Note: Snapshot PDF is the proof copy of corrections marked in EditGenie, the layout would be different from typeset PDF and EditGenie editing view.

Author Queries & Comments:

Q1 : The distinction between surnames can be ambiguous, therefore to ensure accurate tagging for indexing purposes online (e.g. for PubMed entries), please check that the highlighted surnames have been correctly identified, that all names are in the correct order and spelt correctly. Please confirm that the email address given for correspondence is accurate, and that you agree with this email address being published in both the print and online versions of the journal.

Response: University of Plymouth Medical School should read University of Plymouth Peninsula School of Medicine. All other things are correct.

Q2 : Please check the suggested running head.

Response: Resolved

Q3 : Please replace XXX with a department/division in the Biographies section.

Response: Services for people with Adult Learning Disabilities

Q4 : Please rephrase the sentence beginning 'In a further study undertaken…' to clarify your intent. Specifically, please state what 16% and 21% relate to (e.g. adults with intellectual disabilities) and clarify the fragment 'of whom 22.5% were women and 15.4% were men', as it is unclear why these percentages do not total 100%.

Response: Sorry for the confusion. 16.9% of all people with ID who were the study cohort of the 2015 PHE GP study were on antidepressants (ADs). Then in a study 4 years later looking at data from 2010 the % rose from just above 16% (in 2010) to 21% in 2018. So, 2010 - 16%, 2015 - 16.9% (but different study), 2018 - 21%. Now off the total cohort i.e. 100% of people with ID- (of whom in 2018 - 21% were on ADs) - 22.5% were women and 15.4% men...this is of the total cohort and not the 21%. As the men and women total numbers would have been different the final total of men and women would add up to 21%. Hope that makes sense?

Q5 : Please provide reference citations for 'NHS Digital, Health and Care of People with Learning Disabilities, 2015–2020 and 2020–2021' in Table 1.

Response: ref- 6,7,8

Q6 : The text 'Italicised values are calculated measures' was removed from Table 1 as no values were italicised, please check and confirm.

Response: Resolved

Q7 : Please provide reference citations for all data sources mentioned in Table 2.

Response: Please use reference 3 Mehta and Glover

Q8 : Please define the abbreviations marked by XXX in Table 2.

Response: Clinical Practice Research Datalink - https://www.cprd.com/

Q9 : 95% CI has been added to all ranges in parentheses in section 'Are there regional variations in the prescribing of antidepressants to people with intellectual disabilities?', please confirm or amend as necessary.

Response: Resolved

Q10 : Please rephrase the sentence fragment 'and as importantly resources' in sentence beginning 'The only type of…' as your current meaning is unclear.

Response: Resolved

Q11 : Please provide individual author contributions for all authors in the Author contributions section.

Response: Resolved

Q12 : Please spell out UCB in the Declaration of interest.

Response: Union Chimique Belge

Q13 : Please provide a direct URL for references 3 and 4.

Response: ref 3 - https://www.gov.uk/government/publications/psychotropic-drugs-and-people-with-learning-disabilities-or-autism ref 4 - http://clok.uclan.ac.uk/17970/1/Psychotropic%20medication%20and%20people%20with%20learning%20disabilities%20or%20autism.pdf

Q14 : Please confirm edits to reference 18.

Response: Resolved

Q15 : Please cite reference 25 in the text, ensuring all reference citations remain in numerical order, or remove the reference

from the reference list.

Response: Resolved

Q16 : Please be aware that Table 3 has been converted to Fig. 1 so that the data can be appropriately displayed. Please check and confirm.

Response: Resolved

Color coding for Comments and editing changes:

1. Author	(a) Text insertion; (b) ~~Text Deletion~~; (c) Text Formatting; (d) Text Comments
2. Editor	All track changes and comments.
3. Assitant Editor	All track changes and comments.
4. Associate Editor	All track changes and comments.
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Intellectual Disability
Analysis

Antidepressant prescribing for adult people with an intellectual disability living in England

Verso running head : Branford and Shankar

Recto running head : Antidepressant prescribing and intellectual disability

David **[Q2]**Branford, Rohit Shankar**[Q1]**

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History : received : 2021-09-22 revised : 2022-01-30 accepted : 2022-02-10

ABSTRACT

The prescribing of psychotropic medications for people with an intellectual disability has changed. In many locations across England, antidepressants have become the most widely prescribed psychotropic. In the context of the current NHS England STOMP programme to reduce inappropriate psychotropic prescribing for people with intellectual disability, there is an urgent need to understand whether this change reflects evidence-based use of the medications involved. There has been little analysis into the benefits or problems associated with the change and whether it is of concern. This paper offers a variety of possible explanations and opportunities to improve clinical practice and policy.

