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**Article:**
Verbist, I.L. and Lorimer, B. (2026) Physical long-term conditions and psychological treatment outcomes in NHS talking therapies: prevalence, impact, and moderators. British Journal of Clinical Psychology. ISSN: 0144-6657

https://doi.org/10.1111/bjc.70040

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# Physical Long-Term Conditions and Psychological Treatment Outcomes in NHS Talking Therapies: Prevalence, Impact, and Moderators

Short title: ***Long-Term Conditions and Therapy Outcomes in NHS-TT***

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**Keywords:**

Long-term conditions; Multimorbidity; NHS Talking Therapies; Routing data

**Data availability statement:**

The data that support the findings of this study are available on request from the corresponding author. The data are not publicly available due to privacy or ethical restrictions.

**Acknowledgements:**

This study was supported through expertise from the NIHR HealthTech Research Centre in Long Term Conditions (D4D). The views expressed are those of the author(s) and not necessarily those of the NIHR or the Department of Health and Social Care. We also acknowledge Strategic Research Funding from Greater Manchester Mental Health NHS Foundation Trust, which supported time for Dr Ben Lorimer and Patient and Public Involvement (PPI) activities.

## Abstract

### Objective

This study examined the impact of having one or multiple physical long-term conditions (LTCs) on treatment outcomes and engagement with NHS Talking Therapies (NHS-TT), focusing on clinical and treatment-related moderators.

### Methods

A retrospective cohort design was applied to routine data from 44,957 patients discharged from seven NHS-TT services in Northwest England between September 2021 and September 2024. Logistic regression analyses assessed the impact of LTC status (none, one, or multiple LTCs) on reliable recovery (defined as clinically significant improvement in both depression and anxiety scores) and treatment engagement (operationalised as planned discharge versus dropout). Moderation analyses explored the influence of provisional diagnosis, baseline functional impairment, treatment intensity, and mode of therapy delivery.

### Results

LTCs were reported by 47.5% of patients, with 9.4% reporting multiple LTCs. Patients with LTCs had significantly lower odds of reliable recovery (*OR* = 0.83, 95% CI [.79–.86]), with further reductions observed among those with multimorbidity (*OR* = 0.71, 95% CI [.66–.77]). Conversely, LTC status was associated with higher odds of planned discharge (*OR* = 1.28, 95% CI [1.23–1.34]). Provisional diagnosis was found to moderate the relationship between LTC status and reliable recovery, with the negative relationship being less pronounced among those patients with depression (OR = 1.21, 95% CI [1.09-1.33), compared to those patients with anxiety-related disorders.

### Conclusion

Multimorbidity is associated with poorer clinical outcomes despite higher treatment engagement. Tailored care pathways are needed to better support patients with LTCs.

**Practitioner Points**

- Despite higher engagement with treatment, patients with long-term conditions (LTCs) are less likely to achieve reliable recovery in NHS Talking Therapies (NHS-TT).
- The presence of multiple LTCs (multimorbidity) further reduces the likelihood of recovery compared to a single LTC.
- Patients with anxiety-related problems show the poorest outcomes among those with LTCs, compared to those with depression.
- Tailored care pathways are needed to better address the complex needs of patients with physical-mental health comorbidities.

## Introduction

The prevalence of long-term conditions (LTCs), such as diabetes, cardiovascular diseases, and chronic pain, is steadily rising, with approximately 26 million people in England currently affected (NIHR, 2023). Approximately 30% of individuals with an LTC also experience anxiety and depression, while nearly half of those with mental health disorders concurrently manage at least one LTC (Naylor et al., 2012). This bidirectional relationship between LTC and mental health is particularly significant as it substantially increases healthcare utilisation, reduces treatment adherence, and creates a significant financial strain on healthcare systems (Guthrie et al., 2016, Gruber et al., 2021).

