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Original Article

Predictors of primary care psychological therapy outcomes for depression and anxiety in people living with dementia: evidence from national healthcare records in England

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Background

Psychological therapies can be effective in reducing symptoms of depression and anxiety in people living with dementia (PLWD). However, factors associated with better therapy outcomes in PLWD are currently unknown.

Aims

To investigate whether dementia-specific and non-dementia-specific factors are associated with therapy outcomes in PLWD.

Method

National linked healthcare records were used to identify 1522 PLWD who attended psychological therapy services across England. Associations between various factors and therapy outcomes were explored.

Results

People with frontotemporal dementia were more likely to experience reliable deterioration in depression/anxiety symptoms compared with people with vascular dementia (odds ratio 2.98, 95% CI 1.08–8.22; $P = 0.03$) or Alzheimer's disease (odds ratio 2.95, 95% CI 1.15–7.55; $P = 0.03$). Greater depression severity (reliable recovery: odds ratio 0.95, 95% CI 0.92–0.98, $P < 0.001$; reliable deterioration: odds ratio 1.73, 95% CI 1.04–2.90, $P = 0.04$), lower work and social functioning (recovery: odds ratio 0.98, 95% CI 0.96–0.99, $P = 0.002$), psychotropic medication use (recovery: odds ratio 0.67, 95% CI 0.51–0.90, $P = 0.01$), being of working age (recovery: odds ratio 2.03, 95% CI 1.10–3.73, $P = 0.02$) and fewer therapy sessions (recovery: odds ratio 1.12, 95% CI 1.09–1.16, $P < 0.001$) were associated with worse therapy outcomes in PLWD.

Conclusions

Dementia type was generally not associated with outcomes, whereas clinical factors were consistent with those identified for the general population. Additional support and adaptations may be required to improve therapy outcomes in PLWD, particularly in those who are younger and have more severe depression.

Keywords

Dementias/neurodegenerative diseases; anxiety or fear-related disorders; depressive disorders; psychological therapies; national healthcare records.

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Depression and anxiety are common in people living with dementia (PLWD)[1] and are associated with numerous adverse outcomes.[2–4] A recent Cochrane review of randomised controlled trials found that psychological therapies may be helpful in reducing symptoms of depression in PLWD.[5] Depression and anxiety are routinely treated with psychological therapies including in PLWD, in line with national guidelines (e.g. National Institute for Health and Care Excellence in the UK).[6] A key mode of delivery is through primary care psychological therapy services, such as National Health Service Talking Therapies for Anxiety and Depression (NHS TTad) services in the UK (previously known as Improving Access to Psychological Therapies before 2023). The utility of this has been supported in large secondary data effectiveness studies with national coverage.[7] This research found large effect sizes for pre–post NHS TTad therapy improvement in symptoms of anxiety and depression in PLWD, although PLWD were less likely to reliably improve or reliably recover following psychological therapy than people without dementia.[7] Despite promising evidence for the effectiveness of primary care psychological therapy services for PLWD, there is significant variability in therapy outcomes within a dementia population, and little is known about why this might be. Understanding this is critical in informing treatment decision-making.

Predictors of psychological therapy outcomes

Dementia is an umbrella term that covers a range of neurological conditions. It is possible that different neurological symptoms associated with dementia type may affect psychological therapy outcomes by differentially affecting ability to engage with treatment protocols. For example, PLWD with memory-led symptoms, such as in Alzheimer's disease, may experience difficulties with remembering and implementing therapeutic strategies, leading to poorer therapy outcomes. Conversely, therapists and patients might find it easier to compensate for memory difficulties within therapy than for behavioural symptoms (e.g. apathy, behavioural disinhibition, loss of empathy) characteristic of behavioural variant frontotemporal dementia.[8] It is also possible that age at onset (<65 *v.* ≥65 years) may be important. People with young-onset dementia are more likely to experience behavioural and psychological symptoms,[9] present with non-memory-based first cognitive symptoms,[10] have

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rarer forms of dementia[11] and have a greater awareness of the disease[12] than people with late-onset dementia. Considering these differences and previous findings that older adults have better therapy outcomes than working-age adults in primary care psychological therapy,[13] it is possible that older PLWD may have better psychological therapy outcomes than younger PLWD.

Furthermore, various sociodemographic, clinical and therapy variables have been associated with psychological therapy outcomes for common mental health problems (e.g. depression, anxiety) in a general population. Some examples associated with poorer therapy outcomes include higher baseline symptom severity,[14–16] longer duration of symptoms before treatment,[14] psychotropic medication use,[14] greater pre-treatment impairment in work and social functioning,[15] lack of social support,[17] fewer treatment sessions,[16,18] longer waiting times,[18] younger age[13] and unemployment.[19] It is likely that such factors may also be important in PLWD, although at present no research has investigated this. Understanding which factors predict better psychological therapy outcomes in PLWD could help inform service adaptations and improve therapy outcomes in this population. To our knowledge, no studies have investigated dementia-specific or general indicators of treatment prognosis for PLWD receiving psychological therapy for common mental health disorders. Consequently, this study will be the first to (a) investigate whether dementia-specific factors (including dementia type and age at dementia diagnosis) are associated with primary care psychological therapy outcomes, and (b) identify non-dementia-specific factors associated with primary care psychological therapy outcomes in PLWD.

