Short-term Psycho-Education for Carers To Reduce Over Medication of people with intellectual disabilities: Programme Development Project (SPECTROM PDP)

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Abstract

Background

Overmedication of people with intellectual disabilities, particularly the off-licence use of psychotropic medicines for behaviours that challenge (BtC), is a significant public health concern. To address this issue, NHS England in the UK launched an initiative called 'STopping Over-Medication of People with learning disabilities, autism or both (STOMP)'. However, limited resources are available to implement STOMP. Staff who support adults with intellectual disabilities play a pivotal role in the prescribing process. Thus, properly training staff should reduce the number of staff requests for medicines for BtC. Previous field tests on SPECTROM (N=60) showed a positive impact, but none of these were RCTs. Thus, there is a need for a feasibility RCT before a large-scale RCT.

Aims

The primary aim of the study was to evaluate the feasibility of conducting an appropriately powered cluster randomised controlled trial (RCT) involving SPECTROM.

Methods

Clusters (community homes and supported living accommodations) were randomised to SPECTROM or the control arm in a 2:1 ratio. Only participants in the SPECTROM arm received the SPECTROM training. Both groups received the standard training from their organisations. SPECTROM is a hybrid/blended learning program comprising 14 modules and includes internal and external resources. Two of these 14 modules were used for face-to-face training, through which the other modules and resources were introduced. These two core modules are Medicine/STOMP and Alternatives to medication (ATM). Anonymised psychotropic medicine prescriptions were collected pre and post-training at six months to detect any signal of SPECTROM's effect. Changes in staff attitude toward BtC and psychotropic knowledge were assessed by analysing pre- and post-training data at 4 weeks and 6 months using the Management of Aggression and Violence Attitudes Scale-Revised-Intellectual Disabilities (MAVAS-R-ID) and the Psychotropic Knowledge Questionnaire-Revised (PKQ-R). A mixed-methods process evaluation involving a questionnaire and two focus groups, one with service managers (n = 7) and one with support staff (n = 7), was conducted to assess the barriers and facilitators of SPECTROM training.

Results

26 homes were randomised to the SPECTROM and 13 in the control arm. SPECTROM training was delivered to 140 staff. The training sessions were delivered online via MS Teams by the research team, each lasting 4 hours. There was a greater total antipsychotic and antidepressant dose reduction at the six-month follow-up in the SPECTROM (7.5% and 2.4%, respectively) compared to the control arm (2.7% and 1.2%, respectively). There was a significant improvement in the overall PKQ-R scores ($p<0.001$) and MAVAS-R-ID scores at four weeks ($p<0.01$). The change-over-time analysis revealed a significant difference in mean scores across three different time points for both PKQ-R and MAVAS-R-ID scores ($p < 0.001$). The focus groups identified the following themes: a) improved knowledge, b) improved self-confidence, c) facilitated self-reflection, d) empowered staff to advocate for people they support, e) better attitude on medicine use for BtC, f) improved the support they provide, and (g) challenges of SPECTROM training.

Conclusion

The findings of this feasibility study support progression to a larger and more definitive RCT.

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Plain English summary

Background
More people with learning disabilities (LD) and autism receive mental health medicines than others, often for behaviours that challenge (BtC). These medicines are licensed for mental illnesses like schizophrenia, not for BtC without a psychiatric illness. Support staff play an important role in this process. So, staff training should improve BtC management. We worked with various stakeholders to develop SPECTROM (Short-term psychoeducation for caregivers to help reduce the overmedication of people with intellectual disabilities) training for staff.

Aim
The main aim was to assess whether it's possible to deliver the SPECTROM training within organisations and show whether a large-scale trial of SPECTROM is possible.

Methods
Six organisations in England and Wales that support adults with LD in community settings participated. From these six organisations, support staff and home managers from 26 community homes received the SPECTROM training and staff from 13 community homes did not. All community homes received their usual training offered by the organisations. SPECTROM was delivered to 140 staff and service managers.

Results
More adults with LD had their medicine reduced or stopped by the prescriber in the group that received SPECTROM training compared to the group that didn’t receive the training. Staff found the training useful, which increased staff knowledge, improved their attitude towards BtC and gave them the confidence to speak to prescribers.

Dissemination, outputs and impacts
A dissemination workshop was held, attended by 33 staff members and one family member. The results of the study presented showed that SPECTROM helped to improve staff knowledge and attitude toward BtC.

Patient and Public Involvement
The Tizard Centre Learning Disability Advisory Group were involved and provided feedback throughout the project.

Conclusion
The results show that SPECTROM is beneficial to staff, and a larger trial of SPECTROM is possible. The training also helped reduce the use of mental health medications.

Summary of Research Findings

Introduction

Overmedication of people with intellectual disabilities, particularly the off-licence use of psychotropic medicines for behaviours that challenge, such as verbal aggression, physical aggression to others or property, or self-injury in the absence of a psychiatric diagnosis, is a significant public health concern (Mehta & Glover, 2019). To address this issue, NHS England (NHSE) in the UK initiated a long-term plan, 'STopping Over-Medication of People with Learning Disabilities, Autism, or Both (STOMP)', nine years ago (Branford et al., 2018). Despite this, the rate of psychotropic use has not changed much in the last three decades (Deb & Fraser, 1994). Around half (35-63%) of adults with intellectual disabilities continue to receive psychotropic medicines (Song et al., 2023; Deb, 2024; Deb et al., 2025a), primarily antipsychotics (24-32%), whereas the prevalence of psychosis is 2-4% in adults with intellectual disabilities for which the antipsychotics are primarily licenced (Deb et al., 2022).

