Effectiveness of psychological interventions for young adults versus working age adults: a retrospective cohort study in a national psychological treatment programme in England

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Summary

Background The prevalence of depression and anxiety in young adults is rising, leading to an increasing need for evidence-based treatment. Psychological therapies are a first-line treatment for these conditions and are broadly preferred to pharmacotherapies, particularly by young adults. There is some evidence that younger people might have poorer outcomes from psychological therapies than adults over the age of 25 years, but research has been confined to smaller studies or has not considered the role of statistical confounding, as well as the potential interaction between age and gender. This study uses data from a national psychological treatment programme to investigate differences in outcomes between young adults (age 16–24 years) and working age adults (age 25–65 years).

Methods We used data from all individuals who had an episode of treatment in any English National Health Service Talking Therapies for anxiety and depression (TTad) service between April 1, 2015, and March 31, 2019. We compared change in Patient Health Questionnaire 9-item (PHQ-9) score and Generalised Anxiety Disorder Scale 7-item (GAD-7) score pre-treatment to post-treatment between patients who were aged 16–24 years and those aged 25–65 years, as well as service-specific outcomes including recovery, reliable recovery, reliable improvement, and reliable deterioration. Age was also treated as a continuous variable in linear regression models examining change in depression and anxiety symptom severity scores. We examined geographical and temporal consistency as sensitivity analyses. People with lived experience were involved in the study design and interpretation.

Findings The young adult cohort contained 309 758 patients aged 16–24 years (214 977 [69·4%] female and 93 728 [30·3%] male; 255 547 [82·5%] of White ethnicity; mean age 20·8 years [SD 2·3]). The working age adult group comprised 1 290 130 patients aged 25–65 years (840 631 [65·2%] female and 445 466 [34·5%] male; 1 078 985 [83·6%] of White ethnicity; mean age 41·5 years [SD 11·1]). We observed that improvements in PHQ-9 and GAD-7 scores were smaller for young adults compared to working age adults (PHQ-9: b –0·98 [95% CI –1·00 to –0·96]; GAD-7: b –0·77 [–0·80 to –0·75]). Young adults were less likely to meet criteria for reliable improvement (odds ratio 0·78 [95% CI 0·77–0·78]), recovery 0·73 (0·73–0·74), and reliable recovery (0·74 [0·73–0·74]), and more likely to meet criteria for reliable deterioration 1·19 (1·17–1·20). Sensitivity analyses revealed consistency of the age-related treatment effect when differences in temporal, geographical, and adults older than 65 years, were considered.

Interpretation Outcomes following routinely delivered psychological treatments across all areas of England were poorer in young adults than working age adults. These effects, when scaled up to the population level, affect thousands of young adults annually. Future research should consider adaptions to treatment tailored to younger people, including how young people navigate adult mental health services.

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Introduction

Depression and anxiety are the leading causes of disease burden in young adults, and they have become more common in this age group over recent years.[1] Young or emerging adulthood is the phase of life beginning around 16–18 years old and considered to continue up until the end of the 24th year according to WHO.[2] This important period of brain and social maturation coincides with a peak in the incidence of common mental disorders (CMDs).[3] Timely and effective treatment of these conditions is crucial to long-term prognosis and to reduce the negative impacts of these conditions across the life course.[4]

Psychological therapies are recommended as a first-line treatment for adults with CMDs,[5] and in young adults they are particularly important given concerns about the risk-to-benefit ratio of antidepressant medication for this age group.[6] Treatment recommendations contained in clinical guidelines are based on evidence from randomised controlled trials (RCTs), but the average age of participants in trials of treatments for CMDs (around age 44 years) does not reflect the mean age of adults treated in mental health

Research in context

Evidence before this study

Clinical guidelines recommend psychological therapies as first-line treatments for depression and anxiety disorders for adults. Given the increasing prevalence of mental health issues in young people, understanding the effectiveness of routinely delivered psychological therapy is of extreme importance. Existing studies, pooling data from controlled trials, report inconsistent findings, and the selection biases apparent in the samples mean findings from these studies might not generalise well to patients in routine care settings. Annual reports from the English National Health Service (NHS) indicate younger people might have poorer outcomes than other age groups, but these analyses do not consider potential statistical confounding. We searched PubMed for papers in English published from database inception to March 28, 2025, using title or abstract search terms ("age" "difference/comparison/group") AND ("mental health/disorder" OR "depression" OR "anxiety") AND ("counselling" OR "therapy" OR "psychotherapy" OR "psychological treatment") AND ("routine care/practice" OR "service*" OR "implement*" OR "program*"). We identified 247 studies, the most relevant of which focused on differences in access to services between young adults and older groups, including transitions in care. Others were focused on differences in outcomes between older aged adults and those of working age. Any other comparisons were from controlled trials, and none provided national-level information about differences in psychological treatment outcomes.

Added value of this study

Using routine data on over 1·5 million attendees to all NHS Talking Therapies for anxiety and depression services in England, this study compares psychological treatment outcomes between service users aged 16–24 years (young adults) and those aged 25–65 years (working age adults). It is the largest analysis of its kind with national coverage, and builds on previous evaluations with regard to availability of a standardised set of covariates to consider the impact of statistical confounding. A robust set of analyses with considerable statistical power indicate that psychological treatment outcomes are poorer for young adults across a number of outcome metrics, and across all health regions of England. These differences exist while statistically controlling for the intensity of treatment received and service users' engagement with treatment. We provide estimates that show how reducing the observed inequalities in outcomes could result in significant numbers of young adults having improved mental health at the population level.

