA) is lacking. The RCA, like the CSA exam preceding it, is considered broadly acceptable by candidates and it has been in place since May 2020.[14] Prior performance in the Multi-Specialty Recruitment Assessment (MSRA), which is an assessment for recruitment in seven medical specialties, including general practice (GP), strongly influences licencing test outcomes,[15] but this has not yet been considered when examining SpLD candidates' performance.

Even though this study focuses on GP licencing examinations in the United Kingdom, its findings are relevant to other international examinations such as the United States Medical Licensing Examination (USMLE) or the Medical Council of Canada Qualifying Examination (MCCQE) due to the similar structure of these examinations. The examinations in all these three countries have, until now, been a combination of applied knowledge multiple choice (MCQ) tests and separate observational assessments of clinical skills.[16,17] Whilst the applied knowledge MCQ examinations in all three countries (AKT in the United Kingdom; USMLE step 1 in the United States; MCCQE part 1 in Canada) have remained as before, the CSAs are being adapted in the United Kingdom and permanently discontinued due to the impact of COVID-19 in the United States and Canada (the USMLE step 3 in the United States and MCCQE part 2 in Canada).[18] This change risks failure to uncover difficulties with clinical performance due to a SpLD and poses challenges to finding appropriate adjustments. It also shifts back to medical schools the responsibility of developing unbiased assessments and appropriate adjustments for such trainees.[19]

Considering previous evidence, our research question was 'Are there any differences between performance of candidates with declared specific learning difficulties and those without declared disabilities on both written and clinical skills assessments?'

The overarching aim of this study was to address the existing gap in evidence regarding performance of doctors with a SpLD on applied knowledge written examinations, clinical skills examinations and in-training performance. As such, the study evaluated in-training assessments (WPBA) and licencing examinations (AKT, CSA and RCA) outcomes of SpLD candidates whilst accounting for prior attainment on MSRA and other demographic factors.

2 | METHODS

2.1 | Design

We used a longitudinal data linkage study design that tracked doctors from selection to the end of GP training by linking selection, licencing and demographic data from UK doctors entering GP specialty training in 2016.

2.2 | Theory

In this study, we adopted a postpositivist theoretical position, accepting that knowledge is subject to conjecture because of incomplete information.[20] This approach was adopted because the present findings can both modify and enrich the existing knowledge regarding performance of candidates with SpLDs within medical examination settings. Furthermore, this approach was complemented by the social model of disability that states that problems of disability are socially determined rather than due to individual impairment. The model also

argues that adequate provision made for people with disabilities can help them overcome the barriers that they face. Within this model's framework, the findings of our study can be used to inform future adjustments for candidates with SpLDs based on the areas of assessment where they find most challenging.[21]

2.3 | Ethics statement

Independent ethical review was sought, and approval was gained from the University of Lincoln Human Ethics Committee (reference 2020_3645).

2.4 | Data collection and processing

The datasets comprised individual candidate data, assigned a unique (non-personally identifiable) number that allowed linkage between the datasets. Multi-Specialty Assessment (MSRA) records from 2016 and 2017 were linked with their AKT, CSA and RCA outcomes up to 2021 and Workplace Based Assessment-Annual Review of Competence Progression (WPBA-ARCP) outcomes up to 2021.

The AKT is a mandatory, multiple-choice, computer-based knowledge test component of the medical licencing examination for UK GP and candidates who declare an SpLD are offered reasonable adjustments (e.g. extra time) meant to reduce any potential disadvantage.[22]

The CSA is an objective structured clinical examination (OSCE), designed to integrate and apply clinical, professional, communication and practical skills for GP, which uses realistic simulations of 13 real-life consultations in which patients are played by trained role players.

In the context of the COVID-19 pandemic, the CSA was replaced by the RCA that had a similar structure and objectives, but consultations were conducted on real patients either face-to-face or using video or telephone.

The WPBA is performed annually and measured through the Annual Review of Competence Progression (ARCP), which comprises several in-training or end of training outcomes. Some of these outcomes are considered standard (e.g. achieving progress and competencies at the expected rate or gaining all required competencies for completing training), whereas other outcomes are considered developmental (e.g. Development of specific competences required—additional training time not required; Inadequate progress by the trainee—additional training time required; Incomplete evidence presented—additional training time may be required; Released from training programme with or without specified competences), and there is also the option of releasing the candidate from the training programme.