About 71-81% of antipsychotic prescriptions are off-licence, as no severe mental illness is recorded. Instead, in over 50% of cases, they are prescribed for behaviours that challenge (Sheehan et al., 2015; de Kuijper et al., 2010; Deb et al., 2025a, b). Long-term antipsychotic medicine use increases the risk of serious adverse effects such as sedation, constipation, obesity, diabetes, and metabolic syndrome, which can impair a person's quality of life (QoL) and reduce life expectancy (Ramerman et al., 2018; Sun et al., 2023). In one study, 84.4% of 99 adults with intellectual disabilities who displayed challenging behaviour had at least one psychotropic-related adverse effect, and 45.6% had over three (de Kuijper et al., 2013). The same study also found extrapyramidal symptoms in 53%, overweight or obesity in 46%, and metabolic syndrome in 11% of participants among those treated with antipsychotics. Hyperprolactinaemia and one or more elevated bone turnover markers were present in 17% and 25% of cases, respectively (de Kuijper et al., 2013).

As support staff ask for medicine to control behaviours that challenge in the first place and are apprehensive about withdrawing inappropriate psychotropic medicine, training them to build their knowledge of psychotropics, skilling them up to address behaviours that challenge without using the medicine, and giving them the confidence to consider psychotropic withdrawal when appropriate could be a helpful strategy towards the reduction of overmedication and implementation of the STOMP objectives. To address these issues, we have recently co-produced in the UK an NIHR-funded SPECTROM (Short-term Psycho-Education for Carers to Help Reduce the OverMedication of People with Intellectual Disability) (https://spectrom.wixsite.com/project) training programme for support staff to help reduce the overuse of psychotropic medicines among adults with intellectual disabilities (Deb et al., 2020a).

Training programs for staff and caregivers are effective in many neurodevelopmental disorders, such as autism (Deb et al., 2020b) and ADHD (Montoya et al., 2011). Two literature reviews, including ours (Deb & Roberts, 2005), found several small studies of staff training improving the management of behaviours that challenge in people with intellectual disabilities (Rose & Gallivan, 2019). However, unlike SPECTROM, none of these training programmes were specifically designed to reduce the overuse of psychotropic medicine in adults with intellectual disabilities.

The Banerjee report (2009) recommended training care staff and prescribers in non-pharmacological approaches to behaviour management in patients with dementia (Pan et al., 2014). Specific training for care staff achieved 40-50% antipsychotic dose reduction in patients with dementia (Fossey et al., 2006). It should, therefore, be possible to learn from this body of work and hopefully achieve a similar rate of antipsychotic reduction among adults with intellectual disabilities with appropriate intervention, such as the SPECTROM training.

Two pre- and post-training field tests of SPECTROM involving 60 trainees in the UK and Australia found significant post-training improvement in psychotropic knowledge and staff attitude in the medication management domain of attitude to manage behaviours that challenge (Deb et al., 2021; Wilson et al. 2023; Barratt et al., 2023). However, none of these were RCTs. Therefore, we conducted a feasibility RCT involving SPECTROM training. The current study aims to provide information on the feasibility of conducting a future large-scale clinical and cost-effectiveness randomized controlled trial (RCT) involving SPECTROM.

Method

The current study is a scoping exercise and a multi-centre feasibility cluster randomised controlled trial (RCT).

The protocol paper (Limbu et al., 2025a) details the methodology. We followed the Consolidated Standards of Reporting Trials (CONSORT) extension to randomised pilot and feasibility trials guidelines (Eldridge et al., 2016) (see Supplementary materials). This study was approved by the West Midlands-Coventry & Warwickshire Research Ethics Committee, UK (REC reference: 23/WM/0211).

The study was conducted using the following five work packages (WPs).

WP 1 (months: 1-4): A stakeholder scoping workshop to assess the service provider organisation's willingness to participate in the RCT.

WP 2 (months: 5-6): A feasibility cluster RCT. Each community home and supported living accommodations for adults with intellectual disabilities where at least one person received psychotropic medicine in different parts of England and Wales formed a cluster.

WP 3 (months: 7-12): Outcome data collection over six months. This involved primary outcome data in the form of anonymised psychotropic medicine prescriptions for adult residents in all the randomised community accommodations. The secondary outcomes included the assessment of the trainees' knowledge of psychotropic medicines using the PKQ-R (Psychotropic Knowledge Questionnaire-Revised) (Wilson et al., 2023) and their attitude towards the behaviours that challenge using MAVAS-R-ID (Management of Aggression and Violence Attitude Scale-Revised-Intellectual Disabilities) (Deb et al., 2021) at baseline pre-training, and four weeks and six months post-training only in the intervention arm. The emphasis was on the four-week follow-up data, but we also included six-month follow-up data to assess any attrition over time and to evaluate any early score gains.

WP 4 (months: 13-15): A mixed methods process evaluation to assess SPECTROM intervention fidelity, barriers and promoters of future implementation, positive and negative aspects of participating in training, acceptability, practicality, and relevance of the intervention to trainee's day-to-day practice. This included focus groups with a purposive sample of SPECTROM training participants and an online questionnaire survey using the TFQ (Trainee Feedback Questionnaire) (Deb et al., 2021) (see online Supplementary material), which was sent to all trainees. We also sent an online questionnaire (see online Supplementary materials) to the control arm participants to assess contamination.

WP 5 (months: 16-18): Dissemination workshop to disseminate the project findings and plan for a future large-scale RCT.

The following feasibility outcomes were assessed in the study.