Method

Participants

This study uses the Mental health and other psychological therapy Outcomes; their relationship to Dementia Incidence in the Following Years (MODIFY) project dataset,[7] which includes NHS TTad data[20] linked with Hospital Episode Statistics (HES) data,[21] the Mental Health Services Dataset (MHSDS)[22] and HES–Office for National Statistics mortality data.[23] Anonymised data and linkage key were provided by NHS Digital. As such, this study did not require ethics review in accordance with the Governance Arrangements of Research Ethics Committees. A sample of PLWD who attended NHS TTad between 2012 and 2019 were identified. Exclusion criteria were consistent with previous research using NHS TTad data.[7,13] Where participants entered treatment on more than one occasion during this period, only data from their first NHS TTad treatment episode were used. Participants were included if they received a course of psychological therapy (defined as at least two sessions),[20] had an ICD-10 matched problem descriptor (the term used to describe NHS TTad treatment focus) for an anxiety or depression diagnosis,[24] were not still receiving treatment, had complete pre–post data for the Patient Health Questionnaire-9 (PHQ-9)[25] and the Generalised Anxiety Disorder-7 screener (GAD-7),[26] and met clinical cut-off scores for depression (≥10 on the PHQ-9) or anxiety (≥8 on the GAD-7, or scoring above 'caseness' on any other anxiety disorder-specific measure (ADSM) matching the problem descriptor).[20] Of the 1 922 139 patients who were treated in NHS TTad during 2012–2019 and met the above inclusion criteria, 1522 received a dementia diagnosis before attending NHS TTad (those diagnosed during or after therapy were excluded). The full sample comprised 1522 PLWD (see Table 1 for sample characteristics).

Table 1 Sample characteristics

Characteristic	Full sample (*N* = 1522), *n* (%)
Gender	
Male	647 (42.51)
Female	871 (57.23)
Missing/prefer not to say	4 (0.26)
Ethnicity	
White	1209 (79.43)
Mixed	15 (0.99)
Asian	68 (4.47)
Black	54 (3.55)
Other	22 (1.45)
Missing/prefer not to say	154 (10.12)
Employment status	
Unemployed	420 (27.60)
Employed	167 (10.97)
Retired	800 (52.56)
Missing/prefer not to say	135 (8.87)
Long-term health condition	
Yes	760 (49.93)
No	385 (25.30)
Missing/prefer not to say	377 (24.77)
Psychotropic medication	
Taking	814 (53.48)
Not taking	454 (29.83)
Missing	254 (16.69)
Age at dementia diagnosis	
<65 years	675 (44.35)
≥65 years	847 (55.65)
Age at referral (categorical)	
<65 years	610 (40.08)
≥65 years	912 (59.92)
Appointment year	
2012	18 (1.18)
2013	73 (4.80)
2014	160 (10.51)
2015	274 (18.00)
2016	311 (20.43)
2017	301 (19.78)
2018	314 (20.63)
2019	71 (4.66)
Treatment intensity	
Low only	478 (31.41)
High only	535 (35.15)
Stepped down	30 (1.97)
Stepped up	125 (8.21)
Missing	354 (23.26)
Reliable improvement	
Yes	934 (61.37)
No	588 (38.63)
Reliable recovery	
Yes	633 (41.59)
No	889 (58.41)
Reliable deterioration	
Yes	130 (8.54)
No	1392 (91.46)
Drop-out	
Yes	331 (21.75)
No	374 (53.68)
Missing	374 (24.57)
	Mean (s.d.)
Age at referral	65.93 (16.12)
IMD decile	4.76 (2.81)
Baseline depression severity (PHQ-9)	15.70 (5.67)
Baseline anxiety severity (GAD-7)	13.11 (4.95)
Baseline work and social functioning (WSAS)	16.91 (9.72)
Waiting time (weeks)	10.37 (8.57)
Dementia diagnosis to treatment (weeks)	102.03 (135.94)
Number of sessions	5.53 (3.98)

IMD, Index of Multiple Deprivation; PHQ-9, Patient Health Questionnaire-9; GAD-7, Generalised Anxiety Disorder-7; WSAS, Work and Social Adjustment Scale.