NHS Talking Therapies for anxiety and depression (NHS-TT; formerly Improving Access to Psychological Therapies [IAPT]) is a national programme developed in England to provide evidence-based psychological treatments for common mental health problems. Following the guidelines introduced as part of the NHS Five Year Forward View (NHS England, 2016) and subsequently updated through the IAPT-LTC framework (National Collaborating Centre for Mental Health, 2018), NHS-TT have increasingly integrated LTC-specific pathways to better address the psychological needs of this population (Catalao et al., 2024; Seaton et al., 2022; Jenkinson et al., 2024).

However, although the access of NHS-TT patients reporting at least one LTC has gradually increased from 23% (Delgadillo et al., 2017) to 49% (Ronaldson et al., 2025), treatment outcomes for this population remain suboptimal. Evidence shows that the presence of an LTC is independently associated with poorer treatment outcomes, including higher psychological distress, functional impairment, and lower recovery rates, even after adjusting for sociodemographic characteristics and baseline symptom severity (Delgadillo et al., 2017; Seaton et al., 2022). In line with these findings, a qualitative study by Carroll et al. (2021) identified key barriers to treatment for the LTC population, including system constraints, limited accessibility, and the need for more personalised care.

In an analysis of N=17,095 referrals to NHS-TT services, Jenkinson et al. (2024) after controlling for covariates, found no difference between patients with or without an LTC in terms of attendance at initial assessment or first treatment session. Nevertheless, the relationship between LTC status and broader treatment engagement, defined by NHS standards as attending two or more treatment sessions and having a planned discharge after mutual agreement with the therapist (NHS England, 2018), has yet to be comprehensively explored.

Despite growing evidence, research to date has predominantly assessed clinical outcomes solely based on traditional recovery metrics with limited attention being given to multimorbidity. Multimorbidity, defined as having two or more LTCs, affects approximately 15% of the English population (Valabhji et al., 2024), presenting heightened challenges, greater functional impairment, and increased healthcare needs compared to single LTC cases (Barnett et al., 2012; Frølich et al., 2019; Williams & Egede, 2016). Understanding how multimorbidity impacts psychological treatment outcomes and engagement is therefore crucial, considering the observed complexity in clinical management and psychological interventions.

A recent pivotal study by Ronaldson et al. (2025) demonstrated that the likelihood of achieving clinical recovery through NHS-TT declines significantly as the number of LTCs increases. Using linked primary care and NHS-TT data from a single London borough, the authors showed a dose-response relationship

between the number of physical LTCs and recovery outcomes, primarily focusing on recovery and reliable improvement. While this offers valuable insights into the challenges faced by patients with multimorbidity, several critical dimensions remain underexplored. This includes the most recent NHS-TT metric of 'reliable recovery', a more stringent composite outcome that requires both recovery below clinical thresholds and reliable symptom improvement, as well as the exploration of clinical factors that may moderate this relationship. Identifying moderators of the negative relationship between LTCs and clinical outcomes could help pinpoint subgroups in need of more tailored support. More specifically, individuals with LTCs typically present with greater functional impairment (Seaton et al., 2022), which may influence recovery trajectories. LTC-related complexity may also shape whether patients benefit equally from low- versus high-intensity interventions (Delgadillo et al., 2017). Variation by provisional diagnosis is also plausible, as patients with different mental health problems may respond differently to psychological interventions, and recent evidence highlights the benefits of stratified and personalised approaches to psychological care (Delgadillo et al., 2022). It is also worth noting that the dataset used by Ronaldson et al. (2025) concluded in early 2021, preceding significant service adaptations prompted by the COVID-19 pandemic, which notably increased the provision of remotely delivered therapy (Verbist et al., 2023). This shift toward remote delivery raises the question of whether mode of therapy delivery interacts with LTC status, particularly considering practical and illness-related barriers reported by this population (Carroll et al., 2021).

Therefore, the present study aims to address these gaps in the evidence base by: (1) examining the prevalence and common combinations of multimorbidity among patients accessing NHS-TT services; (2) assessing the impact of having one or multiple LTCs on treatment outcomes, utilising reliable recovery and discharge status as primary indicators, and reliable improvement being examined in post hoc sensitivity analyses and (3) identifying clinical moderators of this relationship, including provisional diagnosis, baseline functional impairment, treatment intensity and mode of therapy delivery.