- Acceptability of the SPECTROM training intervention to the users (trainees).

- Adherence to the intervention (SPECTROM training).
- Ways to ensure representative recruitment and engagement and the organisation's methods of identifying potential participants.
- The number of available eligible support staff and adults with ID who can take part in the future definitive RCT.
- The willingness of the staff to be randomised.
- The willingness of the service provider organisations to randomise their staff for SPECTROM training.
- Collect psychotropic prescription data from each house remotely and anonymously.
- Collect data for a sample size calculation.
- The choice of an adequate comparator.
- Follow-up rates, response rates to questionnaires, adherence/compliance rate, and intra-cluster correlation (ICC).
- Contamination between the trial arms.
- Time needed to collect, clean and analyse data.
- Practicality of delivering the intervention (SPECTROM training) in the proposed setting (community homes and supported living accommodations for adults with intellectual disabilities).
- Variation in the intervention delivery (SPECTROM training) in each setting.
- Patient and Public Involvement (PPI).

Recruitment and participants

Support staff, service managers, and trainers within social service provider organisations that support adults with intellectual disabilities in community settings were eligible for participation. A senior manager in each organisation approached the trainers and service managers within their respective organisations, who subsequently approached the staff team they supervised for recruitment and randomisation. Each service manager was asked to choose a staff team from only one community home/supported living accommodation where at least one adult with intellectual disabilities received psychotropic medicine.

Intervention

The intervention in the current study was the SPECTROM training programme, a hybrid/blended learning platform featuring numerous online resources complemented by face-to-face training. The training was delivered to service managers, their staff teams, and the organisation's trainers. SPECTROM comprises 14 modules, along with internal and external resources. Two of these 14 modules were used for face-to-face training, through which the other modules and resources were introduced. These two core modules are (a) Medicine/STOMP and (b) Alternatives to medication (ATM). These two core modules were delivered online in two four-hour sessions. All trainees were required to attend both core module sessions. They were also encouraged to explore the SPECTROM online resources and use SPECTROM tools in their day-to-day practice.

Data analysis

As the study was not powered, we did not conduct any hypothesis testing using the primary outcome data on the psychotropic prescription rate and dose reduction. Instead, we used descriptive analysis to calculate the proportion of decrease in total dose and to identify where any dose reduction was achieved in both the training and non-training groups at six months post-training. To calculate the total dose reduction at the six-month follow-up, we converted the dose of antipsychotic medicines to a risperidone equivalent daily dose where possible. Similarly, we converted the antidepressant medicine

dose to citalopram equivalent daily dose to calculate the total dose reduction at follow-up. These data were used to calculate the sample size for a future large-scale RCT.

We analysed the pre- and post-training scores of the PKQ-R at four weeks and six months and the MAVAS-R-ID at four weeks post-training using the Wilcoxon signed-rank paired test, as the data were not normally distributed. MAVAS-R-ID data were normally distributed at six months and were analysed using paired samples t-test. To mitigate Type II errors, we applied a Bonferroni correction to the item-level analysis of PKQ-R scores ($p = 0.0025$) and the domain-level analysis for MAVAS-R-ID ($p = 0.01$). Changes over time were analysed from participants who had complete data at all three time points (baseline at pre-training, four weeks and six months post-training) on PKQ-R and MAVAS-R-ID scores. Friedman's test with a post hoc analysis using the Wilcoxon signed-rank test and a Bonferroni adjustment of 0.017 was used to analyse changes over time for the PKQ-R score. Repeated ANOVA was used to analyse the MAVAS-R-ID score over time.

We analysed TFQ data using descriptive statistics to determine the number and percentage of responses for each item in the scale. We analysed focus group data using a framework analysis method (Gale et al., 2013). We used NVivo 12 Plus software (Lumivero, 2017) to assist with data coding. Two raters (BL and CV) independently coded the data to enhance the consistency of the findings. A topic guide facilitated the focus groups with support staff and service managers (see online Supplementary material). All focus groups and interviews were conducted online, recorded digitally and transcribed verbatim.

Planned procedures and changes to procedures

We planned to collect PKQ-R and MAVAS-R-ID data at baseline, as well as at four weeks, three months, and six months post-training. However, we were unable to collect data at the three-month follow-up due to staff workload and capacity constraints.

We also planned to assess SPECTROM resource use through a monthly log. However, due to staff time constraints, this was not possible. Instead, we collected SPECTROM resource utilisation data through TFQ. The TFQ was sent to all participants in SPECTROM training six months after training. Information on SPECTROM resource utilisation was also collected during the participant focus groups.

We planned a focus group with service managers in the control arm who did not receive SPECTROM training to assess contamination, specifically to determine whether participants in the control group received any information on SPECTROM or accessed its resources. However, service managers declined to participate in this focus group due to a lack of capacity. Therefore, we gathered contamination-related information using a purpose-deigned questionnaire, asking the participants if they had access to or knowledge of any SPECTROM training materials and resources (see online Supplementary material). This online questionnaire was sent to all in the control group.

We planned to conduct semi-structured interviews with adults with intellectual disabilities who resided in community homes where staff received SPECTROM training, as well as their families, to understand their experiences and capture the impact of the training on staff's practice, particularly in interactions with adults with intellectual disabilities and their families. However, although adults with intellectual disabilities successfully contributed to the research through the Intellectual Disabilities Advisory Group (IDAG), service managers were unable to identify adults with intellectual disabilities and their families to participate in the interviews.