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Dementia type subsample

To facilitate examination of dementia-specific factors, we created a subsample excluding participants who had a non-specific dementia diagnosis. Dementia type was determined from ICD-10 codes.[27] For Alzheimer's dementia, vascular dementia and frontotemporal dementia groups, we excluded any cases where there were different diagnoses recorded at different time points. There were no participants in the full sample that had a diagnosis of atypical Alzheimer's dementia only. To define this group, we included participants who were diagnosed with atypical Alzheimer's dementia with any combination of Alzheimer's dementia or dementia not otherwise specified. The final subsample included 479 PLWD, of whom 214 had a diagnosis of Alzheimer's dementia, 150 had vascular dementia, 65 had atypical Alzheimer's dementia and 50 had frontotemporal dementia (see Table 2 for sample characteristics). Comparisons of those included and excluded from this subsample are presented in Supplementary Table 1 available at https://doi.org/10.1192/bjp.2024.12.

Measures

Sociodemographic factors

Sociodemographic information was available from NHS TTad data, including gender, ethnicity, employment status, Index Of Multiple Deprivation (IMD) decile and age at referral. Ethnicity was categorised with ONS ethnicity groups. IMD decile was treated as a categorical variable, with lower scores representing more deprived geographical areas in England. Given previous findings regarding age and therapy outcomes,[13] age was explored as a categorical variable (<65 *v.* ≥65 years).

Clinical and therapy factors

Clinical and therapy variables associated with psychological therapy outcomes in prior studies[14–16,18] were taken from NHS TTad and HES data. Routinely collected NHS TTad data included measures for depression (PHQ-9) and anxiety (GAD-7, ADSM) before and after therapy, baseline measure of work and social functioning (Work and Social Adjustment Scale (WSAS); higher scores reflect greater functional impairment),[28] whether the patient was taking any psychotropic medications (e.g. antidepressants, anxiolytics), the number of therapy sessions attended and whether a long-term health condition (e.g. cardiovascular disease, diabetes) was present. Waiting time between referral and treatment was calculated from dates provided in NHS TTad records and winsorized at the top 99%.

Dementia factors

Dementia ICD-10 codes[27] were recorded in HES and MHSDS data. Previous research has suggested this approach has good validity.[29] Although we were unable to ascertain the age at dementia onset, information regarding age at the time of first dementia diagnosis record was available. This was dichotomised as <65 (young onset) *v.* ≥65 (late onset) years, and treated as an estimate of age at onset. Time (number of weeks) between dementia diagnosis and starting psychological therapy was calculated from NHS TTad and HES data.

Outcome measures

Primary and secondary outcome measures were based on routinely used NHS TTad definitions.[30] Primary outcomes included reliable recovery (reduction in depression or anxiety symptoms beyond the error of measurement on the PHQ-9, GAD-7 or ADSM and below caseness on both depression and anxiety measures), reliable deterioration (increase in symptoms beyond the error of measurement on the PHQ-9, GAD-7 or ADSM) and drop-out (did not complete course of therapy). Secondary outcomes included pre–post change in depression and anxiety scores and reliable improvement (reduction in depression or anxiety symptoms beyond the error of measurement). See Supplementary Table 2 for symptom scale cut-offs.

Statistical analysis

All analyses were conducted with Stata version 17 for Windows.[31] The first analysis used the dementia type subsample and explores the association between dementia-specific factors (time between dementia diagnosis and NHS TTad therapy, dementia type, age at time of dementia diagnosis) and psychological therapy outcomes. Logistic regression models were conducted for primary outcome analyses (reliable recovery, reliable deterioration, drop-out), and linear and logistic regression models were used for secondary outcome analyses (PHQ-9 score change, GAD-7 score change, reliable improvement). Standardised beta coefficients are reported for linear regression models. Complete data were available for all dementia-specific factors.

The second analysis used the full sample to explore predictors of psychological therapy outcomes over and above dementia-specific factors in PLWD. Specifically, clinical and health variables (baseline depression, anxiety, work and social functioning, psychotropic medication, presence of a long-term health condition), therapy variables (number of sessions offered, NHS TTad waiting time) and sociodemographic variables (gender, IMD decile, employment status, age at referral to NHS TTad) were explored alongside age at dementia diagnosis. Ethnicity was not included in these models because of the small number of participants (10.45%) identifying as Black and minority ethnicities. Variables were first explored with univariate logistic regression models. Those with significant associations were used in subsequent analyses, whereby multiple logistic regression models were conducted for primary outcomes, and multiple linear and logistic regression models were conducted for secondary outcomes. To maximise sample size, missing data on all categorical variables were dummy coded and used in analyses. Comparisons of those with complete data versus missing data on at least one key variable were performed with independent *t*-tests and chi-squared tests (Supplementary Table 3). Finally, three sensitivity analyses were conducted for primary outcomes only. The first explored individual WSAS items (excluding the 'ability to work' item). The second controlled for NHS TTad appointment year. The final sensitivity analysis was conducted for both dementia-specific and non-dementia-specific factor models, and included patients who were diagnosed with dementia during NHS TTad treatment.

