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Original Article

Measuring the impact of therapy on medication use: data-linkage study

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Background

The psychological therapies service (PTS) in the Northern Health and Social Care Trust, in Northern Ireland, provides therapies to adults with moderate or severe mental health difficulties. Psychometric outcomes data are routinely collected to assess if a patient demonstrates significant improvement in their main presenting problem area following therapy. The wider impact of therapy is not fully measured in the outcomes database as this would be disproportionately burdensome for both patient and therapist. The present study, to our knowledge, is the first to use data linkage to link patient therapy outcomes data with prescriptions data.

Aims

To widen our understanding of patient medication use before and after therapy.

Method

Using Health and Care Number as a unique identifier, the Psychological Therapies Service – Routine Outcome Measurement Database ($n = 3625$) and data from 72 500 controls were linked with data from the Enhanced Prescribing Database (EPD). The EPD data were sourced from the Honest Broker Service.

Results

Key findings from the study were: (a) the odds of PTS clients using antipsychotics in the year before therapy were 25 times greater compared with controls (odds ratio (OR) = 24.53, 95% CI 20.16–29.84); (b) in the 1st year post discharge, PTS clients who clinically improved post therapy discharge were more likely than 'non-engagers' and 'non-improvers' to come off antianxiety medication (OR = 0.61, 95%, CI 0.38–0.98); and (c) therapy did not have an impact on antidepressant use.

Conclusions

The results highlight the need for discussion between therapy services, GPs and psychiatry about whether more engagement and collaboration is needed to plan phased reduction in medication.

Keywords

Antidepressants; antipsychotics; antianxiety drugs; anxiety or fear-related disorders; depressive disorders.

Background

The prevalence of common mental disorders is rising in the UK, with past-week prevalence rates of generalised anxiety disorder (4.7% in 2007; 6.6% in 2014) and depressive disorder (2.6% in 2007; 3.8% in 2014) following a marked upward trend.[1] Post-traumatic stress disorder (PTSD) levels have also increased over the past decade due to heightened public awareness and additional traumatic experiences such as those associated with having COVID-19.[2,3] Although there is a clear correlation between this societal symptomatological escalation and psychotropic prescribing, the relationship is not proportionate, with a worrying trend of prescription levels exceeding rates of diagnosed mental health difficulties.[4]

Variations in regional and international prescribing patterns also obfuscate the issue. For example, the number of prescriptions for antidepressants in Northern Ireland has been estimated to be two and a half times that of England with a similar discrepancy for anxiolytics.[5] Explanations for such variance across nations is complex, with the specific challenges faced by the populace likely playing a significant role (for example 'The Troubles' societal conflict in Northern Ireland).[6]

Understandably, the escalating and inconsistent rates of psychotropic medication usage have caused concern among practitioners, particularly regarding medications that exhibit greater side-effect profiles (i.e. anxiolytics and antipsychotics). Therefore, reductions in medication dose and prescribing levels have been identified as potentially key foci for mental health interventions, including psychological treatment. Randomised controlled trials have demonstrated that cognitive–behavioural therapy (CBT) can significantly reduce antidepressant usage post-intervention.[7] However, most psychological therapy outcomes frameworks (e.g. NHS Digital)[8] have either not included medication change as a target for measurement or, in the handful of services that have, no evidence has been found to support that the interventions altered long-term prescribing.[9]

A number of practical issues make effective monitoring of medication usage and impact difficult in routine practice,[10] most notably the implementation of pragmatic follow-up methods after discharge, as well as the undue burden placed on both clients and therapeutic staff when required to monitor such longitudinal change. Recent advances in data-linkage methodology represent a new opportunity to explore this topic. Merging data from mental health service outcomes and wider population prescription levels has been used to highlight overprescribing of antidepressants and antipsychotics among populations with intellectual disabilities.[11] Nevertheless, as yet, no study has used this technique, to our knowledge, to examine the relationship between psychological therapy outcomes and psychotropic medication trends.

Aims

The present investigation aimed to provide a comprehensive analysis of psychotropic medication usage over time in a population of patients who have received psychological therapy. Data-linkage methodology was employed to examine the relationship between patient therapy outcomes and medication prescribing, as well as compare these trends with a matched general population sample.