Patient and Public Involvement

The project's development involved adults with intellectual disabilities, their family carers, and support staff. One family carer and one training Director of a provider organisation are also co-investigators. We discussed the SPECTROM training and medicine use for BtC with a group of five adults with intellectual disabilities, who unanimously supported the idea and felt that staff should always involve them in any decisions about their care, including medicine use. Some people expressed concern about the adverse effects of the medicine they suffered from. They felt that the staff should explain their medicine to them in simple terms so that they can understand why they are taking it and also be aware of its side effects. They asked us to prepare material in an accessible format, which we have now incorporated into the study. Adults with intellectual disabilities were involved throughout the project, and feedback was gathered via the Tizard Centre Learning Disability Advisory Group (LDAG). This LDAG was comprised of 10-12 adults with intellectual disabilities and met every three to four months. This is a well-established group that provides regular feedback on research projects. This group has experience of receiving medicines for BtC, and some have successfully discontinued these medicines recently. The group has advised on (a) an accessible version of the participant information sheet (PIS) and the consent form (CF) (19.06.23) and (b) 1st accessible newsletter posted on the SPECTROM PDP website (https://spectrom.wixsite.com/spectrompdp) (16.02.24). All the recommendations were accepted and acted upon by the research team.

Results

Progression criterion

The progression criterion was to recruit from more than 60% of the service provider organisations approached. This criterion was met as we recruited from six of the eight service provider organisations we approached (75%).

Acceptability of SPECTROM training.

This was measured using TFQ and focus group data. The qualitative analysis of focus group data with a purposive sample of service managers and support staff trained in SPECTROM revealed that the trainees found the training to be acceptable, applicable, practical, and relevant to their practice. The training also helped to improve staff's (a) self-reflection, (b) confidence in dealing with behaviours that challenge without using medicines, (c) knowledge of psychotropic medicines and their side effects, (d) empowered them to advocate on behalf of the adults with intellectual disabilities they support, and (e) improved the support they provided for people with intellectual disabilities (Limbu et al., 2025b). Of the 89 participants who completed TFQ, 93% found the training helpful, 94% reported a better understanding of psychotropic medicine use, 93% reported a better understanding of behaviours that challenge, 90% reported improvement in their day-to-day practice, and 95% improved their engagement with people they support and their families as a result of the training (see Table 1).

Table 1: Trainee feedback questionnaire (N=89)

Question	Yes, N (%)	No, N (%)
Q1. I have found the training and resources useful to my everyday practice.	83 (93%)	6 (7%)
Q2. I often use/check the information available in SPECTROM while discussing the care planning of people I support.	73 (82%)	16 (18%)
Q3. I now better understand psychotropic medications and their use in people with intellectual disabilities.	84 (94%)	5 (6%)
Q4. The training has helped me make more informed decisions about when and when not to use psychotropic medication.	83 (93%)	6 (7%)
Q5. I now understand better the side effects of psychotropic medications.	85 (96%)	4 (4%)
Q6. I now better understand why some people show behaviours of concern (behaviours that challenge/challenging behaviour).	83 (93%)	6 (7%)
Q7. I now understand better the medication review and withdrawal process.	84 (94%)	5 (6%)
Q8. I have visited the SPECTROM website.	66 (74%)	23 (26%)
Q8a. How often did you visit the SPECTROM website and what did you explore?	Ranged from once to very often, and mainly for its resources, and medication information.	
Q9. Our team has used the STOMP action planning review checklist (STAR)/Medication review checklist in SPECTROM.	61 (71%)	25 (29%)
Q9a. If you used SATR/Medication review checklist, how many clients have you completed this for?	Ranged from none (staff used as practice) to seven service users	
Q9b. Did the STAR review lead to a medical medication review?	34 (63%)	20 (37%)
Q9c. Did the medical review lead to a reduction in psychotropic medicine?	35 (65%)	19 (35%)
Q10. Our team has used CATS (trigger checklist).	41 (53%)	38 (48%)
Q10a. If you have used CATS (trigger checklist), how many clients have you completed a CATS for?	Ranged from none to seven service users.	

Q10b. Did CATS help with completing ABC charts?	37 (95%)	2 (5%)
Q11. Our team has used MOAS.	32 (43%)	43 (57%)
Q11a. How many clients have you completed the MOAS for?	Ranged from none to seven service users.	
Q12. Our team has used CC-QoLS (Quality of Life Scale).	44 (59%)	30 (41%)
Q12a. For how many clients have you administered the CC-QoLS (Quality of Life Scale)?	Ranged from none to seven service users.	
Q13. Our team has used the accessible psychotropic medication leaflets.	44 (59%)	30 (41%)
Q13a. If you have used the accessible psychotropic medication leaflets, for how many clients have you used this and how often?	Ranged from none to six service users.	
Q13b. Did it help with the shared decision-making involving the person you support and their families?	35 (81%)	8 (19%)
Q14. I feel that my practice has improved.	66 (90%)	7 (10%)
Q15. My attitude to behaviours of concern has changed for the better.	70 (96%)	3 (4%)
Q16. I now engage with people I support more effectively.	69 (95%)	4 (5%)
Q17. I now communicate with people I support more effectively.	69 (95%)	4 (5%)
Q18. I now engage with the families of people I support more effectively.	67 (92%)	6 (8%)
Q19. I now engage more effectively with multidisciplinary team members, such as doctors, psychiatrists, nurses, etc.	62 (85%)	11 (15%)

Adherence to SPECTROM training and resources.