The main outcome variables were a pass (1) or a failure (0) for the AKT, CSA and RCA examinations and presence of only standard or satisfactory outcomes on the ARCP (1) versus presence of at least one developmental outcome or release from training (0). The pass/fail outcome was chosen to be able to compare and align the results of this study with previous studies and because the main objective is to

pass the assessment to qualify as a GP, the pass score being less relevant.

The datasets also comprised demographic data including gender, ethnicity, country of primary medical qualification and declared disability together with results for each assessment including overall scores, scores for assessment subdomains and outcomes of pass (1) or fail (0). Declared disability was divided into three categories including no declared disability, SpLD and other disabilities. SpLDs were recorded under the umbrella of 'specific learning difficulty e.g., dyslexia, dyspraxia, dyscalculia' so we could not differentiate between the different types of SpLDs, other disabilities included: 'hearing impairment', 'visual impairment', 'physical disabilities' or 'other disabilities'. Ethnicity was divided into three categories of white, ethnic minority and mixed minority backgrounds. Binary variables included country of graduation (UK or non-UK graduates) and gender (male or female).

2.5 | Statistical analysis

Descriptive statistics included percentages and numbers of candidates taking and passing each assessment and the average scores obtained on the licencing tests subdomains. Not all candidates took all assessments, so the dataset did not include records for those assessments, mainly for the RCA due to its later introduction. There were no inclusion/exclusion criteria, but records with missing data were not included in the multivariable analyses that were run separately for each assessment.

Multivariable logistic regression models established differences in the likelihood of passing each of the licencing tests between those with SpLD and other declared disabilities and those without any declared disabilities. The models adjusted for the covariates gender, ethnicity, country of graduation and MSRA scores. The assumptions of no multicollinearity and no outliers were met.

Multivariable linear regression models determined the link between having a reported disability and the average scores obtained on the subdomains of CSA and RCA tests.

3 | RESULTS

3.1 | Descriptive statistics

A total of 2070 of candidates with or without declared SpLDs undertook the AKT, CSA and/or RCA. Sample's demographics are shown in Table 1, and numbers and percentages of candidates with SpLDs or other declared disabilities are reported in Table 2. A higher percentage of candidates from ethnic minority backgrounds (12.4% versus 8.9%) and of candidates graduating outside the United Kingdom (12.9% versus 9.4%) had a declared SpLD compared to White, UK candidates. Performance on the three different clinical licencing tests varied between the three groups as shown in Figure 1. Overall, candidates who reported a SpLD had lower pass rates on all assessments, but

TABLE 1 Demographics including gender, ethnicity, country of graduation and disability for the entire sample

Demographics	Numbers and percentages
Gender	
Female	1264 (62.5%)
Male	760 (37.5%)
Ethnicity	
White	989 (50.1%)
Ethnic minorities	919 (46.6%)
Mixed	65 (3.3%)
Country of graduation	
UK	1518 (73.3%)
Non-UK	552 (26.7%)
Disability	
No disability	1822 (88.0%)
Specific learning difficulties	214 (10.3%)
Other disability	34 (1.7%)

these were statistically significant only for the CSA ($z = 4.59$, $p < 0.001$). Candidates with SpLDs also had more than one AKT attempt (60.75% of them compared with 29.25% for non-SpLD candidates) and more than one CSA or RCA attempt (62.30% of them compared with 28.15% for non-SpLD candidates).

Regarding in-training WPBA performance, 54.67% of candidates with SpLD had only standard ARCP outcomes, but this percentage was significantly lower than for candidates with no declared SpLD, which was 82.6%. Over 76% of candidates with SpLD received only standard outcomes on the first evaluation, but this proportion dropped to under 50% in later evaluations. Analogously, the percentage of SpLD candidates receiving non-standard outcomes increased with every new evaluation, which usually happened once a year. The percentage of candidates receiving non-standard outcomes increased from 24% for the first evaluation to 27% in the second evaluation, to 58% for the third evaluation. This percentage was over 60% for those who received more than four evaluations. The transition between the second and third evaluations seemed to be the most challenging one.