Implications of all the available evidence

Younger people appeared less likely to benefit from routinely delivered psychological treatment for depression and anxiety. Those differences, scaled over the population attending psychological treatment services in England, amounted to worse outcomes for tens of thousands of young adults compared to those 25 years and older. Research has indicated that young people find it harder to navigate adult services, and our findings show that those under 25 years of age were reported to cancel sessions and drop out of treatment more often. With the increasing prevalence of mental health problems among young adults globally, our findings point to the urgent need to consider what adjustments are needed to improve outcomes for young adults, including those that might increase engagement with treatment.

services for such conditions (age 32 years).[7,8] RCTs of treatments for children and adolescents span a broad age range, including childhood, adolescence, and young adulthood. Meta-analyses of response to cognitive behavioural therapy (CBT) from RCTs suggest that children and adolescents might have poorer outcomes than adults, but it is unclear to which specific age group this applies. Findings relating just to young adults compared to those in middle age are less clear, as while some studies have shown that younger age could be associated with worse outcomes,[9] others have indicated no association between age and treatment outcomes,[8] and others still have found that younger people could have better outcomes.[10] This field is hampered by the scant number of young adults included in RCTs of interventions for CMDs and by the selection of settings and samples that do not reflect routine treatment, where young adults are predominantly assessed and treated in adult services rather than in those for children and adolescents.

There is a crucial need to clarify the efficacy and effectiveness of treatments delivered in clinical practice for young adults, as they represent the modal class of referrals to psychological therapy services in England (approximately 23% of all referrals).[11] Evaluations of routine services in England indicate young adults might have poorer outcomes from psychological treatment, but these have not considered potential confounding factors.[12] In addition, young people are both less likely to start treatment after a referral and less likely to complete treatment once started, compared with working age adults.[13] It has been hypothesised that this in part reflects the absence of adaptation of processes and of treatment to the requirements of young adults. Further, given concerns that young women are more likely to report both depression and anxiety-related difficulties,[14] and that their mental health was disproportionately affected by the COVID-19 pandemic,[1] it is important to understand whether poorer outcomes are especially pronounced in young women. Finding gender-related differences in the relationship with age and outcomes might have important public health implications for how we understand and support the mental health of young adults.

We aimed to examine differences in outcomes from routinely delivered psychological treatments for diagnosed depression and anxiety disorders across age, especially between young (aged 16–24 years) and working age adults (aged 25–65 years), and to explore the interaction between gender and age group. We leveraged the unique resource of national-level real-world data from over 1·5 million adults, including over 300 000 young adults treated by England's National Health Service (NHS) Talking Therapies for anxiety and depression services.

Methods

Services and participants

The Improving Access to Psychological Therapies (IAPT) programme was initiated in 2008 to increase the availability of evidence-based psychological treatments for adults with depression or anxiety disorders in England.[15] Evidence-based treatments are provided as part of a stepped care model in all areas of England, with low-intensity interventions (eg, guided self-help) delivered for less-severe presentations (formerly termed mild-to-moderate) and high-intensity interventions (eg, CBT) delivered to those with more-severe presentations (formerly termed moderate-to-severe). The programme has since been renamed NHS Talking Therapies for anxiety and depression (TTad). This work uses data provided by patients and collected by the NHS as part of their care and support. It included all referrals to all TTad services who received a course of treatment between April 1, 2015, and March 31, 2019 (totalling 2 125 501 records). Access to this dataset was provided as part of the MODIFY project, with full details of the dataset and project provided elsewhere.[16] Briefly, the project accessed national TTad data linked to Hospital Episode Statistics, mortality data from the Office of National Statistics, and the secondary care Mental Health Services Dataset. Data linkage was conducted by NHS Digital, and we used Hospital Episode Statistics and Mental Health Services Dataset data to identify neurodevelopmental conditions. Data were applied for through the Data Access Request Service (DARS) at NHS Digital; as such no further ethical approval was required.

In line with national reporting practices,[12] we excluded patients still in treatment, those who were not scoring above symptom severity thresholds indicating clinically significant depression or anxiety at assessment (see appendix pp 2–3), and people who did not provide more than one outcome measure or did not receive two or more treatment sessions. Finally, we excluded people missing data about their age at referral. TTad services typically see adults 18 years or older, but some people aged 16–17 years are seen by TTad services (eg, when agreed with transition teams), and we retained these people in our analyses. Individuals older than 65 years were excluded in the primary analyses due to evidence they respond particularly well in TTad services, and might have specific differences in presentation,[17] but are included in sensitivity analyses. We involved people with lived experience of using TTad services in the study design, analysis, and interpretation of findings.

See Online for appendix

Measures

All measures and variables used in the current study are presented in the appendix (pp 2–3). Briefly, age at referral; self-reported ethnicity, gender, and employment status; local-area deprivation based on postcode; presenting problem; treatment type; waiting times; psychotropic medication status; long-term health conditions; and cohort year of first session were included as variables. Data on the presence or absence of intellectual disability, autism and ADHD, taken from linked Hospital Episode Statistics and the Mental Health Services Dataset, were also included as covariates.