It was hypothesised that psychological therapy patients would be prescribed psychotropic medication more frequently than the general population sample both pre therapy and post therapy. It was also predicted that service-users who exhibited clinically significant improvement after therapy would have significantly lower

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psychotropic medication usage 2 years post therapy compared with service-users that showed no clinical improvement and service-users who did not engage with therapy.

Method

Study design and population

The project employed a case–control design using two linked Northern Ireland health data-sets, the Psychological Therapies Service – Routine Outcome Measurement Database (PTS-ROMD) and Enhanced Prescribing Database (EPD). The PTS-ROMD, which contains 4409 client records, was initially linked using Health and Care Number to the Patient Medical Card Registration Northern Ireland (PMCR-NI), for the purposes of control selection.

PMCR-NI contains records of all patients registered with a GP in Northern Ireland; a successful match was found for 3742 PTS patients (85%). Following this a small number of PTS patients were removed because of either being deceased or having insufficient demographic information to facilitate matching, resulting in a final sample of 3625 PTS patients. Controls were then selected from non-deceased individuals in the PMCR-NI database using the Stata 'calipmatch' command, with exact matching on gender, and matching with a caliper width of plus or minus 1 on Northern Ireland Multiple Deprivation Measure (NIMDM) Decile score, and year of birth. The case–control ratio was 1:20 (i.e. 3625 PTS patients, 72 500 controls). The PTS patients and controls were very closely matched on gender (PTS and controls both 62% female); year of birth (PTS, mean 1973.47, s.d. = 13.67; controls, mean = 1973.48, s.d. = 13.77) and NIMDM (PTS, mean 5.78, s.d. = 2.48; controls, mean 5.78, s.d. = 2.48).

Data sources and measures

PMCR-NI

Patients who register with a GP practice based in Northern Ireland are recorded within this database which is sourced from the National Health Application and Infrastructure Services; updates are made on a quarterly basis. Demographics including patient's year of birth, gender and NIMDM 2017[12] group are also recorded within this data-set. The data were extracted in March 2020.

EPD

This database contains a record of all primary care prescription items that were dispensed by Northern Ireland community pharmacies and submitted to Business Services Organisation for payment during 1 January 2010 to 31 December 2019. Access to this data-set was via the Honest Broker Service (HBS). Data were then coded with respect to four 1-year time periods defined in accordance with referral date for first episode to PTS therapy and the discharge date for last episode of PTS therapy. To facilitate this time-period coding, those in the control group were assigned the referral and discharge dates of their specific PTS match.

Four 1-year periods of interest were defined as follows: 2nd year pre-referral (366–730 days before referral for first episode); 1st year pre-referral (1–365 days before referral for first episode); 1st year post therapy discharge (1–365 days after last episode ends); 2nd year post therapy discharge (366–730 days after last episode ends). Two prescription measures, at least one prescription and number of prescriptions, were created for British National Formulary Version 65–69 categories 4.1–4.3 and 4.5–4.10 (see Table 1 for category labels). BNF categories 4.4 and 4.11 were excluded from the analyses because of small values. Values of at least one prescription and number of prescriptions were left blank for individuals in the data-set if the 1-year period of interest fell completely or partially outside of the period covered by the prescription data-set.

PTS-ROMD (January 2020 version)

The PTS is based in the Northern Health and Social Care Trust, in Northern Ireland, and provides a wide range of evidence-based psychological interventions for adults with moderate/severe mental health difficulties living in the community. Clinicians include accredited clinical psychologists, counselling psychologists, CBT therapists, psychotherapists, and assistant/associate psychologists.

Service-level statistics outline that the main presenting problems of service-users at first episode of PTS therapy are: mixed anxiety and depression (21%); mood disorders (19%), anxiety presentations (17%); PTSD (18%); obsessive–compulsive disorder (OCD, 8%); stress adjustment problems (5%); personality disorder (4%); schizophrenia/psychosis (1%); somatoform disorders (1%); bipolar disorder (1%); and unknown (4%). A large proportion of patients present with anxiety presentations (39%), mixed anxiety and depression (38%), or mood disorder (36%), as either their main or a secondary problem area, whereas other presentations such as psychosis are uncommon as either primary or secondary problem areas (2%).