Results

PLWD in NHS TTad

Sample characteristics including outcomes are presented in Table 1 (full sample) and Table 2 (dementia type subsample). For the full sample of PLWD (Table 1), 61% reliably improved, 42% reliably recovered and 9% reliably deteriorated following NHS TTad psychological therapy. Further, 31% of the full sample received low-intensity interventions only, 35% received high-intensity interventions only and 10% received both (either stepped up or stepped down during episode of treatment). Treatment intensity data were unavailable for 23% of the full sample. To compared with national outcomes rates in 2015–2016 for all patients treated in NHS TTad services, 62% reliably improved, 44% reliably recovered and 6% reliably deteriorated.[32] Regarding national rates for treatment intensity in 2015–2016, 36% received low-intensity interventions only, 28% received high-intensity interventions only and 34% received both.[32]

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Table 2 Dementia type subsample characteristics

Characteristic	Alzheimer's dementia (*n* = 214), *n* (%)	Vascular dementia (*n* = 150), *n* (%)	Frontotemporal dementia (*n* = 50), *n* (%)	Atypical Alzheimer's dementia (*n* = 65), *n* (%)
Gender				
Male	85 (39.72)	69 (46.00)	31 (62.00)	29 (44.62)
Female	129 (60.28)	81 (54.00)	19(38.00)	36 (55.38)
Ethnicity				
White	166 (77.57)	127 (84.67)	42 (84.00)	49 (75.38)
Mixed	4 (1.87)	1 (0.67)	1 (2.00)	1 (1.54)
Asian	6 (2.80)	6 (4.00)	0 (0.00)	4 (6.15)
Black	5 (2.34)	5 (3.33)	0 (0.00)	3 (4.62)
Other	5 (2.34)	1 (0.67)	0 (0.00)	0 (0.00)
Missing/prefer not to say	28 (13.08)	10 (6.67)	7 (14.00)	8 (12.31)
Employment status				
Unemployed	49 (22.90)	29 (19.33)	27 (54.00)	7 (10.77)
Employed	27 (12.62)	8 (5.33)	7 (14.00)	3 (4.62)
Retired	124 (57.94)	103 (68.67)	12 (24.00)	52 (80.00)
Missing/prefer not to say	14 (6.54)	10 (6.67)	4 (8.00)	3 (4.62)
Long-term health condition				
Yes	91 (42.52)	85 (56.67)	23 (46.00)	35 (53.85)
No	68 (31.78)	27 (18.00)	16 (32.00)	15 (23.08)
Missing/prefer not to say	55 (25.70)	38 (25.33)	11 (22.00)	15 (23.08)
Psychotropic medication				
Taking	114 (53.27)	79 (52.67)	33 (66.00)	38 (58.46)
Not taking	75 (35.05)	42 (28.00)	15 (30.00)	19 (29.23)
Missing	25 (11.68)	29 (19.33)	2 (4.00)	8 (12.31)
Age at dementia diagnosis				
<65 years	92 (42.99)	51 (34.00)	38 (76.00)	9 (13.85)
≥65 years	122 (57.01)	99 (66.00)	12 (24.00)	56 (86.15)
Appointment year				
2012	5 (2.34)	1 (0.67)	0 (0.00)	0 (0.00)
2013	7 (3.27)	5 (3.33)	3 (6.00)	6 (9.23)
2014	16 (7.48)	17 (11.33)	4 (8.00)	13 (20.00)
2015	31 (14.49)	18 (12.00)	7 (14.00)	10 (15.38)
2016	44 (20.56)	27 (18.00)	12 (24.00)	10 (15.38)
2017	40 (18.69)	35 (23.33)	7 (14.00)	9 (13.85)
2018	60 (28.04)	41 (27.33)	12 (24.00)	12 (18.46)
2019	11 (5.14)	6 (4.00)	5 (10.00)	5 (7.69)
Treatment intensity				
Low only	66 (30.84)	62 (41.33)	15 (30.00)	25 (38.46)
High only	87 (40.65)	48 (32.00)	21 (42.00)	15 (23.08)
Stepped down	1 (0.47)	4 (2.67)	0 (0.00)	1 (1.54)
Stepped up	16 (7.48)	7 (4.67)	6 (12.00)	2 (3.08)
Missing	44 (20.56)	29 (19.33)	8 (16.00)	22 (33.85)
Reliable improvement				
Yes	143 (66.82)	93 (62.00)	29 (58.00)	44 (67.69)
No	71 (33.18)	57 (38.00)	21 (42.00)	21 (32.31)
Reliable recovery				
Yes	93 (43.46)	74 (49.33)	21 (42.00)	31 (47.69)
No	121 (56.54)	76 (50.67)	29 (58.00)	34 (52.31)
Reliable deterioration				
Yes	13 (6.07)	9 (6.00)	8 (16.00)	3 (4.62)
No	201 (93.93)	141 (94.00)	42 (84.00)	62 (95.38)
Drop-out				
Yes	48 (22.43)	29 (19.33)	13 (26.00)	10 (15.38)
No	124 (57.94)	82 (54.67)	30 (60.00)	31 (47.69)
Missing	42 (19.63)	39 (26.00)	7 (14.00)	24 (36.92)
	Mean (s.d.)	Mean (s.d.)	Mean (s.d.)	Mean (s.d.)
Age at referral, years	66.19 (16.40)	69.93 (14.74)	56.60 (12.83)	73.69 (11.24)
IMD decile	5.25 (2.82)	4.57 (2.84)	4.98 (2.88)	5.54 (2.80)
Baseline depression severity (PHQ-9)	15.91 (6.00)	15.42 (5.54)	17.88 (4.91)	14.46 (5.88)
Baseline anxiety severity (GAD-7)	13.61 (4.92)	12.49 (5.23)	13.70 (4.70)	12.45 (4.54)
Baseline work and social functioning (WSAS)	16.74 (9.57)	16.35 (8.79)	19.60 (9.40)	13.60 (8.18)
Waiting time (weeks)	11.91 (9.68)	9.89 (7.85)	10.35 (9.43)	10.64 (8.53)
Dementia diagnosis to treatment (weeks)	170.22 (283.82)	96.64 (89.67)	95.27 (67.45)	69.29 (71.66)
Number of sessions	5.93 (4.32)	4.99 (2.97)	6.82 (4.80)	5.17 (3.09)