Outcomes

There were two main primary outcomes for this study: change in symptom severity scores on the Patient Health Questionnaire 9-item (PHQ-9)[18] and the Generalised Anxiety Disorder Scale 7-item (GAD-7).[19] The PHQ-9 is a nine-item self-reported scale which asks individuals about nine symptoms of depression. Response options are scored from 0 (not at all) to 3 (nearly every day), with total scores ranging from 0 to 27. The GAD-7 includes seven items assessing self-reported levels of generalised anxiety symptoms. Response options are the same as those for the PHQ-9, with total scores ranging from 0 to 21. Secondary outcomes included TTad key performance indicators used and defined in national evaluations.[12] These were recovery, reliable recovery, reliable improvement, and reliable deterioration. Recovery was defined as scoring below the thresholds for caseness (ie, the threshold to indicate clinically significant levels of symptoms) on both the depression (PHQ-9) and anxiety (either the GAD-7 or the appropriate Anxiety Disorder Specific Measure [ADSM] when specific anxiety disorders are recorded as the problem descriptor) measures at the end of treatment, having scored above the threshold on at least one of the measures pre-treatment. Thresholds for caseness used by TTad services are scores of ≥10 on the PHQ-9, and ≥8 on the GAD-7, with thresholds on the ADSMs presented in the appendix (p 3). Reliable improvement was reporting a pre–post decrease in PHQ-9 or either the GAD-7 or ADSM scores larger than the threshold for the error of measurement of that scale (a change of ≥6 points on the PHQ-9 and of ≥4 points on the GAD-7, with thresholds on the ADSMs presented in the appendix [p 3]). Reliable recovery was defined as when criteria for both recovery and reliable improvement, as defined above, were met. Reliable deterioration was defined as a pre–post increase in scores for the PHQ-9, GAD-7, or appropriate ADSM, larger than the threshold for reliable change, but no decrease in either measure by larger than the same threshold.

We adjusted for a number of covariates in multivariable models (detailed in the appendix pp 2–3) to assess the independence of any potential effect of age group on treatment outcomes. These included gender, ethnicity, local-area deprivation, clinical factors including diagnosis type, psychotropic medication status, initial severity scores, treatment intensity, and number of sessions, which have been found to be associated with CMD treatment outcomes in similar data[17] as well as in clinical trials.[8] We also included diagnoses of neurodevelopmental conditions (autism, ADHD, and intellectual disability), available in linked datasets, given the increased likelihood of these being reported in people younger than 25 years and the association of these conditions with higher rates of mental health problems and with poorer treatment outcomes.[20] Missing data on covariates were reported for categorical variables, and handled in models by creating a separate category for missing, which was included to avoid exclusion of cases through listwise deletion, as per previous studies.[16] There were no missing data on continuous variables.

Statistical analysis

We used age as both a continuous variable, with the full range of ages of those in the dataset, to examine non-linear associations and provide a transparent picture of associations between age and outcomes; and as a binary variable with ages 16–24 years and ages 25–65 years, in order to facilitate interpretability and present differences in baseline variables. We use young adults and working age adults as descriptors of our two groups for reporting, and acknowledge that these do not reflect specific identities of individuals within these two age groups.

To compare baseline characteristics, young adults were compared on all measures to working age adults using χ^2 tests (for categorical variables) and *t*-tests (for continuous variables).

We estimated, using linear regression, the association of age with change in PHQ-9 or GAD-7 scores in a model without covariates (unadjusted Model 1) and with the following covariates (adjusted Model 2): treatment intensity, gender, psychotropic medication status, ethnicity, Index of Multiple Deprivation (IMD) quintiles, number of sessions, diagnosis, and record of autism, intellectual disability and ADHD diagnosis.

We have compared the fit of unadjusted linear models to ones that included age as a third-degree polynomial, both within a subsample of n=799 944 and a left-out sample of n=799 944. As there were only minimal differences in the adjusted R^2, mean squared error, and mean absolute error, we chose to report linear models for better model interpretability. Details of the analyses are reported in the appendix (pp 4–5).

To reduce the likelihood that changes observed in our study might be affected by regression to the mean, we conducted further analyses that also adjusted for the baseline scores.[21] We added adjustments for baseline