Keywords

- Antidepressants
- developmental disorders

- intellectual disability
- information technologies
- polypharmacy

In 2016, NHS England embarked on a national campaign to reduce inappropriate use of psychotropic medication in people with intellectual disabilities and autistic people. The campaign, Stopping Over Medication of People with a Learning Disability, Autism or Both (STOMP),[1] arose from investigations carried out in the wake of a major scandal of abuse of people with intellectual disabilities and autistic people who were patients in a private psychiatric hospital.[2] Although its principal focus was on the use of antipsychotics and antidepressants outside of the conditions for which they are licensed, the programme encouraged review of all psychotropic prescribing. This paper focus is on only people whose primary diagnosis is intellectual disability with or without associated neurodevelopmental comorbidities such as autism. The paper actively excludes autism without an intellectual disability.

Although many local programmes have focused on antipsychotic prescribing, little insight exists on antidepressant prescribing in people with intellectual disabilities.[3] This paper looks to provide a critical scientific analysis of the trends of antidepressant prescribing in people with intellectual disabilities in England. It also provides a variety of potential explanations to aid both clinical practice and future research not just in the UK, but internationally.

An attempt is also made to highlight regional variance at a clinical commissioning group (CCG) level. CCGs are clinically led statutory National Health Service (NHS) bodies responsible for the planning and commissioning of healthcare services for their local area, of which there were 106 across England's population of approximately 56 million people.

Antidepressant prescribing in people with intellectual disabilities

Surveys of psychotropic medication prescribed for people with an intellectual disability have been a common feature since the middle of the 20th century. Most were surveys of institutionally based people and reported 30–50% receiving psychotropic medication(s), of which antipsychotics were the main component. These older surveys showed relatively low use of antidepressants, typically 3–6% of the surveyed populations.

Since the turn of the 21st century, antidepressant use has increased greatly. A general practice (GP)-based study in 2015 by Public Health England found antidepressants were prescribed to 16.9% of adults with intellectual disabilities.[4] In a further study undertaken 4 years later, it was shown that antidepressant prescribing rates rose between 2010 and 2018, from just over 16% to more than 21%, of whom **[Q4]**22.5% were women and 15.4% were men.[3] That study showed that between 2010 and 2018, rates rose from 7.1 to 11.4% for people aged 18–24 years, from 15.6 to 19.8% for people aged 25–44 years and from 20.2 to 26.1% for people in the older age groups.[3] A study from Scotland reported that over the decade from 2004 to 2014, there was an increase in the prescription of antidepressants from 11.2 to 19.1%.[5] The increase was greatest for women and people with mild intellectual disabilities.[5]

Comparison with antidepressant prescribing in the general population

Antidepressant prescribing has also become more prevalent in the general population. Of all British National Formulary (BNF) therapeutic areas, 'antidepressants' saw the greatest numeric rise for prescription items dispensed in England in each of the years 2012–2013 to 2015–2016, with a 6.0% increase in 2016.[6] However, antidepressant prescribing has risen at a faster rate for people with intellectual disabilities. In 2021, NHS Digital, the national provider of data and information on health and social care for commissioners, analysts and clinicians in England, introduced a new indicator that shows a 10.4 percentage point difference between people with and without intellectual disabilities.[7] The percentage of people with intellectual disabilities (including children) who were treated with antidepressants was 20.7%, compared with 10.3% for those without intellectual disabilities.