IMD, Index of Multiple Deprivation; PHQ-9, Patient Health Questionnaire-9; GAD-7, Generalised Anxiety Disorder-7; WSAS, Work and Social Adjustment Scale.

Associations between dementia-specific variables and psychological therapy outcomes

The associations between dementia-specific variables and primary psychological therapy outcomes are presented in Table 3. There was no evidence to suggest that dementia type was associated with therapy outcomes, except that people with frontotemporal dementia had a higher likelihood of reliable deterioration in symptoms of depression or anxiety following therapy than people with

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Table 3 Association between dementia-specific variables and primary psychological therapy outcomes

	Reliable recovery			Reliable deterioration			Drop-out		
	Odds ratio	95% CI	*P*-value	Odds ratio	95% CI	*P*-value	Odds ratio	95% CI	*P*-value
Alzheimer's dementia (reference) versus vascular dementia	1.27	0.83–1.93	0.27	0.99	0.41–2.37	0.98	0.91	0.53–1.57	0.74
Alzheimer's dementia (reference) versus frontotemporal dementia	0.94	0.51–1.76	0.85	2.95	1.15–7.55	0.03	1.12	0.54–2.33	0.76
Alzheimer's dementia (reference) versus atypical Alzheimer's dementia	1.19	0.68–2.07	0.55	0.75	0.21–2.71	0.66	0.83	0.38–1.83	0.65
Vascular dementia (reference) versus frontotemporal dementia	0.74	0.39–1.42	0.37	2.98	1.08–8.22	0.03	1.23	0.56–2.66	0.61
Vascular dementia (reference) versus atypical Alzheimer's dementia	0.94	0.52–1.68	0.83	0.76	0.20–2.90	0.69	0.91	0.40–2.09	0.83
Atypical Alzheimer's dementia (reference) versus frontotemporal dementia	0.79	0.38–1.67	0.54	3.94	0.99–15.70	0.05	1.34	0.51–3.53	0.55
Age at dementia diagnosis (<65 *v.* ≥65 years)	2.98	2.02–4.39	<0.001	0.35	0.17–0.73	0.01	0.49	0.31–0.79	0.003
Dementia diagnosis to NHS TTad treatment	0.99	0.99–0.99	0.05	1.00	0.99–1.00	0.55	1.00	1.00–1.00	0.02

NHS TTad, National Health Service Talking Therapies for Anxiety and Depression.

vascular dementia (odds ratio 2.98, 95% CI 1.08–8.22, $P = 0.03$) and people with Alzheimer's dementia (odds ratio 2.95, 95% CI 1.15–7.55, $P = 0.03$). Age at dementia diagnosis was associated with all therapy outcomes, suggesting that being diagnosed with dementia at ≥65 *v.* <65 years of age is associated with higher likelihood of reliable recovery (odds ratio 2.98, 95% CI 2.02–4.39, $P < 0.001$), and lower likelihood of reliable deterioration (odds ratio 0.35, 95% CI 0.17–0.73, $P = 0.01$) and drop-out (odds ratio 0.49, 95% CI 0.31–0.79, $P = 0.003$) following psychological therapy. No significant relationships were found for time between dementia diagnosis and treatment. Findings for secondary outcomes are presented in Supplementary Table 4.