	Age 16–24 years (n=309 758)	Age 25–65 years (n=1 290 130)	p value*
Mean age, years	20·8 (2·3)	41·5 (11·1)	<0·001
Ethnicity			
White	255 547 (82·5%)	1 078 985 (83·6%)	..
Mixed	9993 (3·2%)	24 909 (1·9%)	..
Asian	13 088 (4·2%)	58 740 (4·6%)	..
Black	7884 (2·5%)	34 789 (2·7%)	..
Chinese	743 (0·2%)	2581 (0·2%)	..
Other	2686 (0·9%)	15 468 (1·2%)	..
Missing	19 817 (6·4%)	74 658 (5·8%)	<0·001
Gender			
Male	93 728 (30·3%)	445 466 (34·5%)	..
Female	214 977 (69·4%)	840 631 (65·2%)	..
Missing	1053 (0·3%)	4033 (0·3%)	<0·001
Index of Multiple Deprivation quintile			
1 (most deprived)	73 066 (23·6%)	295 063 (22·9%)	..
2	69 927 (22·6%)	285 589 (22·1%)	..
3	60 095 (19·4%)	258 128 (20·0%)	..
4	54 080 (17·5%)	232 805 (18·0%)	..
5 (least deprived)	49 039 (15·8%)	205 906 (16·0%)	..
Missing	3551 (1·1%)	12 639 (1·0%)	<0·001
Employment status			
Employed	143 503 (46·3%)	810 014 (62·8%)	..
Unemployed and actively seeking work	36 645 (11·8%)	134 915 (10·5%)	..
Student	83 215 (26·9%)	16 601 (1·3%)	..
Long-term sick or disabled	12 981 (4·2%)	123 042 (9·5%)	..
Homemaker	10 084 (3·3%)	76 746 (5·9%)	..
Not receiving benefits and not working	7498 (2·4%)	32 004 (2·5%)	..
Unpaid voluntary work and not working	901 (0·3%)	4232 (0·3%)	..
Retired	185 (0·1%)	31 644 (2·5%)	..
Missing	14 746 (4·8%)	60 932 (4·7%)	<0·001
Clinical measures pre-treatment, pre-existing conditions, and medication			
Depression symptoms pre-treatment (PHQ-9)	15·7 (5·3)	15·9 (5·6)	<0·001
Anxiety symptoms pre-treatment (GAD-7)	14·4 (4·2)	14·5 (4·4)	<0·001
Psychotropic medication			
Prescribed but not taking	14 273 (4·6%)	60 231 (4·7%)	..
Prescribed and taking	118 949 (38·4%)	648 984 (50·3%)	..
Not prescribed	155 996 (50·4%)	496 009 (38·4%)	..
Missing	20 540 (6·6%)	84 906 (6·6%)	<0·001
Self-reported long-term condition			
Yes	46 774 (15·1%)	330 640 (25·6%)	..
No	213 107 (68·8%)	761 811 (59·0%)	..
Missing	49 877 (16·1%)	197 679 (15·3%)	<0·001
Record of intellectual disability			
Yes	1448 (0·5%)	4198 (0·3%)	..
No	265 033 (85·6%)	1 283 997 (99·5%)	..
Missing	43 277 (14·0%)	1935 (0·1%)	<0·001
Record of autism			
Yes	2925 (0·9%)	4250 (0·3%)	..
No	263 556 (85·1%)	1 283 945 (99·5%)	..
Missing	43 277 (14·0%)	1935 (0·1%)	<0·001

(Table 1 continues on next page)

	Age 16–24 years (n=309758)	Age 25–65 years (n=1290130)	p value*
(Continued from previous page)			
Record of ADHD			
Yes	2070 (0·7%)	3078 (0·2%)	..
No	264411 (85·4%)	1285117 (99·6%)	..
Missing	43277 (14·0%)	1935 (0·1%)	<0·001
Treatment factors			
CMD diagnosis			
Depression	91337 (29·5%)	435991 (33·8%)	..
Mixed anxiety and depressive disorder	44123 (14·2%)	185024 (14·3%)	..
Generalised anxiety disorder	58077 (18·7%)	239723 (18·6%)	..
Obsessive compulsive disorder	9139 (3·0%)	22433 (1·7%)	..
PTSD	9137 (2·9%)	45653 (3·5%)	..
Social phobia	18310 (5·9%)	22449 (1·7%)	..
Other phobia and panic-related disorders	18307 (5·9%)	58041 (4·5%)	..
Unspecified anxiety disorder	1281 (0·4%)	5149 (0·4%)	..
Missing	60047 (19·4%)	275667 (21·4%)	<0·001
Treatment intensity			
Low	132864 (42·9%)	518466 (40·2%)	..
High	131098 (42·3%)	583440 (45·2%)	..
Mixed	29915 (9·7%)	131316 (10·2%)	..
Missing	15881 (5·1%)	56908 (4·4%)	<0·001
Appointment year			
2015	30686 (9·9%)	128655 (10·0%)	..
2016	82530 (26·6%)	349730 (27·1%)	..
2017	86167 (27·8%)	363622 (28·2%)	..
2018	91453 (29·5%)	368572 (28·6%)	..
2019	18922 (6·1%)	79551 (6·2%)	<0·001
Reason for ending therapy			
Completed	171486 (55·4%)	826875 (64·1%)	..
Dropped out	104763 (33·8%)	338453 (26·2%)	..
Service not suitable	3735 (1·2%)	13874 (1·1%)	..
Declined	11243 (3·6%)	39515 (3·1%)	..
Referred on	12663 (4·1%)	48827 (3·8%)	..
Missing	5868 (1·9%)	22586 (1·8%)	<0·001
Number of sessions	6·3 (4·4)	6·7 (4·6)	<0·001
Time between referral and assessment, weeks	2·6 (3·5)	2·6 (3·6)	0·071
Time between assessment and treatment, weeks	6·9 (7·6)	7·2 (7·9)	<0·001
Count of did not attends	0·84 (1·15)	0·65 (1·07)	<0·001
Count of cancellations by patient	0·85 (1·25)	0·94 (1·36)	<0·001
Proportion of did not attends	0·11 (0·15)	0·08 (0·13)	<0·001
Proportion of cancellations	0·09 (0·12)	0·10 (0·13)	<0·001

Data are n (%) or mean (SD). CMD=common mental disorders. GAD-7=Generalised Anxiety Disorder Scale 7-item. PHQ-9=Patient Health Questionnaire 9-item. PTSD=post-traumatic stress disorder. *Independent *t*-tests were used for continuous variables and χ^2 tests were used for categorical variables.