The data source

Most studies of antidepressant use in people with intellectual disabilities living in England are based on data from GP prescribing systems. In January 2021, NHS Digital published data on several aspects of psychotropic and anti-epileptic prescribing by GPs for people identified as having intellectual disabilities, along with comparison data for the rest of the registered population.[8] The publication documents care in the years 2015–2016 to 2019–2020. A further publication with a slightly expanded scope, covering the year 2020–2021, was published in December 2021.[7] Although the scale of the data is at least ten times that of the research data-sets used in earlier, work the data collection process has not been supported by one of the large commercial companies providing GP practice notes systems. The overall coverage across 5 years is between 56 and 60% of GPs. Coverage varies greatly between the current seven NHS regions, ranging from 20 to 88% of total persons in the 2019–2020 collection. Coverage was highest in the North-West, London and the South-East, and lowest in the East, North-East and Yorkshire. There was similarly wide variation between CCGs within regions. This means that as with many other research data-sets, the total figures quoted do not reflect England proportionately, and have a degree of regional bias. The measures used here all reflect an end of year (31 March) position. They are thus labelled for the year in which this fell. In this paper, only data relating to people aged ≥18 years have been used.

Table 1 summarises the prevalence of diagnosed depression and prescribing of antipsychotics, antidepressants and benzodiazepines in adults, with and without intellectual disabilities, in March 2016 and March 2020. Table 2 provides the prevalence of prescribing of

classes of psychotropic drugs and of a diagnosis of active depression in adults with diagnosed intellectual disabilities between April 2009 and March 2021, from a combination of all three data-sets.[3,4,6–8]

Table 1 Prevalence (%) of diagnosed depression and prescribing of antipsychotics, antidepressants and benzodiazepines in adults, with and without diagnosed intellectual disabilities, March 2016 and March 2020

	2016		2021		Change	
Year	**With intellectual disability**	**Without intellectual disability**	**With intellectual disability**	**Without intellectual disability**	**With intellectual disability**	**Without intellectual disability**
Active depression diagnosis	14.4 (14.2–14.6)	14.9 (14.9–14.9)	17.5 (17.3–17.7)	17.2 (17.2–17.2)	+22.0%	+15.1%
Prescriptions						
Antidepressants – all	–	–	24.6 (24.4–24.8)	13.0 (13.0–13.0)		
Antidepressants without depression diagnosis	12.2 (12.0–12.4)	5.5 (5.5–5.5)	13.6 (13.4–13.8)	5.4 (5.4–5.4)	+11.4%	−1.8%
Antipsychotics	18.4 (18.2–18.6)	1.1 (1.1–1.1)	17.5 (17.3–17.7)	1.2 (1.2–1.2)	−5.2%	+6.9%
Benzodiazepines	9.3 (9.1–9.5)	3.4 (3.4–3.4)	8.6 8.5–8.8)	2.4 (2.4–2.4)	−7.5%	−28.9%

Source: NHS Digital, Health and Care of People with Learning Disabilities **[Q5]**, 2015–2020 and 2020–2021. Values in brackets are 95% confidence intervals, using Wilson's method for proportions **[Q6]**.

Table 2 Prevalence (%) of prescribing of classes of psychotropic drugs and diagnosis of active depression in adults with diagnosed intellectual disabilities, general practitioner samples from April 2009 to March 2021 (three studies combined)

Source	**Year to which data relate**	**Antidepressants**	**Antidepressants in the absence of diagnosed active depression**	**Antipsychotics**	**Benzodiazepines**	**Diagnosis of active depression**
Public Health England (2015) (CPRD)	2009–2012	16.9		17.0		
Public Health England (2019) (THIN)	2010	16.2		17.5		
NHS Digital (2021)	2016		12.2	18.4	9.3	14.4
Public Health England (2019) (THIN)	2017	21.2		17.5		
NHS Digital (2021)	2017		12.6	18.3	9.3	15.1
	2018		12.8	18.0	8.9	15.7
	2019		13.1	17.8	8.8	16.3

	2020		13.4	17.7	8.5	17.0
	2021	24.6	13.6	17.5	8.6	17.5

CPRD, XXX; THIN **[Q7]**, XXX **[Q8]**.

Potential explanations for the rise in antidepressant prescribing for people with intellectual disabilities

Do people with intellectual disabilities have a higher rate of depression?