This was measured using TFQ and focus group data. The fidelity rating of two raters' video recordings of training sessions delivered by a trainer (BL + SD) using a structured questionnaire showed good adherence to the training protocol. Whereas 140 trainees attended the required number of training sessions, four-hour online sessions on core modules 1 and 2, five additional trainees completed only one of the two core modules. This provides an adherence figure of 97%. A high proportion of trainees used SPECTROM resources and tools after the training. For example, according to TFQ data (see Table 1), 71% of trainees utilized the STAR review resource, which led to a formal medicine review by doctors in 63% of these cases, resulting in a reduction in inappropriate medicine use in 65% of these cases. Similarly, 53% of trainees used the Comprehensive Assessment of Triggers for Behaviours of Concern Scale (CATS) (Limbu et al., 2021). Additionally, 43% of trainees used the MOAS (Modified Overt Aggression Scale) (Ratey & Gutheil, 1991), 59% used the CC-QoLS (Caregiver's Concerns-Quality of Life Scale) (Unwin & Deb, 2014), and 59% utilised accessible psychotropic medicine leaflets.

Recruitment of a representative sample.

To ensure a representative sample, we recruited through both large and small service provider organisations from a wide geographic area in England and Wales, including urban, rural, affluent, and deprived regions.

Willingness of staff to be randomised.

Our target was to randomise support staff and service managers from at least eight clusters (community homes and supported living accommodations for adults with intellectual disabilities where at least one resident is prescribed psychotropic medicine). We eventually randomised staff and service managers from 39 community homes and supported living accommodations instead of a minimum of eight. Assuming an average of ten support staff in each community home (cluster), our target was to train at least 80 support staff and service managers. We eventually trained 140 support staff and service managers. The enthusiasm for participating in the project and being randomised varied from service manager to service manager and their staff teams. The demographic characteristics of staff that were

randomised to the SPECTROM arm are presented in Table 2. The questions were optional, and some participants declined to answer them.

Table 2: Demographic data of managers and support staff randomised to SPECTROM arm

Service managers			n response
Gender	Male	4	16
	Female	12	
Age	Mean	40	16
	Range	27-68 years old	
Highest Qualification	Graduate degree or above	8	15
	National Vocational Qualification	7	
Number of years of experience	Mean	7 years	16
	Range	2.5 – 31 years	
Level of staff	Service managers	15	16
	PBS practitioner	1	
Support staff			**n response**
Gender	Male	56	123
	Female	67	
Age	Mean	39 years old	117
	Range	18- 72 years old	
Highest Qualification	Graduate degree or above	52	113
	National Vocational Qualification	47	
	School leavers	13	
	Studying	1	
Number of years of experience	Mean	6 years	113
	Range	0 months to 40 years	
Level of staff	Support Staff	100	124
	Deputy	9	
	Senior	15	

Willingness of organisations to randomise their staff

Our target was to recruit from at least four social service provider organisations. We eventually recruited six. The enthusiasm of service provider organisations for recruiting and randomising their staff for the project varied.

Randomisation

Initially, we considered randomising the clusters in a 1:1 ratio between the SPECTROM training and the control group. However, we eventually decided to randomise using a 2:1 ratio so that for each community home in the control arm, we recruited two in the SPECTROM training group to increase the number of participants in the training. Participants were randomly assigned (2:1) remotely and blindly by the study statistician to receive SPECTROM training along with the organisation's standard training or the organisation's standard training alone but not the SPECTROM training using a random number generator. However, gathering written consent from all staff in each community home in the control arm was not always possible.

Outcome and its characteristics

The primary outcome measure used in this study is the change in psychotropic medicine dose, particularly antipsychotics, six months post-SPECTROM training. The baseline and six-month follow-up psychotropic prescription data were successfully collected remotely and anonymously. Service managers supplied the information to the researcher anonymously.

Psychotropic prescription data were available at baseline and six-month follow-ups for 43 antipsychotics in the SPECTROM training and 31 in the non-training group, for whom a risperidone equivalent daily dose could be calculated for all antipsychotics. There was a 7.5% reduction in the total group dose in the SPECTROM training group at follow-up compared with a 2.7% dose reduction in the non-training group. At follow-up, antipsychotic dose reduction was observed in eight of 43 (18.6%) prescriptions in the SPECTROM training group compared with two of 31 (6.5%) in the non-training group (Deb et al., 2025b).

Data were available for ten antidepressant prescriptions in the SPECTROM training and 22 in the non-training group at baseline and six-month follow-up for whom a citalopram equivalent daily dose could be calculated for all antidepressants. In the SPECTROM training group, the total daily citalopram equivalent dose of antidepressants was reduced by 2.4% at follow-up compared with a 1.2% dose reduction in the non-training group. At follow-up, there was a reduction in antidepressant dose in one of ten (10%) prescriptions in the SPECTROM training group compared with 1 of 22 (4.5%) in the non-training group (Deb et al., 2025b).

The secondary outcome measure, PKQ-R, was completed by 126 trainees at baseline and within four weeks of SPECTROM training. There was less than 2% missing data in the four weeks and 1% in the six months PKQ-R and MAVAS-R-ID. All available data were analysed without exclusion. The PKQ-R total score showed statistically significant post-training improvements ($p < 0.001$) at four weeks post-training, with a large effect size ($r = 0.84$) (Kerby, 2014). There was a post-training improvement at four weeks in PKQ-R scores for 42 of the 43 questions (97.7%), with 22 statistically significant differences ($p < 0.001$) (Limbu et al., 2025c; Figure 1). At six months, the total PKQ-R scores showed a statistically significant improvement compared with the baseline pre-training score ($p<0.001$) and no statistically significant drop in score compared to the four-week follow-up data. This indicates that the gains in knowledge at four weeks post-training were maintained at six months. The MAVAS-R-ID was completed at baseline and within four weeks of training by 125 trainees. The MAVAS-R-ID total score showed statistically significant post-training improvements ($p < 0.01$) at four weeks post-training, with a moderate effect size ($r = 0.35$) (Kerby, 2014). Individual domain score analysis showed a statistically significant improvement in one of the five domains related to attitude regarding the use of medicine for behaviours that challenge (Limbu et al., 2025c; Figure 2). The change-over-time analysis revealed a significant difference in mean scores across three different time points ($p < 0.001$).