Table 1: **Participant characteristics**

severity to Models 1 and 2 above, with these adjusted figures provided for each model, where the post-treatment PHQ-9 (or GAD-7) score was regressed on age group (young *vs* working age) and the difference between each person's baseline PHQ-9 (or GAD-7) score and the mean baseline PHQ-9 (or GAD-7) score.

For the secondary outcomes of recovery, reliable improvement, reliable recovery, and reliable deterioration, we replaced linear regression with logistic regression for Models 1 and 2 above, and report odds ratios (ORs) and 95% CIs, through which we also estimated the proportions and absolute numbers of patients reaching the outcome in each group.

We also examined whether differences in outcomes by age group were associated with service-user gender. In the dataset accessed for this analysis, TTad services included the terms male and female, alongside not known, as the available options for service users to self-report, and we acknowledge that this does not capture the full range of gender identities.[22] Individuals whose gender was reported as not known were excluded from this analysis. We first fitted an interaction term between gender and age, and also present results stratified by gender.

As a sensitivity analysis, we examined the geographical consistency of our findings by estimating the proportion of individuals achieving reliable improvement across the seven health regions of England. We examined the temporal consistency of our findings by estimating reliable improvement across years of the first session. Finally, as an additional sensitivity analysis we included adults older than 65 years in the working age group.

Role of the funding source

The funder had no role in study design, data analysis, data interpretation, or writing of the report

Results

A participant flow diagram is presented in the appendix (p 6): from over 2·1 million records of people who received a course of treatment, we analysed data on 309758 young adults (mean age 20·8 years [SD 2·3]) and compared them with 1290130 individuals aged 25–65 years (mean age 41·5 years [SD 11·1]) in the primary analyses. Overall, for young adults 93728 (30·3%) identified as male, 214977 (69·4%) identified as female, and 1053 (0·3%) had missing data; 255547 (82·5%) were White. For working age adults, 445466 (34·5%) identified as male, 840631 (65·2%) identified as female, and 4033 (0·3%) had missing data; 1078985 (83·6%) were White (table 1).

Compared with working age service users, young adults were more likely to live in socially deprived areas and less likely to self-report being long-term sick or disabled (4·2% *vs* 9·5%) or having a long-term physical health condition (15·1% *vs* 25·6%; table 1); however, they were more likely to have a record of intellectual disability, autism, or ADHD (table 1). Young adults had lower mean PHQ-9 and GAD-7 scores pre-treatment, were less likely to be prescribed psychotropic medication, and were more likely to be treated for obsessive compulsive disorder, social phobia, or other phobic or panic-related disorders relative to working age adults. In addition, it was observed that young adults had a higher mean number of sessions and proportion of total sessions recorded as did not attend, whereby the individual has not pre-warned the service of non-attendance to a session, whereas working age adults were more likely than young adults to cancel the session formally with the service. Comparison of the last treatment type received by individuals showed that while there were small increases in the use of computer-based self-help for young adults, the largest difference was that young adults were less likely to receive counselling as the last treatment type they received (appendix p 7).

For the two main primary outcomes, change in symptom scores, figure 1 shows the mean change in PHQ-9 and GAD-7 scores by age. There was an increase in the change in both PHQ-9 and GAD-7 symptom scores with increasing age. Mean change in pre–post PHQ-9 scores gradually increased from approximately 5·5 (95% CI 5·4–5·6) at age 20 years to 6·3 (6·2–6·3) at age 35 years; and from 6·9 (6·8–7·0) at age 55 years to 7·0 (6·9–7·1) at age 60 years. Mean change in pre–post GAD-7 scores increased from 5·1 (5·0–5·1) at age 20 years to 6·2 (6·1–6·2) at age 60 years, but remained stable at 6·0 (5·9–6·1) between ages 35 and 55 years.

Table 2 presents the mean differences in change in PHQ-9 and GAD-7 scores per 10-year increase in age. For both PHQ-9 and GAD-7, younger adults reported a smaller change in symptom scores between the start and end of treatment in the unadjusted Model 1 (PHQ-9: b 0·40 [95% CI 0·39 to 0·41]; GAD-7: b 0·20 [0·20 to 0·21]; p<0·001). The magnitude of difference was reduced in the adjusted Model 2 (0·25 [0·24 to 0·26] for PHQ-9 and 0·16 [0·16 to 0·17] for GAD-7). For both the PHQ-9 and GAD-7, young adults (aged 16–24 years) reported smaller changes in symptom scores between the start and end of treatment than working age adults (aged 25–65 years) in unadjusted models (PHQ-9: b –0·98 [95% CI –1·00 to –0·96]; GAD-7: b –0·77 [–0·80 to –0·75]; table 2), and the magnitude of difference was again smaller in the adjusted model. Mean changes pre-treatment to post-treatment by age are shown in table 3. When adjusting for baseline severity scores, the magnitude of difference was reduced for the PHQ-9, but not for the GAD-7 (appendix p 8).

For the secondary outcomes, figure 2 shows the average proportion of patients whose symptoms reliably deteriorated or reliably improved by age. The proportion of these two outcomes held relatively stable between the ages of 30 and 55 years, while those aged 55–65 years saw some further increase in reliable improvement.