3.2 | Multivariable regression models

Logistic multivariable regression models, which assessed the likelihood of passing each licencing test, for candidates with SpLD and other disabilities compared to candidates with no declared disability revealed that candidates having a SpLD were significantly less likely to pass the CSA (OR 0.43, 95% CI 0.26, 0.71, $p = 0.001$) but not the AKT (OR 0.96, 95% CI 0.44, 2.09, $p = 0.913$) or RCA (OR 0.81, 95% CI 0.35, 1.85, $p = 0.615$). Importantly, they were significantly less likely to have only standard ARCP outcomes (OR 0.28, 95% CI 0.20, 0.40, $p < 0.001$) meaning that they were more likely to encounter

difficulties with WPBA. These results accounted for demographic factors as well as prior attainment which was a significant positive predictor for all outcomes. Detailed results can be seen in supplementary results (Tables S1–S4).

3.3 | Licencing test subdomains

Average scores for both CSA and RCA derive from scores obtained on each of the three different subdomains of Clinical Management Skills, Data Gathering Skills and Interpersonal Skills. Each of these subdomains is an evaluation of a different applied skill, and average scores obtained for the subdomain by candidates with SpLD or other disabilities are shown in Figures 2 and 3.

Having an SpLD was a significant predictor of poorer performance on the CSA Interpersonal Skills (B = -0.70, 95% CI -1.2, -0.19, $p = 0.007$) but did not predict performance on CSA Clinical Management Skills (B = -0.39, 95% CI -0.90, 0.12, $p = 0.138$) or CSA Data Gathering Skills (B = -0.19, 95% CI -0.26, 0.65, $p = 0.411$).

Having an SpLD was a significant predictor of poorer performance on RCA Clinical Management Skills (B = -1.68, 95% CI -3.24, -0.13, $p = 0.034$) but did not predict performance on RCA Data Gathering Skills (B = -0.53, 95% CI -2.04, 0.10, $p = 0.490$) or RCA Interpersonal Skills (B = -0.29, 95% CI -1.73, 1.15, $p = 0.694$).

4 | DISCUSSION

4.1 | Main findings

Overall, candidates who declared an SpLD had lower pass rates on all GP licencing assessments, but these were statistically significant only for the CSA (92.34% versus 79.88%, $z = 4.59$, $p < 0.001$). They also attempted these assessments more times than candidates who never declared an SpLD. Importantly, candidates with SpLDs were more likely to encounter difficulties with ARCP related to in-training workplace assessments, and this trend increased with time.

Candidates declaring an SpLD were significantly less likely to pass the CSA (OR 0.43, 95% CI 0.26, 0.71, $p = 0.001$) but not the AKT (OR 0.96, 95% CI 0.44, 2.09, $p = 0.913$) or RCA (OR 0.81, 95% CI 0.35, 1.85, $p = 0.615$). They were also less likely to have only standard ARCP outcomes (OR 0.28, 95% CI 0.20, 0.40, $p < 0.001$). These results show that having an SpLD can impact both in-training as well as applied knowledge or clinical skills exam performance.

Moreover, candidates with SpLD performed significantly less well on the CSA Interpersonal Skills subdomain (B = -0.70, 95% CI -1.2, -0.19, $p = 0.007$) and the RCA Clinical Management Skills subdomain (B = -1.68, 95% CI -3.24, -0.13, $p = 0.034$). This may indicate that the recorded consultations with real-life patients are associated with better interactions with patients but greater difficulty collecting clinical data.

TABLE 2 Numbers and percentages of candidates with an SpLD and other candidates for each licencing test

Declared disabilities	Licencing tests		
	AKT N (%)	CSA N (%)	RCA N (%)
None	1822 (88.02%)	1357 (87.55%)	373 (83.45%)
SpLD	214 (10.34%)	169 (10.90%)	61 (13.65%)
Other disabilities	34 (1.64%)	24 (1.55%)	13 (2.91%)
Total	2070 (100%)	1550 (100%)	447 (100%)