Figure 1: Pre- and post-training PKQ-R correct answer scores

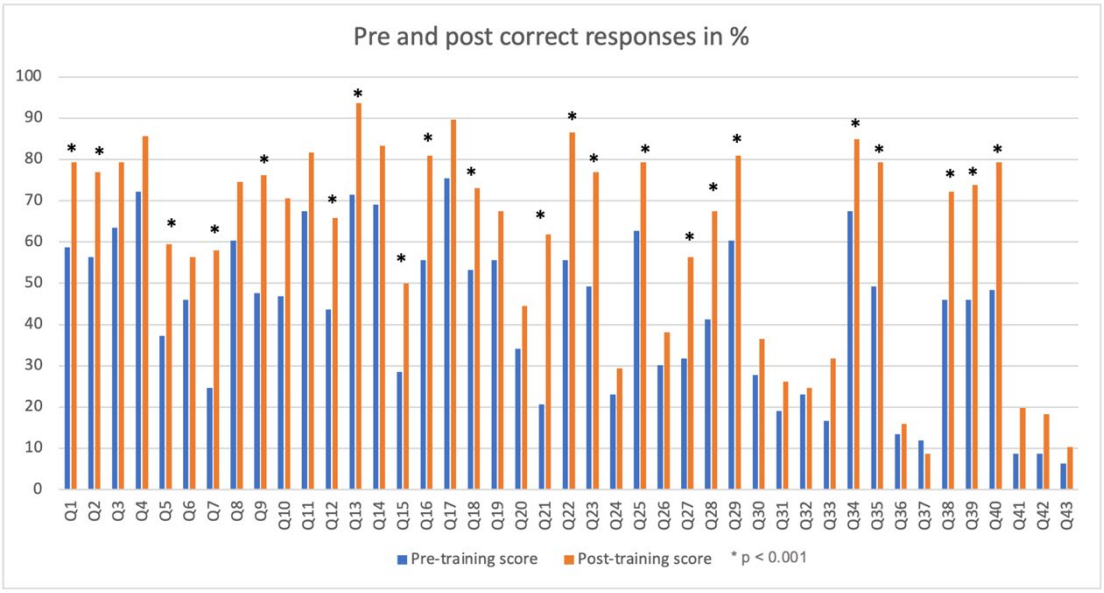
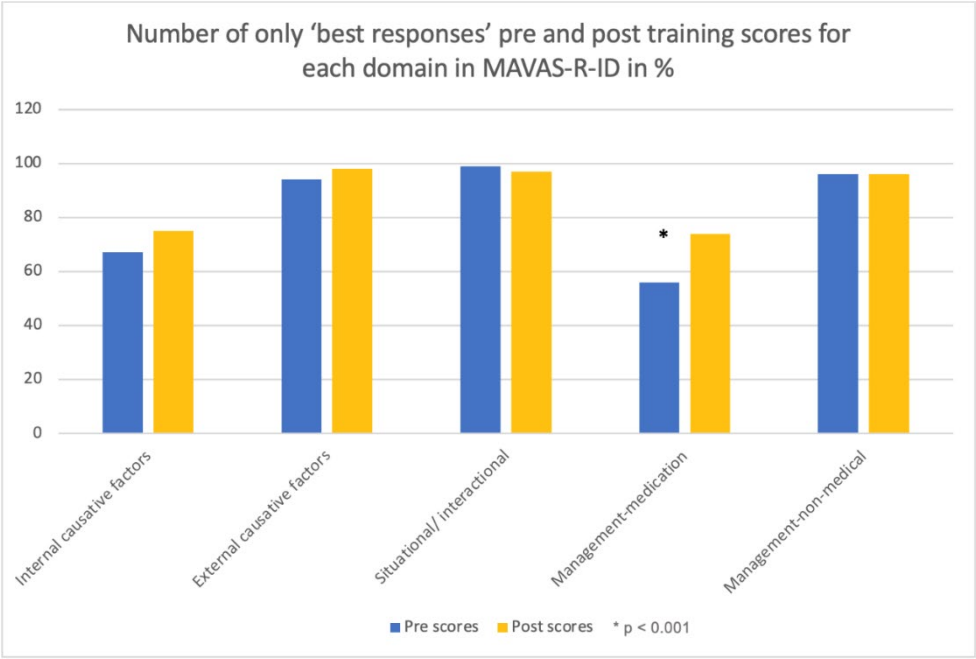


Figure 2: MAVAS-R-ID pre- and post-training number of only 'best responses' in % for each domain.



Choice of adequate comparator.

This was achieved by ensuring that both randomised groups received their organisation's standard training as usual. Thus, the comparison was between SPECTROM training and the organisation's regular training versus the organisation's usual training without additional SPECTROM training. We also ensured that there was no contamination in the control group by sending them an online questionnaire, which confirmed that no staff in the control group had accessed or were aware of the SPECTROM training programme and its online resources.