Predictors of psychological therapy outcomes in PLWD

The following analyses were performed with the full sample, and included significant non-dementia-specific factors from the univariate models (Supplementary Table 5) and age at dementia diagnosis. When controlling for all other variables in the model, no associations were found for IMD decile or age at dementia diagnosis with any therapy outcome in PLWD (Table 4). Age at referral was associated with reliable recovery (odds ratio 2.03, 95% CI 1.10–3.73, $P = 0.02$), suggesting that older PLWD (≥65 years) were more likely to recover from symptoms of depression and anxiety than working-age PLWD (<65 years). Taking psychotropic medication was associated with lower likelihood of reliable recovery (odds ratio 0.67, 95% CI 0.51–0.90, $P = 0.01$) and higher likelihood of reliable deterioration (odds ratio 1.73, 95% CI 1.04–2.90, $P = 0.04$). Higher baseline depression severity was associated with lower likelihood of reliable recovery (odds ratio 0.95, 95% CI 0.92–0.98, $P \leq 0.001$) and reliable deterioration (odds ratio 0.94, 95% CI 0.89–0.98, $P = 0.01$). Higher baseline anxiety severity was associated with higher likelihood of drop-out (odds ratio 1.06, 95% CI 1.02–1.11, $P = 0.01$) and lower likelihood of reliable deterioration (odds ratio 0.89, 95% CI 0.84–0.94, $P < 0.001$). Greater impairment in baseline work and social functioning was associated with lower likelihood of reliable recovery (odds ratio 0.98, 95% CI 0.96–0.99, $P = 0.002$) and higher likelihood of drop-out (odds ratio 1.03, 95% CI 1.01–1.05, $P = 0.01$). Receiving more therapy sessions was associated with higher likelihood of reliable recovery (odds ratio 1.12, 95% CI 1.09–1.16, $P < 0.001$). Findings for secondary outcomes are presented in Supplementary Table 6.

Sensitivity analyses

Work and social adjustment (individual items)

Given the majority of participants were either unemployed or retired, this sensitivity analysis explored individual WSAS items, excluding item 1 (ability to work) (Supplementary Table 7). Greater functional impairment in home management was associated with lower likelihood of drop-out (odds ratio 0.92, 95% CI 0.85–0.99, $P = 0.03$), whereas greater impairment in social leisure

Table 4 Predictors of primary psychological therapy outcomes in people living with dementia (adjusted models)

	Reliable recovery (*n* = 1079)			Reliable deterioration (*n* = 1079)			Drop-out (*n* = 912)		
	Odds ratio	95% CI	*P*-value	Odds ratio	95% CI	*P*-value	Odds ratio	95% CI	*P*-value
Gender (male, reference)	1.09	0.84–1.41	0.53	0.90	0.58–1.40	0.64	1.08	0.78–1.49	0.64
IMD decile	1.01	0.97–1.06	0.61	0.98	0.91–1.07	0.71	0.95	0.90–1.01	0.12
Age at referral (<65 *v.* ≥65 years)	2.03	1.10–3.73	0.02	1.06	0.42–2.70	0.90	0.55	0.26–1.18	0.12
Psychotropic medication (not taking, reference)	0.67	0.51–0.90	0.01	1.73	1.04–2.90	0.04	1.14	0.80–1.64	0.47
Baseline depression severity (PHQ-9)	0.95	0.92–0.98	<0.001	0.94	0.89–0.98	0.01	1.00	0.96–1.03	0.79
Baseline anxiety severity (GAD-7)	0.99	0.96–1.03	0.67	0.89	0.84–0.94	<0.001	1.06	1.02–1.11	0.01
Baseline work and social functioning (WSAS)	0.98	0.96–0.99	0.002	1.01	0.98–1.04	0.49	1.03	1.01–1.05	0.01
Number of sessions	1.12	1.09–1.16	<0.001	0.98	0.93–0.104	0.51	0.76	0.71–0.81	<0.001
Age at dementia diagnosis (<65 *v.* ≥65 years)	0.76	0.41–1.40	0.38	0.53	0.21–1.37	0.19	1.08	0.50–2.33	0.85

IMD, Index of Multiple Deprivation; PHQ-9, Patient Health Questionnaire-9; GAD-7, Generalised Anxiety Disorder-7; WSAS, Work and Social Adjustment Scale.

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activities was associated with higher likelihood of drop-out (odds ratio 1.09, 95% CI 1.00–1.18, $P = 0.05$). Greater impairment in forming and maintaining close relationships was associated with lower likelihood of reliable recovery (odds ratio 0.94, 95% CI 0.89–1.00, $P = 0.04$). No significant associations were found for private leisure activities.