One might expect the primary explanation for higher rates of antidepressant prescribing is a more frequent diagnosis of depression. Crude adult rates of diagnosed depression for people with intellectual disabilities rose from 14.4 (95% CI 14.2–14.6) in 2016 to 17.0 (95% CI 16.8–17.2) in 2020. In adults without intellectual disabilities, the crude rates were slightly higher, rising from 14.9 (95% CI 14.9–14.9) to 16.8 (95% CI 16.8–16.8), but adjusting for the difference in the age and gender profile gave standardised prevalence ratios for diagnosed depression in adults with intellectual disabilities of 1.04 (95% CI 1.02–1.05) in 2016, rising to 1.10 (95% CI 1.08–1.11) in 2020. The rates in people with intellectual disabilities exceeded those in people without intellectual disabilities, most notably for men aged 25–44 years and for those aged >75 years of both genders.

Although the published data is difficult to interpret, the rise in the diagnosis of depression is similar in adults with and without intellectual disabilities, if it is assumed that the prescribing is to treat what is identified as depression. The increase in the diagnosis of depression does not explain the higher rate of prescribing in intellectual disability. The rates of recorded depression diagnosis for both persons with and without intellectual disabilities far exceed rates identified in well-controlled studies of comparable populations.[9,10] However, it is possible that this terminology is being used to cover mixed anxiety–depression as well as depressive disorders, and that may be contributing to the excess prescribing.

Are people with intellectual disabilities receiving antidepressants for a wider range of indications?

The measure of antidepressant use introduced for the period 2016–2021 is a confusing one: it is the proportion of people, with and without a diagnosis of intellectual disability, receiving prescriptions for antidepressants in the absence of a current diagnosis of depression. In March 2021, the prevalence was 13.6% for adults with diagnosed intellectual disabilities and 5.4% for adults without. For adults with intellectual disabilities, this represented an 11.4% increase in the 2016 figure; for those without, it was a 1.8% fall.

If the explanation is that for people with intellectual disabilities, antidepressants are being prescribed for other types of mental disorder, the size of the difference is too great for this solely to be the explanation. A Scottish study showed the prevalence of mental ill health in adults with intellectual disabilities in Glasgow: the largest estimates identified 6.6% with affective disorders, 3.8% with anxiety disorder and 0.7% with obsessive–compulsive disorders.[10]

Previous epidemiological studies indicate that in people with intellectual disabilities, symptoms of depression/'emotional malaise' seems to be chronic and unremitting, often as a by-product of loneliness and social exclusion.[11] This has been further reiterated in a recent review.[12] Such symptoms are unlikely to be captured in a formal diagnosis, but could be treated with an antidepressant by clinical impression.

Are there regional variations in the prescribing of antidepressants to people with intellectual disabilities?