Follow-up rates, response to questionnaires, adherence and compliance

Anonymised collection of prescription data remotely was possible and there was no attrition in the anonymized psychotropic prescription data collection at the six-month follow-up, which was the primary outcome of the project. Of those who participated in the SPECTROM training, 90% completed PKQ-R and MAVAS-R-ID questionnaires at the four-week follow-up and 33.6% at the six-month follow-up. Of those who participated in the SPECTROM training, 63.6% completed TFQ at the six-month follow-up. However, the researcher required much tracking of the participants to collect questionnaire data. The main reason was that the researcher was unable to travel to all community homes as they were scattered throughout England and Wales. Therefore, she collected data online, which required considerable effort. Also, in many cases, the researcher did not have access to the emails of the support staff who received training. So, for many of these participants, the researcher had to rely on their service managers to forward the questionnaires to their staff teams for completion.

Calculation of sample size and ICC

The sample size for a future large-scale RCT was calculated using data derived from the current study. This was based on the rate of antipsychotic medicine dose reductions in the SPECTROM compared to the control arm. In the SPECTROM arm, antipsychotic dose reduction was observed in 18.6% of cases at the six-month follow-up, compared to 6.5% in the control group. The intra-cluster correlation (ICC) was 0.124. Based on these proportions at 90% power and 5% significance in two groups, we would require a total sample of 152 clusters (group homes and supported living accommodations) involving 380 adults with intellectual disabilities for a future large-scale RCT.

Time to collect, clean and analyse data.

The primary outcome of the current study was the collection of anonymized prescription data remotely. These data could be collected on time, albeit requiring the researcher to chase the service managers several times. The secondary outcome measure data collection, conducted at six months using the PKQ-R and MAVAS-R-ID, was slightly delayed and required considerable follow-up from the researcher. We envisage that, as we plan to involve trainers from participating organisations to train their own staff teams in the future RCT, they will be able to help collect data on time, primarily using Qualtrics, which staff can access through their mobile phones. This was not possible in the current study as the researcher did not have access to the email addresses of many staff members. Therefore, the researcher relied on the service managers to distribute the questionnaires to their staff teams and collect the data on time. However, once the primary and secondary outcome data were collected, they were cleaned and analysed within the allocated time without any delay.

The practicality of delivering the SPECTROM training within community homes.

As we recruited participants from a wide geographic area in the UK, we decided to deliver the training online to save staff time and expenses. In the future, the plan is for the organisation’s trainers to roll out the training to their staff teams. This will provide them with flexibility. They could deliver the session online or in person by integrating SPECTROM training within the organisation's existing training programme.

Variation in delivery in each setting.

In the current study, we planned to train service managers and trainers to roll out the training to their staff teams. However, despite enthusiasm from some service managers, this was not possible. However, when we trained a trainer in one organisation, she successfully delivered the training to the staff team.

Therefore, we decided that, in the future, for large-scale RCT, the research team should train the trainers to roll out the training to their staff teams. In the current study, we delivered training in two four-hour sessions. However, many trainees preferred to have the training delivered over a shorter time span in several sessions. Although this could not be achieved in the current study due to time constraints, it could be implemented in a future RCT, given the involvement of the organisation's own trainers, who would have more flexibility in terms of time and the method of SPECTROM training delivery.

Dissemination workshop

The dissemination workshop was held on Tuesday, April 1, and lasted two hours. The research team provided information on the project details, the delivery of the intervention, findings, and implications and discussed a future large-scale RCT involving SPECTROM training. The workshop was attended by 33 people (including two support staff, four trainers, two learning and development managers, three service managers, three area managers, four head of quality assurance and compliance, five operational directors, one head of PBS, one speech and language therapist, seven external invitees, one clinical nurse advisor), and one family member.

Discussion

The current feasibility study successfully met all feasibility goals, and the findings indicate that a large-scale randomised controlled trial (RCT) is feasible. The study showed (a) that adequate recruitment was possible and (b) that the attrition rate was low for collecting the primary outcome data on antipsychotic dose at follow-up. Although the attrition rate for the secondary outcome measures of PKQ-R and MAVAS-R-ID data was acceptable at the four-week follow-up, which was the study's main aim, this was high at the six-month follow-up. However, in future RCTs, we envisage this rate to be much lower due to the direct involvement of the organiser's own trainers in rolling out the training and also helping to collect data. We have also factored in a reasonable attrition rate in our sample size calculation to mitigate against potential attrition. It was possible to involve adults with intellectual disabilities and their families in the research. However, it was not possible to recruit them for interviews.

Data were collected, cleaned and analysed on time. Additionally, a sufficient number of organisations were willing to recruit and randomise participants, although enthusiasm to participate varied from organisation to organisation. For example, larger organisations with more resources and a greater commitment to implementing the STOMP programme were more enthusiastic than smaller organisations with fewer resources, which were not fully committed to implementing the STOMP initiative. Similarly, there was variable enthusiasm among the service managers and staff teams to participate and be randomised.

An adequate number of support staff and service managers were willing to participate in the study and were randomised. However, despite the service manager's consent, difficulties were encountered in obtaining consent from all staff in the control group. Again, we envisage this to improve when their own trainers approach service managers and staff for recruitment and consent.

The SPECTROM training demonstrated a positive impact on both primary (psychotropic medicine dose reduction) and secondary outcome measures (PKQ-R and MAVAS-R-ID, which assess gains in trainees' knowledge of psychotropic medicines and improved attitudes towards behaviours that challenge). The early improvement in the PKQ-R score at four weeks was maintained at six months. The adherence rate of 97% of those who participated in both required training sessions was high. The rating of the trainer's video-recorded training sessions showed good adherence to the training protocol. The trainee feedback showed a high level of satisfaction with the training, which improved their knowledge of pharmacological and non-pharmacological management of behaviours that challenge and made them

more confident in dealing with such behaviours without relying on medication. They also found the training acceptable, practical, and relevant to their practice. The trainee feedback also showed a high level of adherence to accessing and using SPECTROM resources in their daily practice.