Appointment year

Given improvements in NHS TTad therapy outcomes over the data collection period,[20] a sensitivity analysis was conducted controlling for NHS TTad appointment year. Results remained consisted with the main non-dementia-specific factors model, and appointment year was not significantly associated with any therapy outcome (Supplementary Table 8).

Including participants diagnosed with dementia during therapy

Main models were re-run including patients who were diagnosed with dementia during their episode of care in NHS TTad. Although these participants would have likely had dementia before starting treatment, they arguably reflect a different group and may not be comparable to PLWD diagnosed before starting therapy. Including patients diagnosed with dementia during NHS TTad treatment resulted in 3555 participants for the full sample and 1200 participants for the dementia type subsample (508 Alzheimer's dementia, 368 vascular dementia, 195 atypical Alzheimer's dementia, 129 frontotemporal dementia). Results for the dementia type subsample were consistent with the main model (Supplementary Table 9). For the full sample, results were also in line with the main model, with the exception that taking psychotropic medication was no longer associated with higher likelihood of reliable deterioration ($P = 0.09$). Additionally, work and social functioning was associated with reliable deterioration (odds ratio 1.02, 95% CI 1.00–1.04, $P = 0.05$) and IMD decline was associated with drop-out (odds ratio 0.95, 95% CI 0.91–0.98, $P = 0.004$) (Supplementary Table 10).

Discussion

To our knowledge, this was the first study to test predictors of psychological therapy outcomes for anxiety and depression in PLWD. Dementia type was not associated with reliable recovery from depression or anxiety symptoms. People living with FTD had nearly three times higher odds of reliable deterioration in symptoms of depression or anxiety than people with vascular dementia or Alzheimer's dementia, although lack of estimate precision means that this should be interpreted with caution. Age at dementia diagnosis was not significant when controlling for non-dementia-specific factors in the multivariate models. Findings for non-dementia-specific factors revealed baseline symptom severity (depression and anxiety), baseline work and social functioning, psychotropic medication use, age at referral and number of sessions to be associated with psychological therapy outcomes in PLWD.

With our previous findings suggesting that therapies offered in primary care psychological therapy services can be beneficial for reducing symptoms of depression and anxiety in PLWD,[7] understanding which PLWD may benefit is particularly valuable. One possible explanation for the preliminary finding that frontotemporal dementia is associated with greater reliable deterioration than Alzheimer's dementia and vascular dementia, is that people with frontotemporal dementia experience faster rates of decline in cognition and general functioning compared with people with other types of dementia;[33] therefore, this finding may be a reflection of general deterioration beyond symptoms of depression and anxiety. Next, in light of the results for age at dementia diagnosis, it appears that the initial associations observed are likely better explained by other characteristics. For example, people with young-onset dementia generally have a greater awareness of the disease,[12] and this has been associated with more affective and neuropsychiatric symptoms.[34] Thus, associations between age at dementia diagnosis and psychological therapy outcomes may be explained by differences in psychological symptom profiles. Further, given previous findings that older adults have better therapy outcomes than working-age adults,[13] it may be that these results are better explained by differences between age profiles than dementia-onset profiles, as suggested by significant results for age at referral.

It appears that many predictors that are associated with therapy outcomes in a general population are also important for PLWD. Our findings that psychotropic medication use, greater baseline impairment in work and social functioning, and fewer therapy sessions are associated with poorer therapy outcomes are consistent with previous research in a general population.[14–16,18] Regarding baseline symptom severity, our results suggest that higher baseline depression scores are associated with lower odds of reliable recovery and reliable deterioration, and higher baseline anxiety scores are associated with lower odds of reliable deterioration and higher odds of drop-out. The directions of these associations are likely attributable to measurement artefacts, as higher baseline symptom scores have less room for reliable deterioration and require larger change to cross the caseness threshold for reliable recovery. Moreover, given that this is an observational study, causality cannot be established. Specifically, the direction of the association between number of therapy sessions and therapy outcomes should be interpreted with caution. It may be that more therapy sessions may lead to better therapy outcomes, but it is also possible that people showing greater symptom improvement may be more likely to be offered more therapy sessions.

Strengths and limitations

To our knowledge, our study is the first to explore factors associated with psychological therapy outcomes in a sample of PLWD. Moreover, this study uses national healthcare data, which provides a unique insight to outcomes for PLWD in routinely provided clinical care. Limitations of this study primarily relate to defining dementia-specific variables. Although dementia diagnoses in hospital records are mostly reliable,[29,35] determining the type of dementia can present difficulties. Because some people with dementia receive multiple different dementia diagnoses, we focused on those with only one diagnosis recorded (albeit possibly recorded several times). This is likely to be more accurate, but resulted in smaller selective subsamples, which increased the possibility of type 2 error. Given the smaller sample size, findings from the dementia type subsample analyses should be interpreted with caution, as it is possible that these were not sufficiently statistically powered to detect effects; however, results remained consisted when using the larger sample in the sensitivity analysis. Next, people with young-onset dementia typically experience a longer delay between dementia symptom onset and diagnosis than people with late-onset dementia.[36] This presents two issues. First, those diagnosed <65 years of age may have had more advanced dementia than those diagnosed ≥65 years, which could account for their poorer outcomes, something which is perhaps suggested by the fact that when non-dementia-specific factors including a measure of work and social functioning were included, age at onset was no longer a significant predictor of recovery. Second, although we can be confident that those diagnosed <65 years of age reflect young-onset dementia, it is possible that some people diagnosed