# Methods

## Design and Setting

The study design and statistical analysis plan was pre-registered on AsPredicted.org (https://aspredicted.org/mskf-ycqx.pdf ;AsPredicted #190,987). This study adopted a retrospective cohort design, using routinely collected data from patients discharged from seven NHS-TT services in the Northwest of England. Following the nationally mandated stepped-care model for delivering psychological therapies, patients' allocation of treatment is based on severity and complexity. At Step 2, patients are typically offered low-intensity interventions, brief, structured, protocol-driven treatments such as guided self-help, delivered by Psychological Wellbeing Practitioners (PWPs). Those who do not respond, or who present with more severe or complex difficulties (e.g., PTSD), are stepped up to Step 3 for high-intensity therapy, including cognitive behavioural therapy (CBT) and other NICE-recommended treatments, provided by high-intensity therapists (NHS England, 2018). It is worth noting that four of the services delivered only Step 3 interventions and only three were providing in-house Step 2 interventions

## Sample

To be included in the study, patients were required to: 1) score above the clinical cut-off on either the nine-item Patient Health Questionnaire (PHQ-9; Kroenke et al., 2001) and/or the seven-item Generalised Anxiety Disorder scale (GAD-7; Spitzer et al., 2006) at pre-treatment assessment; 2) attend at least two treatment sessions[1]; and 3) be discharged from treatment between September 2021 and September 2024. This timeframe was selected to ensure that the routine dataset reflected current practices in NHS-TT services, which were significantly adapted following the COVID-19 pandemic, such as the provision of therapy being predominantly shifted to being remotely delivered.

[1] A patient is deemed to have had a 'course of treatment' in NHS Talking Therapies if they have had at least two sessions before discharge (National Collaborating Centre for Mental Health, 2024)

Patients who were deemed unsuitable for NHS-TT treatment or signposted to other services were excluded.

**Measures**

NHS-TT services routinely collect outcome scores during patients' initial assessments and at each attended treatment session, including measures of depression and anxiety. Specifically, the PHQ-9 (Kroenke et al., 2001) and GAD-7 (Spitzer et al., 2006) are used to assess the severity of depression and anxiety symptoms respectively. Both measures are widely used and demonstrate strong internal consistency and clinical utility.

PHQ-9 scores range from 0 to 27, with scores ≥10 indicating probable depression (Kroenke et al., 2001), while GAD-7 scores range from 0 to 21, with scores ≥8 indicating probable generalised anxiety (Kroenke et al., 2007). A change of ≥6 points on the PHQ-9 or ≥4 points on the GAD-7 over time indicates statistically reliable change (NHS England, 2018). Functional impairment across five life domains (i.e. work, home management, social life, leisure activities, family and relationships) is also routinely assessed using the five-item Work and Social Adjustment Scale (WSAS; Mundt et al., 2002). WSAS scores range from 0-40, with higher scores indicating greater levels of functional impairment.

Additional anonymised clinical, demographic, and treatment-related variables were available, including gender (female, male, other), age (years), ethnicity (White, Asian & Asian British, Black & Black British, other or multiple ethnic group), sexual orientation (heterosexual, LGBTQ+, declined to respond, unsure), employment status (employed, unemployed, homemaker, student, retired), provisional diagnosis (anxiety-related disorders, depression, mixed anxiety and depression, other), mode of therapy delivery (in-person, remote), number of attended sessions, treatment intensity (Step 2: low-intensity, Step 3: high-intensity; reflected the highest or final level of care received during the episode, including both direct entry to Step 3 and step-up from Step 2). Patients' self-reported LTCs were grouped into categories (e.g., cardiovascular, respiratory, musculoskeletal)

according to previous research (Barnett et al., 2012). For the purposes of analysis, LTC status was recorded as a binary variable (i.e., presence of at least one LTC vs none) and multimorbidity was defined as the presence of two or more self-reported LTCs.