Patient data such as referral, start and end dates for therapy episodes are recorded from March 2009 to May 2019 in the PTS-ROMD. On 1 June 2013, a policy was introduced in the PTS encouraging clinicians to ask patients to fill in for each session a clinical outcomes in routine evaluation (CORE)[13] questionnaire. The CORE has strong internal consistency (Cronbach's alpha 0.82–0.90), and is considered to tap into a broad range of activities especially in the areas of functioning and relationships. PTS patients are typically asked to complete the CORE-OM (34-items) at the start and end of therapy, and a shorter version, the CORE-10 (10 items) during sessions that fall in between. If a patient drops out before the planned therapy end date, then their final CORE-10 is used as a post score. Prior to calculating pre-referral–post-therapy difference scores, data are harmonised by converting CORE-OM scores to CORE-10 scores (scale range 0–40). Finally, each patient is categorised on the basis of their pre–post -referral difference score for their last episode with respect of 1 standard deviation (s.d.) change into 'improvers' (i.e. improved by 1 s.d. or more) and 'non-improvers' (does not improve by 1 s.d. or more). A third group of patients who did not attend therapy or dropped out very early are coded as 'non-engagers'.

Ethical approval

The authors assert that all procedures contributing to this work comply with the ethical standards of the relevant national and institutional committees on human experimentation and with the Helsinki Declaration of 1975, as revised in 2008. All procedures involving human patients were approved by the Yorkshire & Humber – Leeds East Research Ethics Committee (Ref 19/YH/0375). The project involved the analysis of anonymised data only, and therefore patient consent was not required.

Analysis

The data files were prepared in SPSS Version 28, and Stata Version 17 was used for all inferential analyses. As there were no issues with sparse data in relation to the matching strata, all analyses adopted an unconditional regression model approach using the matching variables as covariates.[14]

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Table 1 Dispensed prescriptions for psychological therapies service (PTS) patients and controls in the 2nd and 1st year pre-referral periods

British National Formulary category	2nd year pre-referral				1st year pre-referral			
	At least one prescription		Number of prescriptions		At least one prescription		Number of prescriptions	
	%	*Controls (n = 62 440) PTS (n = 3122)*	Mean	s.d.	%	*Controls (n = 70 360) PTS (n = 3518)*	Mean	s.d.
4. Central nervous system								
Controls	36.9	23 023	10.90	17.05	37.3	26 213	11.30	17.16
PTS	78.2	2442	23.09	25.26	88.3	3105	25.56	26.63
4.1: Hypnotics and anxiolytics								
Controls	10.1	6276	7.21	10.35	10.4	7297	7.27	10.24
PTS	40.3	1259	10.43	11.59	52.6	1850	10.93	12.66
4.2: Drugs used in psychoses and related disorders								
Controls	1.5	917	12.00	9.86	1.5	1057	12.15	9.43
PTS	14.5	454	11.33	8.19	21.0	740	10.91	9.52
4.3: Antidepressant drugs								
Controls	17.0	10 619	7.13	5.69	17.9	12 581	7.19	5.69
PTS	64.7	2021	9.62	6.85	79.3	2789	9.95	6.95
4.5: Obesity								
Controls	0.7	442	2.65	2.47	0.6	449	2.61	2.32
PTS	1.9	59	2.93	2.37	2.1	75	3.19	2.62
4.6: Drugs used in nausea and vertigo								
Controls	6.1	3812	2.56	3.75	6.1	4313	2.68	3.83
PTS	14.4	449	3.54	4.65	16.1	566	4.05	5.53
4.7: Analgesics								
Controls	21.9	13 670	5.93	9.01	22.2	15 630	6.11	9.05
PTS	41.0	1281	9.38	11.56	43.4	1526	9.54	11.57
4.8: Antiepileptic drugs								
Controls	3.9	2463	8.18	7.85	4.1	2910	8.23	7.56
PTS	13.6	424	9.27	8.05	16.1	568	9.01	7.67
4.9. Drugs used in Parkinsonism/related disorders								
Controls	0.3	203	8.35	8.27	0.4	249	8.12	8.29
PTS	1.0	32	7.41	4.02	1.3	44	6.80	4.10
4.10: Drugs used in substance dependence								
Controls	2.4	1516	2.99	4.12	2.2	1550	3.15	4.84
PTS	4.8	149	4.43	7.54	4.9	174	4.40	6.41