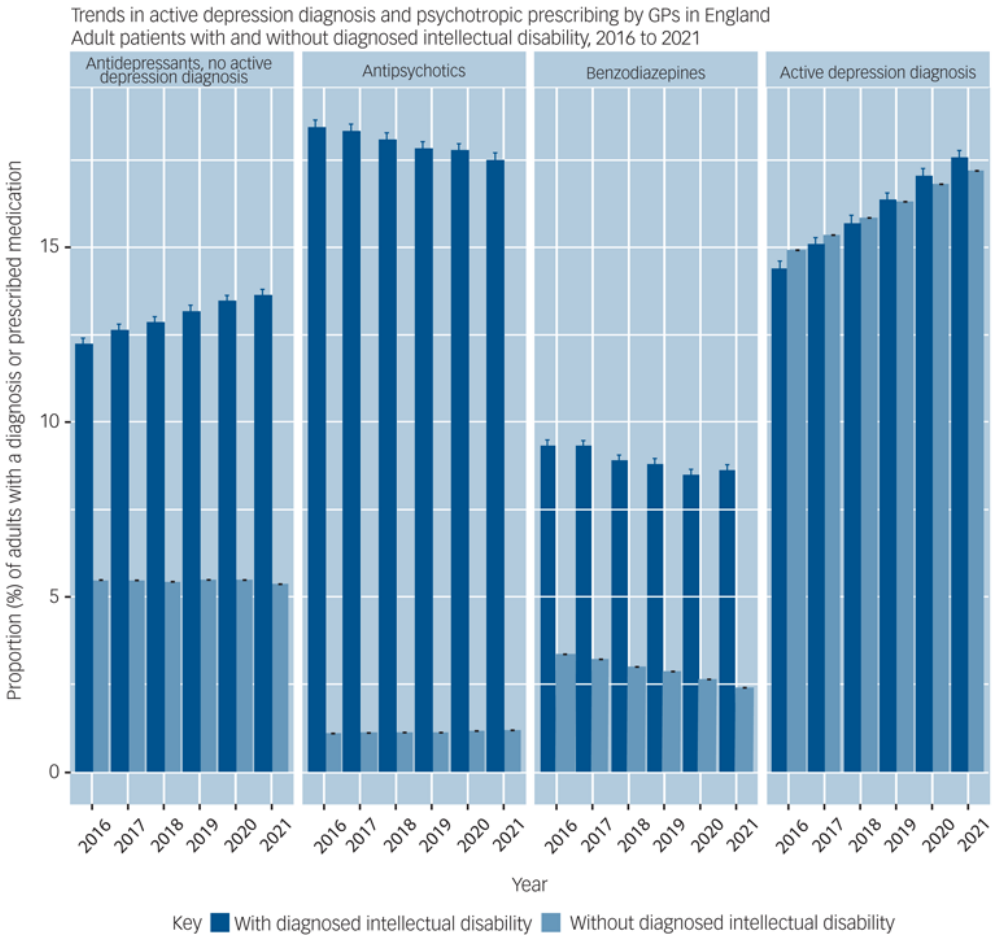
In the case of antidepressant prescribing, NHS Digital provided data only on those people where this occurred in the absence of a current diagnosis of depression.[8] The data showed that, between 2016 and 2020, the percentage of people with intellectual disabilities who were being treated with antidepressants without an active depression diagnosis rose by 13.5%, from **[Q9]**14.3% (95% CI 14.0–14.5) to 16.2% (95% CI 16.0–16.4). For people without intellectual disabilities, the comparable rate rose by only 2.3%, from 6.4% (95% CI 6.4–6.5%) to 6.6% (95% CI 6.6–6.6%). The figures showed considerable variation between regions. In 2020, the rate ranged from 10.8% (95% CI 10.4–11.2%) in London to 20.5% (95% CI 19.8–21.2%) in the North-East and Yorkshire. There were similar variations across CCGs within regions.

Are antidepressants being prescribed for behaviours that challenge?

It is unclear the extent to which the antidepressants are prescribed for behaviours that challenge as an alternative to other psychotropic medications. Although the notion that antidepressants are being used in this way can only be speculative, data from NHS Digital might support this.Fig. 1 shows the prevalence of those receiving an antidepressant without a diagnosis of depression, those prescribed an antipsychotic or a benzodiazepine, and those with a diagnosis of depression in adults, with and without diagnosed intellectual disabilities, in March 2016 to March 2021. Those areas with the greatest fall in antipsychotic and benzodiazepine prescribing were often those with the greatest increase in antidepressant prescribing without a diagnosis of

depression.

Fig. 1 Prevalence (%) of those receiving **[Q16]**an antidepressant without a diagnosis of depression, those prescribed an antipsychotic or a benzodiazepine, and those with a diagnosis of depression, in adults with and without diagnosed intellectual disabilities, March 2016 to March 2021. GP, general practitioner.



Further support comes from a recent survey of psychiatrists working with people with intellectual disabilities in England that found almost half (47%) of those surveyed reported prescribing benzodiazepines or antidepressants to try and manage behaviours that challenge, in preference to antipsychotics.[13]

Is there an evidence base to support the use of antidepressants for behaviours that challenge?

A systematic review published in 2007 found ten relevant studies.[14] They included one crossover randomised controlled trial in a small cohort, seven prospective uncontrolled trials and two retrospective studies. One study explored the effectiveness of the tricyclic antidepressant clomipramine, the other nine considered selective serotonin reuptake inhibitors (SSRIs). The review noted that the studies largely used unvalidated scales, and had small numbers of participants who were followed for inadequate durations. This weak evidence base suggested that when using SSRIs, fewer than 50% of those presenting self-injurious behaviours or aggression showed improvement; others showed no change or deterioration. Those with underlying anxiety or obsessive–compulsive disorder were most likely to benefit. Most studies highlighted concerns about adverse effects.