**Treatment Outcomes**

Reliable recovery and reliable improvement were calculated using baseline PHQ-9 and GAD-7 scores recorded at entry to the NHS-TT episode and the final available PHQ-9 and GAD-7 scores at discharge. Treatment intensity (Step 2 vs. Step 3) reflected the highest or final step of care recorded for each episode, consistent with NHS-TT reporting conventions; as such, the Step 3 group includes both patients who commenced treatment at high intensity and those who were stepped up from Step 2 during the same episode.

***Reliable Recovery.*** Patients were considered to have reliably recovered if: (1) they scored above the clinical cut-off on either the PHQ-9 (≥10) and/or GAD-7 ( ≥8) at their initial assessment (pre-treatment); (2) post-treatment scores on both measures drop below the respective clinical cut-offs; and (3) the reduction in scores met criteria for reliable change (i.e., a decrease of ≥6 on the PHQ-9 or ≥4 on the GAD-7).

***Reliable improvement*.** As a post hoc sensitivity outcome, reliable improvement was defined as a reduction of ≥6 points on the PHQ-9 and/or ≥4 points on the GAD-7 between baseline assessment at service entry and the final recorded scores at discharge, irrespective of whether patients crossed below clinical cut-off thresholds (NHS England, 2018).

***Discharge status.*** Treatment engagement was operationalised as having a planned discharge, defined as ending treatment through mutual agreement between therapist and patient, rather than dropping out.

**Statistical Analysis**

All analyses were conducted using R (version 4.3.0; R Core Team, 2023). Descriptive statistics were used to explore the prevalence of LTCs and common patterns of multimorbidity.

Binary logistic regression models were constructed to assess the impact of LTC presence (yes/no) and multimorbidity (0, 1, 2+ LTCs) on reliable recovery and planned discharge. Logistic regression was employed as the study outcomes represent binary end-of-treatment events, and all clients included in the cohort had completed their therapy episodes (i.e., no active cases), meaning discharge outcomes were available for all individuals. To examine potential moderation effects, interaction terms were included to test whether the relationship between LTC status and outcomes varied by provisional diagnosis (anxiety-related disorders, depression, mixed anxiety and depression, other), baseline functional impairment (WSAS), treatment intensity (Step 2 vs. Step 3), and mode of therapy delivery (remote vs. in-person). Equivalent models were subsequently re-estimated using reliable improvement as the outcome in post hoc sensitivity analyses, using both imputed and complete-case datasets. Model fit and assumptions, including multicollinearity, were assessed. All regression models were adjusted for baseline PHQ-9 and GAD-7 scores, which were included as covariates in both the main effects and moderation analyses. Where significant interactions emerged, predicted probabilities were plotted to aid interpretation. Statistical significance was set at $p < .05$ for all analyses.

**Missing Data**

Prior to conducting the primary regression analyses, missing values were imputed using the *missForest* package in R (Stekhoven, 2013; version 1.5); a non-parametric imputation method based on the Random Forest algorithm (Stekhoven & Buhlmann, 2012). This approach is well-suited for mixed-type data (i.e., both continuous and categorical variables) and has demonstrated strong performance in preserving complex relationships between variables without assuming normality.

**Ethics**

This study was reviewed and approved by the Health Research Authority and Care Research Wales (HCRW), REC Reference: 24/HRA/4112). All patients provided consent for their anonymised data to be used for service improvement and research purposes at the point of referral. Data was handled in accordance with GDPR and NHS data governance policies.

## Results

### Descriptives

As shown in Table 1, the total sample consisted of n= 44,957 patients, with the majority identifying as female (68.4%) and a mean age of 41.3 years (SD= 14.4). Most patients were from a White or a White-mixed ethnic background (84.6%), with smaller proportions identifying as Asian (6.4%) or Black (2.7%). The majority received high-intensity treatment (77.5%) and attended an average of eight sessions.