Unconditional logistic regression models were used to examine if medication use prior to referral for therapy was predictive of PTS status (i.e. PTS patients versus controls), with controls serving as the reference group. Models were run separately for the 1st and 2nd year pre-referral periods. A model was run for each BNF subcategory, with at least one prescription, number of prescriptions and numbers of prescriptions squared as predictors. As the number of prescriptions predictor was only relevant to those who had at least one prescription within the period of interest, a two-part predictor regression modelling approach was used in line with guidelines.[15]

Multilevel mixed-effects logistic regression models with an interaction between PTS status (controls = reference) and time (reference = 1st year post therapy discharge) were used to determine if at least one prescription status showed a different pattern over time for PTS patients versus controls on BNF categories 4.1, 4.2 and 4.3. Subsequently, multilevel mixed-effects logistic regression models with an interaction between time and PTS improvement status were used to compare 'improvers', 'non-improvers' and 'non-engagers' (reference group). The sample used in these analyses included those whose last episode started on or after the period 1 June 2013, as this was the date that the CORE started to be routinely recorded within PTS. All models tested included individuals in the data-set with data for at least one of the four time points.

Results

Table 1 presents the proportion who received at least one prescription for the 2nd year pre-referral (cases $n = 3122$; controls $n = 62\,440$) and 1st year pre-referral (cases $n = 3518$; controls $n = 70\,360$) periods separately for BNF subcategories 4.1–4.3 and 4.5–4.10. Also shown is the mean number of prescriptions for those who received at least one prescription.

Unconditional logistic regression models highlighted that PTS clients were more likely to have been dispensed all types of central nervous system medications examined when compared with controls in the 1st year pre-referral period (Table 2). A similar pattern was found for the 2nd year pre-referral period, with the exception of obesity and drugs used in Parkinsonism/related disorders. For most analyses, the odds ratios were in the small to medium sized range.[16] By contrast large effects were evident at both time points for hypnotics and anxiolytics, drugs used in psychoses and related disorders, and antidepressant drugs.

Multilevel mixed-effects logistic regression models with an interaction between time and PTS status are displayed in Table 3 and Supplementary Figure 1 available at https://doi.org/10.1192/bjp.2023.130. Although all models converged successfully, the estimates for the group parameter were very large, which often occurs in mixed-effects models where there is quasi-complete separation on a parameter. With clustered observations such as longitudinal data, patients often do not change their status during the period examined resulting in quasi-complete separation.[17] The group parameter was retained in the models as the maximum likelihood of other variables is not affected and exclusion would have led to biased model estimates.[18] However, estimates for the group parameter are not presented here as it was not possible to determine a reasonable estimate and the specific effect was not of substantive interest.

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Table 2 Odds ratios (95% CIs) from unconditional logistic regressions using prescription-derived parameters to predict psychological therapies service (PTS) status[a,b,c].