How does treatment duration affect antidepressant prescribing?

A 2021 review looked at various studies to explain the rise in antidepressant prescribing in the general population.[15] The studies involved the examination of several databases of aggregated national prescribing cost and GP medical records. The finding was that antidepressant prescriptions doubled every 10 years, since the end of the 1980s. The main reason for this is an increase in treatment duration. There are no similar published studies of the intellectual disability population that examine treatment duration as a reason for the increased prescribing of antidepressants.

Further support for treatment duration being a key reason for increased prescription of antidepressants comes from a GP-based 2015 study of the incidence rate of new prescriptions of any psychotropic medications in intellectual disabilities. The most common class of psychotropic medication to be prescribed was anxiolytics/hypnotics, not antidepressants.[16]

Combination of antidepressants with another psychotropic medication

Another explanation of the rise of antidepressant prescribing is the combination of an antidepressant with another psychotropic. The Public Health England 2015 study found that there was a 40% overlap of the prescribing of antipsychotics and antidepressants, and simultaneous prescribing of medications from more than one category of psychotropics was common.[4] This phenomenon of antidepressants commonly being prescribed in combination with other psychotropics makes it more difficult to understand the unique role of antidepressants. A 2019 study showed that for adults with intellectual disabilities, 53% of those prescribed antidepressants were also prescribed psychotropic medication from at least one other group.[3] The most common of these groups were antipsychotics (36%), followed by anti-epileptics (24%).

Is the increase in prescribing of antidepressants likely to lead to problems in the future?

A 2021 study reviewed several studies of long-term prescribing concerns of antidepressants in the general population, and the difficulties associated with withdrawal of these medications.[17] The authors concluded that long-term prescribing was associated with increasing risks of side-effects, some severe. In addition to the described medication side-effects, studies reported that in up to half of participants, long-term exposure was associated with blunting of emotions, impairment of autonomy and resilience, and increased dependence on medical help. Longer-term use was also associated with greater risk of having difficult withdrawal problems. No studies of whether these problems occur with similar frequency and characteristics in people with intellectual disabilities were found.

Mortality matters

The Learning Disability Mortality Review report published in 2020, examining all deaths of people with intellectual disabilities across England, highlighted that antipsychotics were being prescribed in 24% of premature deaths in people with intellectual disabilities; this figure was 28% for antidepressants, with 3% on multiple antidepressants.[18] Concerningly, the chance of an antidepressant being prescribed with an antipsychotic was 2.7 times greater than for someone not on an antipsychotic in the study cohort. The older the person, the higher the likelihood, with three times greater rates for those aged >50 years than those aged 18–25 years.

Deprescribing of antidepressants prescribed for people with intellectual disabilities

There is a developing intellectual disability literature on programmes to reduce the use of psychotropics, mostly of antipsychotics, a process now called 'deprescribing' or 'optimisation'.[19–23] In a systematic review of programmes of reduction or discontinuation of antipsychotics for challenging behaviour in adults with intellectual disabilities, the authors were unable to obtain a summary measure of the successful reduction or discontinuation of antipsychotics.[24] However, common themes relevant to any potential programme to reduce antidepressant prescribing were that the more successful programmes worked within a mandated structure overseen by a legislated committee framework, and involved specific multidisciplinary teams.[20,21] The conclusion was that deprescribing is difficult and takes sustained effort over many months or years, and requires a range of alternative strategies to manage the problems that inevitably emerge during the withdrawal process.[13,20,22]