*[enter Table 1]*

LTCs were reported by n= 15,728 (47.5%) patients, of whom n= 3,108 (9.4%) reported multiple LTCs (see Tables 1 and 2). The most frequently reported LTC categories were 'Other' conditions (46.3%), Respiratory conditions (23.8%), and Musculoskeletal conditions (10.9%), followed by Cardiovascular conditions (8.5%) and Chronic Pain (7.4%). Within these categories, the most common specific conditions were asthma (21.4%), chronic musculoskeletal disorders (9.4%), and hypertension (6.4%).

*[enter Table 2]*

As shown in Figure 1, the most prevalent multimorbidity profiles involved combinations of Musculoskeletal, Respiratory, and Chronic Pain conditions with 'Other' Conditions. Chronic Pain frequently co-occurred with both Musculoskeletal and Respiratory conditions, while Respiratory conditions also showed a notable overlap with Musculoskeletal conditions.

*[enter Figure 1]*

## Rates of Reliable Recovery and Planned Discharge

Across the total sample, 44.5% of patients achieved reliable recovery, and 66.4% had a planned discharge. Among patients without an LTC, 47.8% (n= 8,316) met criteria for reliable recovery, and 65.7% (n= 11,625) had a planned discharge. In contrast, among patients with at least one LTC, 39.8% (n= 6,255) achieved reliable recovery, and 67.8% (n= 10,656) had a planned discharge.

When examining outcomes by number of presenting LTCs, patients with a single LTC showed a reliable recovery rate of 41.2% (n= 5,186) and a planned discharge rate of 68% (n= 8,586). Among those with multiple LTCs (i.e., multimorbidity), only 34.5% (n= 1,069) reliably recovered, while 66.6% (n= 2,070) had a planned discharge.

## Data Pre-processing for Imputation

Prior to imputation, we examined patterns of missing data at both the variable and participant level. No variable exceeded 30% missingness, and no participant had more than 50% missing data across variables; therefore, all cases were retained for imputation. To assess potential multicollinearity among continuous variables, a correlation matrix and variance inflation factors (VIFs) were computed. Correlations between predictor variables ranged from $r$= 0.01 to 0.7, with the highest observed between final PHQ-9 and GAD-7 scores (Tabachnick & Fidell, 1996). VIF values for all predictors ranged from 1.00–3.88, indicating no critical multicollinearity concerns (Vittinghoff et al. 2005). These checks supported the inclusion of all relevant variables in the imputation model.

## Impact of LTC Status and Multimorbidity

Binary logistic regression analyses were conducted using imputed data to assess the impact of LTC presence and the number of LTCs on reliable recovery (Models 1 & 2) and planned discharge (Models 3 & 4), while controlling for baseline PHQ-9 and GAD-7 scores. Two complementary sensitivity approaches were used: (a) complete-case analyses to assess robustness to missing data

for the primary outcomes, and (b) post hoc analyses using reliable improvement as an alternative outcome definition.

***Reliable recovery***

As shown in Table 3 (Model 1), patients with at least one LTC had significantly lower odds of achieving reliable recovery compared to those without an LTC (*OR* = 0.83, 95% CI [0.79–0.86], *p*< .001). When considering the number of LTCs (Model 2), patients with multiple LTCs had even lower odds of reliable recovery (*OR* = 0.71, 95% CI [0.66–0.77], *p*< .001), suggesting a cumulative negative impact of multimorbidity. Sensitivity analysis using complete cases yielded similar results (see Supplementary Table 1).

***Reliable Improvement***

In post hoc sensitivity analyses using reliable improvement as the outcome, patients with at least one LTC had significantly lower odds of improvement compared to those without an LTC (*OR* = 0.77, 95% CI [0.74–0.80], *p*< .001). When considering multimorbidity, patients with one LTC (*OR* = 0.79, 95% CI [0.76–0.83], *p*< .001) and those with multiple LTCs (*OR* = 0.67, 95% CI [0.62–0.72], *p*< .001) had lower odds of reliable improvement compared to those without LTCs. Full model estimates are reported for the imputed dataset (Supplementary Table 3) and the complete-case dataset (Supplementary Table 5).