	2nd year pre-referral			1st year pre-referral		
British National Formulary	At least one prescription	Number of prescriptions	Number of prescriptions squared	At least one prescription	Number of prescriptions	Number of prescriptions squared
4. Central nervous system	**3.79 (3.42 to 4.20)**	**1.06 (1.06 to 1.07)**	**1.00 (1.00 to 1.00)**	**7.17 (6.38 to 8.05)**	**1.07 (1.06 to 1.07)**	**1.00 (1.00 to 1.00)**
4.1: Hypnotics and anxiolytics	**4.45 (4.00 to 4.95)**	**1.08 (1.06 to 1.09)**	**1.00 (1.00 to 1.00)**	**7.32 (6.66 to 8.04)**	**1.07 (1.06 to 1.08)**	**1.00 (1.00 to 1.00)**
4.2: Drugs used in psychoses and related disorders	**9.87 (7.52 to 12.94)**	**1.04 (1.00 to 1.08)**	**1.00 (1.00 to 1.00)**	**24.53 (20.16 to 29.84)**	**0.96 (0.94 to 0.98)**	**1.00 (1.00 to 1.00)**
4.3: Antidepressant drugs	**5.22 (4.59 to 5.94)**	**1.11 (1.10 to 1.13)**	**1.00 (1.00 to 1.00)**	**9.59 (8.47 to 10.85)**	**1.13 (1.11 to 1.14)**	**1.00 (1.00 to 1.00)**
4.5: Obesity	1.68 (0.88 to 3.17)	1.35 (0.94 to 1.92)	0.97 (0.94 to 1.01)	**2.11 (1.18 to 3.78)**	1.27 (0.93 to 1.73)	0.99 (0.96 to 1.02)
4.6: Drugs used in nausea and vertigo	**2.03 (1.75 to 2.35)**	**1.12 (1.07 to 1.16)**	**1.00 (1.00 to 1.00)**	**2.22 (1.94 to 2.54)**	**1.12 (1.09 to 1.16)**	**1.00 (1.00 to 1.00)**
4.7: Analgesics	**1.80 (1.63 to 1.99)**	**1.07 (1.06 to 1.09)**	**1.00 (1.00 to 1.00)**	**1.95 (1.78 to 2.14)**	**1.07 (1.06 to 1.08)**	**1.00 (1.00 to 1.00)**
4.8: Antiepileptic drugs	**3.05 (2.49 to 3.73)**	**1.04 (1.01 to 1.07)**	1.00 (1.00 to 1.00)	**3.77 (3.15 to 4.51)**	**1.03 (1.01 to 1.06)**	**1.00 (1.00 to 1.00)**
4.9. Drugs used in Parkinsonism/ related disorders	1.90 (0.61 to 5.87)	1.22 (0.90 to 1.66)	0.99 (0.97 to 1.01)	**2.50 (1.03 to 6.06)**	1.18 (0.92 to 1.52)	0.99 (0.97 to 1.00)
4.10: Drugs used in substance dependence	**1.68 (1.30 to 2.17)**	1.06 (0.99 to 1.13)	1.00 (1.00 to 1.00)	**1.71 (1.34 to 2.17)**	**1.11 (1.05 to 1.19)**	**1.00 (1.00 to 1.00)**

a. Odds ratios are adjusted for matching variables (year of birth, gender and Northern Ireland Multiple Deprivation Measure).
b. Significant ($P < 0.05$) odds ratios are in bold.
c. Reference group = controls.

The models examined showed a statistically significant interaction between time and PTS status. The nature of these interactions is highlighted in the marginal means plots (Supplementary Figure 1). Hypnotics and anxiolytics use demonstrated a very small increase over the period examined for controls (1% point increase). By contrast, the marginal mean increased from 42 to 53% for PTS clients between 2nd year pre-referral and 1st year pre-referral. Following discharge the proportion of PTS clients using hypnotics and anxiolytics continued to fall, down to 48% at 1st year post therapy discharge and then 46% at 2nd year post therapy discharge. Over time, there was very little change in the proportion of controls using antipsychotics. Among PTS clients the proportion prescribed antipsychotics increased from 14 to 21% between 2nd year pre-referral and 1st year post therapy discharge, then stabilised thereafter. The proportion of controls prescribed antidepressants increased steadily between 2nd year pre-referral and 2nd year post therapy discharge (3% point increase). In contrast, there was a large increase in the proportion of PTS clients prescribed antidepressants between 2nd year pre-referral and 1st year pre-referral (7% point increase), followed by a slight decrease before 2nd year post therapy discharge (1% point decrease).

Multilevel mixed-effects logistic regression models with an interaction between time and PTS improvement group are displayed in Table 4 and Supplementary Figure 2. The significant group effects show that, at all time points, 'non-engagers' were more likely to use 'drugs used in psychoses and related disorders'

Table 3 Multilevel mixed-effects logistic regression models of at least one prescription data with psychological therapies service (PTS) status by time interaction ($n = 75\,894$)[a,b]

	Odds ratio (95% CI)		
Effect	4.1: Hypnotics and anxiolytics	4.2: Drugs used in psychoses and related disorders	4.3: Antidepressant drugs
Group (reference = controls)			
PTS[c]	–	–	–
Time (reference = 1st year pre-referral)			
2nd year pre-referral	0.97 (0.92 to 1.02)	0.89 (0.73 to 1.07)	**0.85 (0.80 to 0.89)**
1st year post therapy discharge	**1.06 (1.01 to 1.12)**	**1.72 (1.43 to 2.06)**	**1.51 (1.44 to 1.58)**
2nd year post therapy discharge	**1.10 (1.04 to 1.16)**	**2.07 (1.71 to 2.49)**	**1.77 (1.69 to 1.86)**
PTS status (ref = controls) × Time (ref = 1st year pre-referral)			
PTS 2nd year pre-referral	**0.36 (0.30 to 0.42)**	**0.19 (0.13 to 0.27)**	**0.20 (0.16 to 0.24)**
PTS 1st year post therapy discharge	**0.59 (0.51 to 0.69)**	**1.52 (1.12 to 2.05)**	**0.63 (0.52 to 0.76)**
PTS 2nd year post therapy discharge	**0.47 (0.40 to 0.55)**	1.14 (0.83 to 1.55)	**0.38 (0.31 to 0.46)**