Associations of age as a continuous variable in relation to binary treatment outcomes (reliable recovery, recovery, reliable improvement, and reliable deterioration) are shown in the appendix (p 8). Per 10-year increase in age, the OR for reliable recovery was 1·12 (95% CI 1·12–1·12), independent of adjustment for various potential confounders. In absolute terms, this was between 48 520 and 51 566 additional service users who recovered

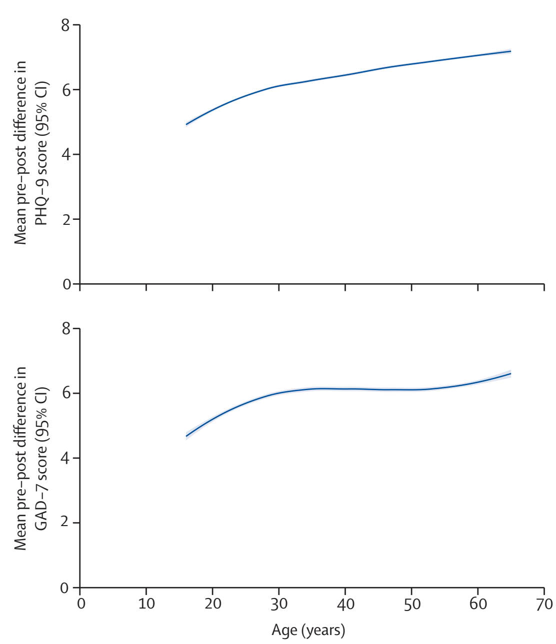

Figure 1: **Mean pre–post difference in scores for the PHQ-9 and GAD-7**
Line indicates the mean score by age, and shaded area represents the 95% CI. GAD-7=Generalised Anxiety Disorder Scale 7-item. PHQ-9=Patient Health Questionnaire 9-item.

	b (95% CI)	Standardised b	p value
Per 10-year increase in age			
PHQ-9			
Model 1 (unadjusted)	0·40 (0·39 to 0·41)	0·079	<0·001
Model 2 (adjusted)	0·25 (0·24 to 0·26)	0·049	<0·001
GAD-7			
Model 1 (unadjusted)	0·20 (0·20 to 0·21)	0·044	<0·001
Model 2 (adjusted)	0·16 (0·16 to 0·17)	0·036	<0·001
Comparison of young adults with working age adults			
PHQ-9			
Model 1 (unadjusted)	–0·98 (–1·00 to –0·96)	–0·06	<0·001
Model 2 (adjusted)	–0·64 (-0·66 to –0·61)	–0·04	<0·001
GAD-7			
Model 1 (unadjusted)	–0·77 (–0·80 to –0·75)	–0·05	<0·001
Model 2 (adjusted)	–0·61 (–0·64 to –0·58)	–0·04	<0·001

Model 2 was adjusted for baseline PHQ-9 and GAD-7 scores, treatment intensity, gender, psychotropic medication status, ethnicity, Index of Multiple Deprivation quintiles, diagnosis type, number of sessions, intellectual disability, ADHD, and autism. Young adults are aged 16–24 years; working age adults are aged 25–65 years. GAD-7=Generalised Anxiety Disorder Scale 7-item. PHQ-9=Patient Health Questionnaire 9-item.

Table 2: **Mean change in PHQ-9 and GAD-7 scores pre–post treatment**

	Young adults	Working age adults	p value
PHQ-9			
Pre-treatment	15·7 (5·3)	15·9 (5·6)	<0·001
Post-treatment	10·2 (6·6)	9·4 (6·8)	<0·001
GAD-7			
Pre-treatment	14·4 (4·2)	14·5 (4·4)	<0·001
Post-treatment	9·2 (5·7)	8·5 (5·9)	<0·001

Data are mean (SD). Young adults are aged 16–24 years; working age adults are aged 25–65 years. GAD-7=Generalised Anxiety Disorder Scale 7-item. PHQ-9=Patient Health Questionnaire 9-item.

Table 3: **Mean change in PHQ-9 and GAD-7 scores pre–post treatment, presented by age group**

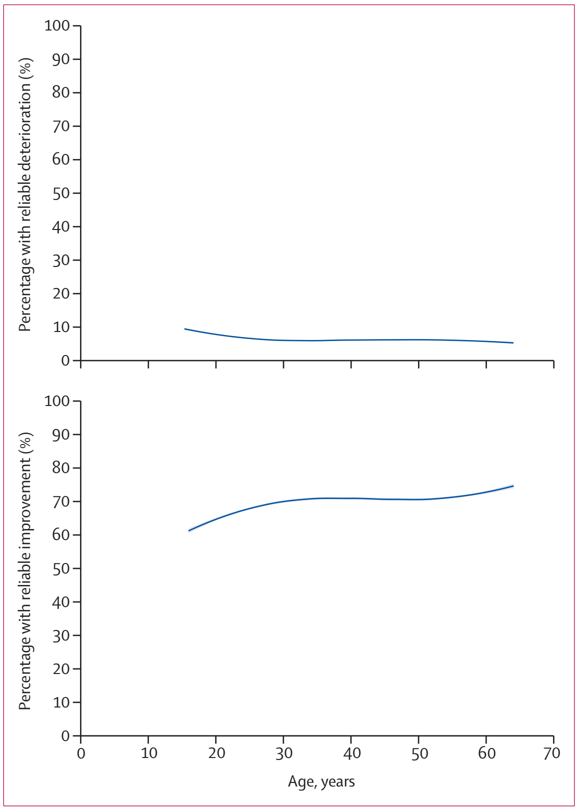

Figure 2: **Percentage of service users with reliable deterioration and reliable improvement**
The shaded area represents 95% CI.