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with dementia aged ≥65 years were presenting with symptoms of dementia before 65 years of age. Another limitation of this study relates to the representativeness of our sample. People with young-onset dementia account for 9% of dementia cases,[37] yet accounted for 44% of the full sample in our study. Additionally, as in our previous research, the proportion of PLWD attending NHS TTad is likely much lower than the need for these services in this population.[7] Thus, our findings should be interpreted in the context of this selective sample. Other limitations of this research include that we could not account for any adaptations that may have been made during therapy for PLWD or for the degree of severity of dementia, as these data were not available. Also, the GAD-7 and WSAS have not been validated for use with PLWD (although the PHQ-9 has[38]). Specifically, it is not clear whether the measure of work and social functioning reflects difficulties arising from mood or dementia. Finally, the possible predictors we could test in the study were limited by the data available. As such, we focused on clinical factors that are routinely measured in NHS TTad. However, there are various other factors identified in the literature as predictors of therapy outcomes that have not been considered for PLWD specifically (e.g. motivation, engagement, social support). Future research should continue to explore which factors are associated with better therapy outcomes in PLWD.

Implications and future directions

Given that general practitioners can be reluctant to refer older adults generally to psychological therapy services,[39] research in this area has important implications for encouraging referrals of PLWD into these services. First, our findings suggest that eligibility of PLWD for primary care psychological therapy services should be assessed beyond dementia-specific factors. Of particular importance is that when individual items of the WSAS were explored, only greater impairment in forming and maintaining close relationships was consistently associated with poorer therapy outcomes in PLWD. Given that general functional impairment is likely to be greater in PLWD than people without dementia, it is potentially important to focus on this aspect of functioning rather than others when assessing for therapy suitability. It is also a potential area for therapy targets, as difficulties with close relationships may be an area that could be addressed within therapy. Next, this research also has implications for identifying PLWD who may require more support and adaptations during their therapy process. For example, PLWD attending psychological therapy with more severe symptoms of depression or anxiety and greater impairment in work and social functioning seem to have worse treatment outcomes, and might thus be candidates for higher-intensity therapy, more regular clinical reviews and additional therapy sessions to mitigate risks of poor treatment outcomes. Finally, given varying evidence for the efficacy of antidepressants in PLWD[40] and our present findings suggesting that psychotropic medication use is associated with poorer therapy outcomes in PLWD, this research may also have implications for the use of psychotropic medication in treating depression and anxiety in PLWD.

Given findings that people with FTD are more likely to reliably deteriorate than people with Alzheimer's dementia and vascular dementia, more work is needed to better understand the mechanisms behind this association. Follow-up studies should consider including additional measures of dementia severity and cognitive and functional decline when investigating psychological therapy outcomes in PLWD. Next, future research should also explore barriers and facilitators to accessing psychological therapies for PLWD, and whether pathways (e.g. referral, waiting times) into therapy differ from people without dementia. Further, given the present results for number of therapy sessions and symptom severity (depression and anxiety), future research could also explore trajectories to understand when PLWD are benefitting.

In conclusion, our findings suggest that predictors of therapy outcomes for a general population (baseline depression and anxiety severity, work and social functioning, psychotropic medication use and number of treatment sessions) are also relevant for PLWD over and above dementia-specific factors. Thus, when assessing eligibility for psychological therapy, referrers should consider these factors regardless of the dementia diagnosis. This research has important implications for encouraging referrals of PLWD into these services, and identifying those who may particularly benefit from psychological therapy.

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Supplementary material

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Data availability

All data used for this study are available upon successful application to NHS Digital via the Data Access Request Service (DARS): https://digital.nhs.uk/services/data-access-request-service-dars. Data fields can be accessed via NHS Digital data dictionary: https://www.datadictionary.nhs.uk/.

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Author contributions

All authors were involved in the conceptualisation and design of the study. G.B., A.J., J.S., R.S. and J.E.J.B. contributed to the methodology and formal analysis. G.B., A.J. and R.S. assessed and verified the underlying data reported in the manuscript. All authors contributed to the manuscript writing and reviewing, and approved the final version. All authors had full access to all data in the study and accept the responsibility to submit for publication.

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