Ref, reference.
a. Odds ratios are adjusted for matching variables (year of birth, gender and Northern Ireland Multiple Deprivation Measure).
b. Significant ($P < 0.05$) odds ratios are in bold.
c. Effect included in model to allow other parameters to be estimated, but not reported due to imprecision in estimates for this particular parameter.

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Table 4 Multilevel mixed-effects logistic regression models of at least one prescription data with psychological therapies service (PTS) improvement group by time interaction ($n = 2277$)[a,b]

	Odds ratio (95% CI)		
Effect	4.1: Hypnotics and anxiolytics	4.2: Drugs used in psychoses and related disorders	4.3: Antidepressant drugs
Group (reference = 'non-engagers')			
'Improver'	**0.48 (0.31 to 0.73)**	**0.13 (0.06 to 0.27)**	0.84 (0.49 to 1.44)
'Non-improvers'	**0.46 (0.31 to 0.70)**	**0.25 (0.12 to 0.49)**	0.79 (0.47 to 1.33)
Time (reference = 1st year pre)			
2nd year pre-referral	0.35 (0.24 to 0.50)	**0.24 (0.14 to 0.41)**	**0.25 (0.16 to 0.39)**
1st year post therapy discharge	0.86 (0.59 to 1.25)	**2.39 (1.35 to 4.25)**	0.73 (0.45 to 1.18)
2nd year post therapy discharge	**0.67 (0.45 to 0.98)**	**2.01 (1.08 to 3.75)**	0.63 (0.38 to 1.04)
PTS improvement group (ref = 'non-engagers') × Time (ref = 1st year pre-referral)			
'Improvers' 2nd year pre-referral	1.04 (0.65 to 1.67)	1.04 (0.49 to 2.19)	0.84 (0.49 to 1.45)
'Improvers' 1st year post therapy discharge	**0.61 (0.38 to 0.98)**	0.81 (0.38 to 1.72)	1.02 (0.56 to 1.86)
'Improvers' 2nd year post therapy discharge	0.79 (0.48 to 1.29)	0.90 (0.40 to 2.02)	1.06 (0.55 to 2.02)
'Non-improvers' 2nd year pre-referral	1.13 (0.72 to 1.78)	0.97 (0.50 to 1.91)	0.89 (0.52 to 1.53)
'Non-improvers' 1st year post therapy discharge	0.83 (0.53 to 1.30)	0.86 (0.43 to 1.73)	1.44 (0.82 to 2.54)
'Non-improvers' 2nd year post therapy discharge	0.88 (0.55 to 1.41)	1.01 (0.47 to 2.19)	1.42 (0.78 to 2.58)

Ref, reference.
a. Odds ratios are adjusted for matching variables (year of birth, gender and Northern Ireland Multiple Deprivation Measure).
b. Significant ($P < 0.05$) odds ratios are in bold.

and 'hypnotics and anxiolytics' than 'improvers' and 'non-improvers'. Over time a similar trend was evident for the 'improvers', 'non-improvers' and 'non-engagers' in terms of likelihood of using 'drugs used in psychoses and related disorders' and 'antidepressant drugs'. An interaction between time and PTS improvement group was evident for 'hypnotics and anxiolytics', with the proportion of 'improvers' using dropping more sharply (down 8% points) than for 'non-engagers' (down 2% points) between 1st year pre-referral and 1st year post therapy discharge. The nature of the interaction for hypnotics and anxiolytics is highlighted in the marginal means plots (Supplementary Figure 2).