after therapy, and an additional 29 090 service users who reliably improved per 10-year increase in age. We then compared young adults to working age adults using reliable recovery or threshold-based recovery (table 4). Compared with working age adults, young adults had significantly lower odds of reliable recovery in unadjusted models (observed probability 41·2% *vs* 48·7%, OR 0·74 [0·73–0·74]). This pattern was consistent across recovery and reliable improvement. When adjusting for baseline variables with Model 2, there was little effect on findings, with lower odds of reliable recovery observed for young adults (estimated probability 41·5% *vs* 48·2%, OR 0·76 [0·75–0·77]). Young adults were also more likely to report reliable deterioration in symptoms than working age adults in both unadjusted (OR 1·19 [1·17–1·20]) and adjusted models (1·15 [1·13–1·17]). Estimates of the additional number of young adults who would have met criteria for reliable recovery or reliable improvement showed an unadjusted estimate of 23 232 or 16 727, respectively, if the proportions of those meeting the criteria were the same as those for working age adults.

When examining the interaction between age group and gender, there was some evidence that males had better outcomes than females among young adults (43·0% [39 957] reliable recovery *vs* 40·4% [86 077]), but in the working age group females had equivalent or better outcomes than males (48·5% [214 307] reliable recovery *vs* 48·8% [406 274]; appendix pp 9–13). However, there was no evidence that adding an interaction term between age and gender improved any of the models with any of the outcomes (for the model of pre–post change in PHQ-9, the mean absolute error in the fully-adjusted linear model of age was 5·241, adjusted R^2 was 0·006, and Bayesian information criterion was 526 4097; after adding the interaction term these were 5·241, 0·006, and 526 4109, respectively).

As our sensitivity analyses, we examined differences between the age groups by geographical location (across all health-care regions of England) and temporal factors (across treatment years) to examine the consistency of the age group effect (appendix pp 13–14). Outcomes in TTad substantially improved between 2015 and 2019, but the difference between age groups remained relatively constant across time. Among the regions, London had the smallest difference in outcomes between the age groups (3·0% [95% CI 2·5–3·5] difference in reliable improvement between age groups), whereas the South West had the largest discrepancy (7·4% [6·8–8·0] difference without adjustment, 6·5% [5·9–7·0] in adjusted model; appendix p 13). The inequality in reliable improvement between the age groups slightly decreased from 2015 to 2019 (6·7% [6·1–7·3] to 4·7% [4·0–5·4]), with smaller differences following statistical adjustment (5·7% [5·1–6·3] *vs* 3·9% [3·2–4·6]). Analyses including individuals older than 65 years did not affect study findings (appendix pp 15–16).

Discussion

We compared characteristics and psychological treatment outcomes across age groups using data from a nationally delivered treatment programme in England. Psychological treatment outcomes were better for working age adults (aged 25–65 years) than young adults (aged 16–24 years), with a monotonic increase over age, even after adjusting for sociodemographic and treatment-related differences between the age groups. Young adults experienced a smaller change in symptoms pre–post treatment and had between 17% and 26% lower odds of reliable recovery and reliable improvement. These estimates might appear small by conventional standards, but given the number of people accessing treatment they represent important differences.[23] We estimated that if outcomes were equivalent between young and working age adults, this would have led to 23 232 more young adults achieving reliable recovery in the study period. We did not find evidence of an interaction between age group and gender in models. Findings were robust to sensitivity analyses across treatment years, with increases in outcomes between 2015 and 2019 as detailed in previous studies,[24] regions of England, and when including older adults (aged >65 years).

	OR (95% CI)*	Estimated probability of outcome (%)		Number of additional young adults who would have the outcome if their outcome probabilities were equivalent to those of people aged 25–65 years
		16–24 years	25–65 years	
Reliable recovery				
Model 1 (unadjusted)	0·74 (0·73–0·74)	41·2%	48·7%	23 232
Model 2 (adjusted)	0·76 (0·75–0·77)	41·5%	48·2%	20 754
Recovery				
Model 1 (unadjusted)	0·73 (0·73–0·74)	43·5%	51·2%	23 851
Model 2 (adjusted)	0·74 (0·73–0·75)	43·7%	51·1%	22 922
Reliable improvement				
Model 1 (unadjusted)	0·78 (0·77–0·78)	65·9%	71·3%	16 727
Model 2 (adjusted)	0·83 (0·82–0·83)	68·6%	72·6%	12 390
Reliable deterioration				
Model 1 (unadjusted)	1·19 (1·17–1·20)	7·3%	6·2%	3407†
Model 2 (adjusted)	1·15 (1·13–1·17)	5·9%	5·2%	2168†

Model 2 adjusted for baseline PHQ-9 and GAD-7 scores, treatment intensity, gender, psychotropic medication status, ethnicity, Index of Multiple Deprivation quintiles, diagnosis type, number of sessions, intellectual disability, ADHD, and autism. GAD-7=Generalised Anxiety Disorder Scale 7-item. PHQ-9=Patient Health Questionnaire 9-item. *p< 0·001. †Numbers indicate less deterioration.