There is currently a responsibility impasse within services. It starts with a reluctance to accept that the withdrawal of psychotropic medications is likely to be problematic and beyond the capacity of the average GP. It is compounded by the likelihood that most intellectual disability specialist services also do not have the capacity to manage large medication withdrawal programmes. Any deprescribing programme comes with risks of relapse or deterioration that GP services alone may feel reluctant to consider.[13,23] A problem for the STOMP programme is that it has not identified that the process of withdrawing inappropriately prescribed medication is a substantial task, requiring funding of specialist resources beyond the expertise of most GPs or the capacity of most community intellectual disabilities services.[13,23] The fundamental underlying issue, however, is that at present, medication is seen by professional and informal carers alike as the key way to manage behavioural crises, and, by extension, to prevent their recurrence. The only type of approach likely to succeed in abolishing inappropriate use of medication would be one that promotes, suitably ~~and as importantly~~ resource ds **[Q10]**, management of ~~by~~ using alternative behavioural approaches.[20–22]

Limitations

The principal limitation of this paper is that much of the data acquisition for analysis is from GP-linked data systems in England, primarily NHS Digital. Given the limitations in recording and coverage, care needs to be taken in presuming this as representative of practices across all of England.

Conclusions

Implications for clinical practice

The prescribing of psychotropic medications for people with intellectual disabilities is changing, and the use of multiple psychotropics, notably including antidepressants, is common. Antidepressants have now replaced antipsychotics as the most widely prescribed psychotropic. The most likely reasons for the increase in antidepressant prescribing are use for indications other than depression, and increasingly protracted treatment after symptoms have remitted. Antidepressants are appropriately prescribed for limited durations, to address specific symptomatic conditions. Although classical symptoms of depression may be more difficult to

elicit and quantify in people with intellectual disabilities than others, in view of the evidence of significant side-effects with long-term use and the evident difficulty experienced in withdrawing antidepressants after protracted use, clinicians should ensure that they only initiate prescribing when recognised specific indications are present. When they do so, they should ensure that all those involved in the care of the individual are aware of the appropriate duration of treatment and the arrangements for its termination.[15] In the case of people with intellectual disabilities, where recognised indications are no longer or have never been present, review with the intention of withdrawal should begin as soon as possible. Carers should be made aware of the maximum duration of treatment from the outset. If clinicians are feeling pressured to use medication in place of adequate care in social care settings, they should raise this through the local forums working with health and social care commissioners.

Implications for policy

The new NHS Digital monitoring data is extremely helpful, representing a major advance in the possibility of monitoring clinical practice in the care of an important vulnerable group of people. However, a major challenge is how the data is summarised from period to period. It is important that this monitoring is extended to include measurement of additional aspects of antidepressant prescribing as well as other psychotropics and anti-epileptics. Consideration should be given to a relaunch of the STOMP programme, to publicise the emerging information about current trends.

It is a major problem for local clinical quality leaders in areas where the majority of GPs use the information system that has chosen not to support this NHS Digital data collection, as they are thereby deprived of a key resource for improving local clinical care. NHS Digital should take whatever steps are necessary to remedy this as a matter of urgency.

Implications for research

Many aspects of this change to prescribing patterns remain unclear. Has the change brought benefits or further problems and harm? There are no satisfactory controlled trials of antidepressants nor any withdrawal studies that investigate whether people with intellectual disabilities have a different presentation during withdrawal

To date, deprescribing programmes have not been tested satisfactorily in people with intellectual disabilities. Further research needs to address both the transitional problems of deprescribing and the longer-term issue of implementing the approaches that have been developed to using more appropriate, non-pharmaceutical approaches in the prevention and management of behavioural crises in long-term care of people with intellectual disabilities or severe autism.

Data availability

The data that support the findings of this study are available at https://digital.nhs.uk/data-and-information/publications/statistical/health-and-care-of-people-with-learning-disabilities/experimental-statistics-2019-to-2020. Further details of analysis are available from the corresponding author, R.S., upon reasonable request.

Acknowledgements

We thank Dr Gyles Glover for helping access and analyse data, and commenting on the draft.

Author contributions

Both authors satisfy the ICMJE guidance bybothsubstantially contributing to the design, analysis and interpretation of the work, drafting of the manuscript, final approval of the manuscript and all agree to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work is appropriately investigated and resolved **[Q11]**.

Funding

This work received no specific grant from any funding agency, commercial or not-for-profit sectors.

Declaration of interest

R.S. has received institutional and research support from LivaNova, GW Pharma, UCB **[Q12]**, Eisai, Veriton Pharma, Averelle and Destin outside the submitted work. No other author has declared any conflict of interest.

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