Discussion

Principal findings and interpretation

This was the first study to employ data-linkage methodology to examine longitudinal medication usage trends among psychological therapy service-users with moderate-to-severe mental health problems. Unsurprisingly, as hypothesised, service-users were significantly more likely than matched controls to be in receipt of hypnotics/anxiolytics and antidepressant medications during the 1st and 2nd years before referral for therapy. However, less predictably given the remit of the therapy service examined, more than one-fifth of therapy clients had received at least one antipsychotic prescription in the year before referral for therapy; a considerably higher rate than that found among controls.

Findings relevant to the second study hypothesis were more equivocal. Although rates of anxiolytic medication use fell after discharge for all therapy clients regardless of their engagement or therapeutic progress, service-users who exhibited clinically significant improvement after therapy were only more likely to come off anxiolytic medication earlier (i.e. 1st year after discharge) than those who did not clinically improve or those who failed to engage in therapy. The data suggest that all therapy client groups tended to remain on antipsychotic and antidepressant medication for as long as 2 years post therapy discharge. Before and after therapy, individuals who failed to engage with therapy were more likely to be prescribed intensive medication subtypes such as anxiolytics or antipsychotics, which suggests these individuals may be a particular at-risk population.

Comparison with previous literature

The present study found high rates of antipsychotic prescribing to service-users, despite only a small proportion of these clients being assessed by clinicians as having psychotic symptoms. Other studies have highlighted this discrepancy between prescription rates for antipsychotics and diagnoses of psychosis, noting that rates of antipsychotic prescribing have been rising faster than psychosis incidence.[19] A UK cohort study also found high rates of antipsychotic prescribing to patients without psychosis and concluded that this reflected psychotropic management of conditions such as depression or anxiety, despite national guidelines recommending that antipsychotics are not clinically indicated for such disorders.[20,21] Clinicians in routine practice may be prescribing antipsychotics (often at low dose) to exert a tranquillising effect and control general features of mental health presentations such as agitation, poor sleep and anxiety.[20] Although such prescribing patterns are aimed at alleviating acute symptoms, they can lead to negative long-term side-effects and are a controversial practice.[22] Subthreshold psychotic experiences are common in the general public and may also occur, for example, in populations who were clinically depressed or individuals meeting clinical high risk for psychosis criteria.[23] However, treatment guidelines oppose the use of antipsychotic medications within these populations as there is little evidence for their effectiveness or capacity to reduce risk of transition to psychotic disorder.[21]

Previously, Sreeharan *et al*[9] concluded, based on group-level data from Improving Assess to Psychological Therapy services in England, that psychological interventions had not altered the long-term upward trend in antidepressant prescriptions. The current study involved a UK-based secondary care psychological therapy service that analysed individual level, as opposed to group-level, data, thereby supporting stronger conclusions regarding the impact of therapy on prescription trends. Consistent with Sreeharan et al,[9] the present results show that therapy does not appear to alter the likelihood of an individual coming off antidepressants, even when the client reports that their psychological well-being has improved. The findings also highlight that a variety of medication types (e.g. antianxiety, antipsychotics) show little

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evidence of prescribing reduction following therapy. Interpretations of such results could include that, despite apparent clinical improvement on symptom measures, psychological therapy may be less effective in alleviating mental health difficulties than self-reported questionnaires indicate, thereby leading to limited change in psychotropic medication usage. However, this contradicts the psychometric literature highlighting that self-ratings of mental health symptoms are less biased than alternative methods (e.g. clinician ratings), as well as the wealth of evidence supporting the clinical effectiveness of comparable models of psychological therapy delivery.[24,25] The moderate reduction in antianxiety medication in patients who exhibited clinically significant improvement after therapy suggests that some transdiagnostic anxiety management elements of psychological therapy may be effective in the year following intervention (e.g. relaxation, thought challenging, graded exposure). Nevertheless, the long-term maintenance of these treatment gains may be more challenging and require additional post therapy elements of psychological support (e.g. peer support groups).[26]

Strengths and limitations

A key strength of this study lies in its use of data-linkage methodology. This represents a modern, cost-effective, and efficient approach to healthcare research[27] and can make maximal use of existing data sources to understand the wider impact of psychological therapies on mental health. Consequently it would be beneficial for other services to record relevant outcomes data to support matching to population databases. A successful match to healthcare records was established in the present study for the vast majority (85%) of therapy clients. It is not possible to determine exactly why the matching process failed for some clients; however, errors could have been present in the therapies or prescriptions data-sets.