Abbreviations: AKT, Applied Knowledge Test; CSA, Clinical Skills Assessment; RCA, Recorded Consultation Assessment; SpLD, specific learning difficulty.
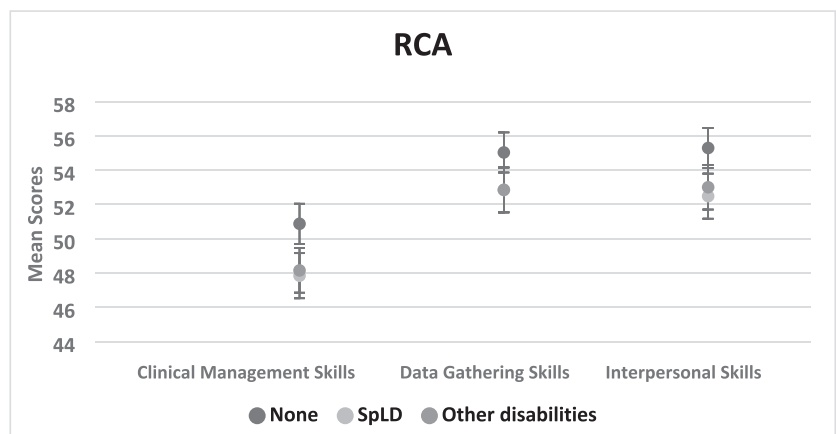
FIGURE 1 Pass rates for each declared disability group
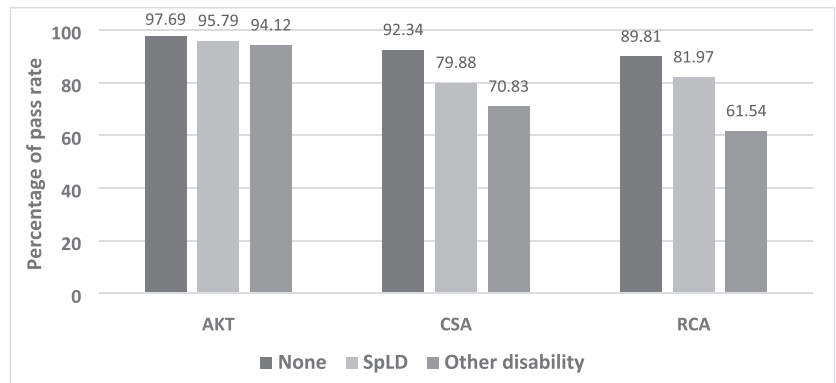
FIGURE 2 Mean scores of Clinical Skills Assessment (CSA) subdomains for each category of declared disability

FIGURE 3 Mean scores of Recorded Consultation Assessment (RCA) subdomains for each category of declared disability

4.2 | Comparison with previous research

This study confirmed findings from previous studies that having a declared SpLD was predictive of poorer performance for the clinical (CSA) but not the knowledge (AKT) test for GP licencing in the United Kingdom.[12,13] Furthermore, the difference in AKT pass rate was small (less than 2%) in this compared with 12% in the previous study.[12] Difficulties with organisational skills, prioritisation of tasks, sensorial sensitivity, self-esteem and concentration for candidates with SpLDs may explain their greater difficulty with the CSA, a test requiring integration of clinical, communication and interpersonal skills, compared with the AKT, a computer-based test of knowledge recall and application where reasonable adjustments of additional time are provided.[5,6] All these skills together with interpersonal skills are important for the CSA, but candidates with SpLD performed significantly less well on the Interpersonal Skills subdomain but not on Clinical Management or Data gathering skills compared with candidates with no declared disability.

Despite the evidence that having a SpLD also affects working memory, writing and reading,[4] candidates with SpLD performed similarly to those without SpLD on the AKT. This indicates that adjustments, such as offering extra time, may be sufficient to compensate for the difficulties encountered. It may also be that the format of the AKT is well-designed, more familiar and suited to their needs. A previous study showed that properly designed multiple-choice tests of medical knowledge were considered appropriate for candidates with SpLDs as no significant differences were found in average scores comparing their performance with that of other candidates.[11]

The reasonable adjustments put in place in the United Kingdom for assessing trainee doctors with learning disabilities vary widely depending on their needs and requirements. Adjustments are offered, based on a specialist assessment, for written examinations, including extra time (the standard is 25% additional time), a separate room for testing and extra breaks.[23] These adjustments are considered beneficial by candidates and can improve performance.[24,25] In the CSA, additional time (10 minutes) is given to read the initial paperwork, which is also offered on paper rather than via an iPad.[12] The RCA also provides reasonable adjustments including extra time, specialist software or help to read or write notes. It is not clear what additional adjustments are needed for clinical examinations to ensure that the assessment of organisational, interpersonal skills and other clinical skills is fair. Further qualitative research is needed to explore which adjustments may be needed for clinical examinations.

There were no statistically significant differences between candidates with or without SpLDs in the RCA, but despite lacking statistical significance, pass rates were 8% lower. When interpreting these results, it needs to be considered that the RCA was a relatively new assessment, and the numbers of candidates who attempted it were much lower at the time of this study. Pass rates were also lower for all candidates, including those with no disabilities, which may have been due to the novelty of the assessment and the lack of time for preparing it.