Table 4: **Comparison of outcome measures in young adults aged 16–24 years versus working age adults aged 25–65 years**

Meta-analytic findings are mixed on this topic: one study found young adults to be more likely to benefit from treatment for depression,[10] another found that they experienced a smaller and a slower symptomatic change for anxiety,[9] and an individual patient-data meta-analysis found no association between age and depression treatment outcomes.[8] However, there were very few young adults in the samples included in those meta-analyses. The use of large-scale real-world data with national coverage therefore provided the opportunity to accurately estimate differences in treatment effects across the age groups.

There are multiple potential explanations for why young adults might have poorer psychological treatment outcomes than working age adults. One set of explanations could be due to underlying aetiological factors distinguishing the two age groups in this Article. For example, the younger group in this Article will inevitably include a higher proportion of early-onset and very early-onset cases than the older cohort. Given that earlier-onset depression has been linked to greater overall severity,[25] and a different genetic profile associated with variants for neurodevelopmental disorders including ADHD[26] and schizophrenia,[27] such aetiological differences might affect treatment outcomes.

More generally, emerging adulthood is often a time of transition, including ending statutory education and perhaps starting university education, looking for and moving jobs, moving out from the family home or away from one's previously supportive social network, and often changes in one's relationship status.[28] A number of these life transitions are associated with poorer treatment outcomes,[29] and might be linked to a variety of stressful life events, which in turn are also associated with poorer outcomes.[30] Such factors could influence the effectiveness of psychotherapies for young adults.

Another explanation could be related to the level of service engagement. Services are set up for adults, and so young adults with experience of mental health service use during their childhood or adolescence might find the operation of adult services difficult to navigate.[31] For example, the onus to book and maintain appointments is on them, compared to dedicated Child and Adolescent Mental Health Services in which a responsible professional's role involves engaging the young person in the services. In support of this, we observed young adults were more likely to drop out of treatment than working age adults, although adjusting for number of sessions received did attenuate this effect. They were also more likely to not attend sessions without advanced notice to the service providers, evidencing poorer engagement with their care, which is especially important given some services discharge individuals if they miss a certain number of sessions.[23]

In terms of efficacy, concerns have been raised about trials in psychotherapy for depression in young people,[32] pointing to the relative weakness of control or comparator groups that might have inflated treatment effect sizes. Similarly, even pharmacotherapy responses seem to be weaker for depression (but not anxiety) in children and adolescents compared to adults, although mainly due to a high placebo response.[33] However, in the present study, outcomes for anxiety were also worse for the young adult group, making this explanation less probable. Another question concerns the appropriateness of a treatment. It is possible that young adults would benefit from different treatment targets, or treatments that consider age-relevant and generation-relevant environmental stressors, such as the effects of social media compared to older adults. For example, people aged 18–25 years are most likely to date online,[34] with reports of high rates of dating application-related stress.[35]

For **DARS** see https://digital.nhs.uk/services/data-access-request-service-dars

While the strengths of this study include the availability of a large dataset with full national coverage, supporting the generalisability of these findings, there are several limitations. We were only able to access data that were routinely recorded in the health services. Measures of general wellbeing or personal sense of improvement were not available, so we instead relied on nationally mandated outcome metrics. We adjusted for the number of treatment sessions received, and for diagnoses of some neurodevelopmental conditions (autism, intellectual disability, and ADHD), but not the severity of impairment of these conditions. There might have been unmeasured differences in the delivery of treatments and other important disorders common in young adults that were not captured here. As such, both residual and unmeasured confounders might have affected our findings. There was limited participation in video therapy during the study period, but we acknowledge that since the COVID-19 pandemic the use of this treatment format has increased. Future research should examine whether age group differences exist across different mediums of therapy delivery. Findings also might not generalise to young adults questioning or identifying with non-binary gender identities, given limited data availability.

In a dataset of all individuals receiving psychological therapies for CMDs in a national service programme, we found that young adults had poorer outcomes than working age adults. The findings were robust to statistical adjustment for available confounders, regression to the mean, across years, and across health-care regions of England. Findings have important implications for services delivering care and indicate that treating clinicians need to consider changes to how psychological services are designed and delivered, alongside changes to the content of the treatment. Getting young adults into treatment more quickly, offering them treatment in a convenient and desired format, and working hard to ensure they stay in treatment have the potential to improve outcomes for this group. Addressing social factors that are of particular concern to emerging adults—eg, job and housing insecurity[35]—might also be required to improve outcomes in young adults. Considering and trialling adaptions tailored to specific requirements of this age group, the management of information on mental health and mental illness, as well as expectations of treatment, might also be necessary. In this context, learning from variation between services might prove helpful and any systematic differences could be tested as to their effects in service provision.

Contributors

RS, JWS, JEJB, GK, and AS conceptualised the study and its design. AJ, CEB, and JS were responsible for data acquisition. RS, JWS, and CEB analysed the data. RS, JWS, JEJB, AJ, CEB, SP, GL, JS, GK, and AS interpreted the data. RS, JWS, and AS drafted the paper, with all other authors providing critical revision of the manuscript for intellectual content. All authors had full access to the data in the study and had final responsibility for the decision to submit for publication.

Declaration of interests

The authors declare no competing interests.

Data sharing

Data used in this study are available from NHS Digital on submission of a successful application via the Data Access Request Service (DARS).

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