The findings of the current investigation have external validity considering the clinical sample is comprehensive and representative of patients of a community psychological therapy service. However, it must be acknowledged that because of data limitations it was not possible to compare subpopulations of diagnoses (e.g. major depressive disorder) or specific medication usage, nor to examine dosing ranges or source of prescription (e.g. primary or secondary care). Moreover, the categorisation of patient presenting problems were made by clinician judgement following intake assessment and intervention on a bespoke assessment proforma, rather than a formal diagnostic schedule.

The present study provides important insights into prescribing use among a population seeking help for mental health problems in Northern Ireland. It is possible different patterns could be found in other regions, as prescribing rates are generally higher in Northern Ireland[5] compared with the rest of the UK and prescribing rates tend to vary in accordance with population demographics. For example, higher levels of prescribing are often found in areas with higher population density and higher social disadvantage.[28] Further, research to explore the impact of therapy on prescribing trends in other countries will help to establish if the trends in the present study are widespread.

Implications

Similar to other data-linkage studies, the present analyses have highlighted possible discrepancies between clinical guidelines and prescribing practice.[11] The current study found that as many as 21% of therapy service clients had received an antipsychotic prescription in the year before therapy, considerably higher than the 2% of clients that present to the service with psychosis symptoms. This is also alarming considering patients in the current sample were more likely to present mixed anxiety and depression, mood disorders, anxiety, PTSD or OCD. Clinical practice guidelines advise against the use of antipsychotics for anxiety disorders,[29] and recommend the use of antipsychotics for mood disorders such as depression where comorbid psychosis symptoms occur.[30] Antipsychotics are also not recommended as first- line treatment for PTSD, and should only be considered as an adjunct to therapy if the client has disabling symptoms and behaviours (e.g. hyperarousal or psychotic symptoms) or their symptoms have not responded to other drug or psychological treatments.[31] This pattern of enhanced antipsychotic prescribing needs further exploration. Clinical practice guidelines reflect gold-standard generic intervention recommendations, however, the idiographic nature of routine practice is more complex and may necessitate straying beyond standard conventions to support individual patient needs (e.g. off-license prescribing). Nevertheless, complacent acceptance of such a potential explanation may obscure other factors such as broader cultural trends in prescribing and lack of timely access to alternative therapies.

Patients on antidepressants continued to receive prescriptions for their medication regardless of therapy outcome in the 1st year after discharge. This finding is consistent with National Institute for Health and Care Excellence guidelines[30] that recommend that for depression patients should continue use for at least 6 months after remission as this reduces the risk of relapse, and such medications are not associated with dependence. However, it is possible that post therapy antidepressant continuance extends for a longer period than required, potentially because of a lack of ongoing review and tapering schedule; acceptance of the minimal side-effect profile while taking the drugs; and genuine unease in both clinicians and clients about potential relapse if withdrawn.[32]

Although the 1-year reduction in anxiolytics/hypnotics post-therapy suggests an anxiety-reducing effect of psychological interventions, the limited long-term decrease in clients who reported clinical improvement after therapy is also concerning. Guidelines are clear that benzodiazepine should be used as a short-term measure in the treatment of generalised anxiety disorder to manage crises due in part to the well-established risks of dependence.[29] Several interventions could assist clinicians in this complex area. Wilson & Lader[32] emphasise the need for further education and training for clinicians and clients to ensure effective decision-making with regard to appropriate medication discontinuance, particularly after successful psychological intervention. More effective integration and multidisciplinary decision-making on elements of treatment (e.g. medication, psychological therapies) in a collaborative care model, could also be instrumental in improving post-therapy prescribing levels.

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Supplementary material

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Data availability

The data are not publicly available owing to privacy and ethical considerations. The process for accessing EPD data from the Honest Broker Service can be found at the following link: Honest Broker Service (https://hscbusiness.hscni.net/services/2454.htm).

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J.-A.J., A.E. and K.F.W.D. formulated the research questions and secured funding. J.-A.J. led on the statistical analyses. All authors made a significant contribution to interpreting the findings and writing the manuscript.

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Declaration of interest

K.F.W.D. and A.E. are managers within the psychological therapies service.

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EXTRA CONTENT ONLINE

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