Another novel and important finding was that candidates with SpLD encountered more difficulties with ARCP outcomes linked to WPBA. This may be due to the impact of SpLDs on organisational and interpersonal skills but could also be related to problems with concentration and comprehension. It may also be that candidates who encounter more difficulties whilst in-training struggle with developing the integrated skills that are tested by the WPBA and are more difficult to acquire than knowledge. Further research is needed to understand the influence of all these factors.

Having an SpLD was a significant predictor of poorer performance on the Clinical Management Skills subdomain in the RCA but not the CSA, suggesting that the real-life setting of the RCA may have negatively impacted performance. Recorded consultations in a real-life setting, consulting real patients rather than actors, may help candidates with SpLD demonstrate interpersonal skills whilst hindering their clinical management skills. Further research is needed to understand how this change of assessment affects performance.

4.3 | Strengths and limitations

The study benefitted from accurate linkage of selection and outcome data for AKT, CSA, RCA and ARCP performance with high rates of completeness for demographic data including sex, ethnicity, place of primary qualification and declared disability. One limitation was that it was not possible to differentiate between the different types of SpLDs because of the way the data were recorded. Thus, we could not explore how different SpLDs affected performance, nor was it possible to establish which specific conditions drove the results. Moreover, there were no data on the reasonable adjustments that were put in place for each candidate, so it was difficult to establish whether the adjustments were sufficient or even put in place because not all candidates with a disability required or requested them. Another limitation was that the number of candidates who completed the RCA was restricted, which implied that the number of candidates with SpLD taking the RCA was small (only 61), which may have affected the significance of the results.

4.4 | Implications for policy, practice and future research

The evidence provided by this study indicates that candidates with SpLDs can encounter difficulties with in-training and licencing tests. Reasonable adjustments for the AKT may be sufficient, although additional support or adjustments may be needed for the applied clinical skills tests (CSA and RCA) and for the ARCP. Trainee doctors with SpLDs may need tailored support for performance in interpersonal and communication skills as well as academic skills. Previous evidence suggests that specialist skills support for students with SpLD is well received, increases likelihood of progression[26] and that the implementation of strategies and support for doctors can help to successfully overcome the difficulties experienced.[27]

Within the social model of disability framework, training courses and assessments need to be adjusted to accommodate the needs of SpLD candidates and to help them overcome the social barriers that they may face. Evidence coming from neuropsychological studies show that people with SpLDs favour cognitive exploration as such they rely more on divergent thinking, tend to look at the bigger picture and exhibit greater non-verbal creativity.[28] The main disadvantage for them in education and academia may be the reliance on reading and writing for learning and the emphasis on details. More practical and explorative ways of learning should be better suited and help them perform better on various assessments, but further research is needed to understand which are the best academic adjustments that can be put in place for them.

Within the human rights model of disability, our study recognises that having a learning disability is part of human diversity and that people with disabilities must have the same rights as everyone else.[29] We consider this model as complementary to the social model of disability, and we believe that our findings should support both the acceptance of human diversity and the guarantee of equal rights as well as future adjustments tailored to their needs that will promote not only equality but also equity. We also recognise other models of disability such as the medical model that promotes the need for medical treatment to fix the individual, biological cause or the affirmation model that promotes positive social identities and dismisses the idea of incapacity of disabled people.[30] Nonetheless, we believe these models can be applied in other contexts and that our findings feed mainly into the social model of disability. As such, we encourage that all necessary adjustments are made to accommodate candidates' needs so they can perform at their maximum during GP training and at assessments, but we also acknowledge that these adjustments cannot guarantee achieving the licence to practice as a GP.

In conclusion, candidates with SpLDs encounter difficulties in multiple domains of the licencing tests and during training. Further research is needed to understand and seek solutions for these difficulties. Provision of reasonable adjustments may be needed for applied clinical skills tests, and more support may be required during training.

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CONFLICT OF INTEREST

ETHICS STATEMENT

Independent ethical review was sought, and approval was gained from the University of Lincoln Human Ethics Committee (reference 2020_3645).

AUTHOR CONTRIBUTIONS

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SUPPORTING INFORMATION

Additional supporting information can be found online in the Supporting Information section at the end of this article.