Barriers to implementing SPECTROM training

The primary barrier to implementing the training is the limited time and capacity of the staff and their managers. This was overcome by many with their enthusiasm to participate. It was felt that unless the training is made mandatory, there will always be some reluctance to participate. As the training has cost implications for the organisations, it requires the highest level of commitment from the organisation's board of Directors. There has to be something in it for both the organisations and the staff. Organisations are expected by their regulators and paymasters to put a strategy in place to implement the NHS England STOMP initiative, and SPECTROM training will support this effort. The training will enhance the staff's professional development, enabling them to provide better support to adults with intellectual disabilities and improve their quality of life.

Dissemination

Dissemination of SPECTROM training will be ongoing. However, we have limited the dissemination at this stage as we plan to conduct a definitive RCT to assess SPECTROM's clinical and cost-effectiveness in reducing overmedication in adults with intellectual disabilities. Wider dissemination at this stage may affect the potential control group for a future randomised controlled trial (RCT). Four papers based on the study's results have been published in high-quality, peer-reviewed, open-access journals (Deb et al., 2025b; Limbu et al., 2025a, c, d), and one is currently under review. We also maintain a project website (https://spectrom.wixsite.com/spectrompdp), where we have continuously disseminated updates on completed work through newsletters. A newsletter with an accessible version was also produced during the project. We also held a dissemination workshop with relevant stakeholders, participants, organisations, and a family member on 1st April 2025. We have already disseminated the findings to all six service provider organisations who took part in the project and to an umbrella organisation called Voluntary Organisations Disability Group (VODG), which represents a large number of social service provider organisations. The final report and published papers are circulated to all participating organisations for further dissemination within their respective organisations. A final report, along with an accessible version, is posted on the project website.

Plan for the future large-scale, more definitive RCT

The plan for future large-scale RCTs is for the research team to train trainers within the organisation to roll out the training among staff teams. This will have several advantages. As trainers are known to the staff, this will facilitate the recruitment, consent, and collection of outcome data. Trainers could be flexible regarding the setting, timing, and training delivery method that suits the staff. As trainers are familiar with the organisation's current training programme, they can avoid overlap and integrate SPECTROM training within its existing framework. We have initiated discussions with numerous service provider organisations for future RCTs, and 12 organisations have already agreed to assist with recruitment. Among them, they provide service in more than 1000 community homes in the UK. This number will likely increase as we continue to discuss and negotiate with many more organisations. We will recruit through both large and small service provider organisations from vast geographic areas in England, Wales, and Scotland, including urban and rural, as well as affluent and deprived areas of the country, to ensure the recruitment of a representative sample.

In the future RCT, the primary outcome will be an improvement in the QoL of the person with intellectual disabilities through a reduction in the antipsychotic medicine dose, which will lead to a reduction in side

effects. Therefore, QoL measures such as EQ-5D-3L (Dolan, 1997) and CC-QoLS (Unwin & Deb, 2014) will be used in conjunction with psychotropic medicine data to compare scores at baseline and at 10- and 18-month follow-ups. We will use two follow-up points to assess the proportion of cases in which initial antipsychotic dose reduction fails and results in the re-reinstatement of these medications.

Strengths and limitations

This study suggests that a future large-scale randomized controlled trial (RCT) involving SPECTROM training is feasible. The primary outcome measure showed that the training had a positive impact on reducing antipsychotic medication doses without increasing antidepressant medication doses. Similarly, the secondary outcome measures showed that the training helped improve staff knowledge of psychotropic medicines and their attitude toward addressing challenging behaviours without relying on medication. The focus group and online questionnaire survey revealed that the trainees appreciated the training and found it beneficial. They also used many SPECTROM resources after the training.

Although some protocol variations occurred, they did not impact the primary feasibility outcomes and could be addressed in a future randomised controlled trial (RCT). We were unable to collect patient-related health data, such as quality of life measure scores, due to ethical restrictions, including the requirement for patient consent to gather these data. We hope to overcome this problem by involving the organisation's trainers in data collection and consenting. As we have limited time and resources for this feasibility study, we had to restrict the number of staff teams each service manager can recruit for participation. This was subjected to selection bias. However, most service managers supported only one staff team, thus eliminating this potential bias in most cases. In a future large-scale RCT, we should be able to randomise all consented staff teams, avoiding any selection bias.

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Disclosure statement

The authors declare that they have no competing interests.

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Author contributions

SD was involved in the study's conception and design. SD is the lead applicant and chief investigator. BL collected and analysed the data. BL and SD are the lead authors who wrote the initial manuscript and prepared revisions. All authors contributed substantially to the preparation of the manuscript and approved the final version. All authors are accountable for all aspects of study design. All authors are part of the project management group and are co-applicants in the grant application.

Data availability statement

The research team, steering committee and the sponsor's research and development department have access to data. If appropriate and legal, the data will be made available upon reasonable request and subject to approval from the sponsor and the funder.

Institutional Review Board Statement

The West Midlands-Coventry & Warwickshire Research Ethics Committee, UK, provided a favourable ethical opinion on October 9, 2023 (REC reference: 23/WM/0211).

Informed Consent Statement

All participants provided written consent before inclusion in the study.

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