***Discharge status***

In contrast to reliable recovery, patients with at least one LTC had significantly higher odds of planned discharge compared to those without an LTC (*OR* = 1.28, 95% CI [1.23–1.34], *p*< .001). This pattern persisted when considering multimorbidity (Model 4), with patients reporting multiple LTCs still showing higher odds of planned discharge (*OR* = 1.24, 95% CI [1.14–1.33], *p*< .001). Sensitivity analysis confirmed the significance of these relationships, although effect sizes were slightly attenuated (Supplementary Table 1).

*[enter Table 3]*

**Moderation Analysis**

A series of binary logistic regression moderation analyses were conducted to examine whether provisional diagnosis (anxiety-related disorders, depression, mixed anxiety and depression, other), functional impairment (WSAS), treatment intensity (Step 2 or Step 3), and mode of therapy delivery (in-person or online) moderated the relationship between LTC status (yes/no) and three outcomes a) reliable recovery b) reliable improvement (post hoc sensitivity analyses) and c) discharge status (planned discharge vs. dropped out). All models were adjusted for baseline PHQ-9 and GAD-7 scores.

***Reliable recovery***

As shown in Table 4, the interaction between LTC status and provisional diagnosis was statistically significant. Compared to patients with anxiety-related disorders, the negative impact of LTC status on reliable recovery was less pronounced among those diagnosed with depression (*OR* = 1.21, 95% CI [1.09–1.33], $p < .001$) but amplified for those with mixed anxiety and depression (*OR* = 0.71, 95% CI [0.65–0.79], $p < .001$). A significant interaction was also observed between LTC status and treatment intensity (*OR* = 0.82, 95% CI [0.75–0.90], $p < .001$), indicating that the negative effect of LTC status on reliable recovery was more pronounced among patients receiving high-intensity interventions (Step 3) compared to those receiving low-intensity treatment (Step 2). The interactions between LTC status and both functional impairment ($p = .13$) and mode of therapy delivery ($p = .64$) were not statistically significant.

In the sensitivity analyses, using complete cases, the only moderator that remained significant was having a provisional diagnosis of depression vs an anxiety-related disorder. Specifically, although having an LTC was associated with lower odds of reliable recovery for both depression and anxiety, this negative association was stronger among patients with anxiety than those with depression (Supplementary Table 2).

***Reliable Improvement***

Moderation analysis indicated that provisional diagnosis moderated the association between LTC status and reliable improvement, with a stronger negative effect observed among patients with mixed anxiety and depression compared to those with anxiety-related disorders. Treatment intensity also moderated this relationship, such that the negative association of LTC status with reliable improvement was more pronounced among patients receiving high-intensity treatment (Step 3). No significant moderation effects were observed for functional impairment or mode of therapy delivery in either the imputed (Supplementary Table 4) or complete-case analyses (Supplementary Table 6).

***Discharge status***

As shown in Table 4, a significant interaction between LTC status and provisional diagnosis was also observed for discharge status. Specifically, patients with LTCs and a diagnosis of mixed anxiety and depression had lower odds of planned discharge (*OR* = 0.66, 95% CI [0.60–0.73], $p < .001$) compared to those with anxiety-related disorders. No significant interactions were found between LTC status and functional impairment ($p = .95$), treatment intensity ($p = .29$) and mode of therapy delivery ($p = .22$). Sensitivity analyses using complete cases did not identify any significant interactions (Supplementary Table 2).

*[enter Table 4]*

## Discussion

The present study explored the impact of having one or multiple LTCs on psychological treatment outcomes and engagement within NHS-TT services, with a particular focus on potential moderators. The prevalence of patients with at least one LTC was 47.5%, of which 9.4% reported multiple. Our analysis showed that patients with LTCs, especially those with multiple LTCs, were significantly less likely to achieve reliable recovery but more likely to have a planned discharge, in relation to patients without an LTC. Notably, moderation analyses revealed that the negative impact of LTC status on

reliable recovery, was attenuated in patients with depression when compared to patients with anxiety-related disorders. Post hoc sensitivity analyses using reliable improvement corroborated the main findings, demonstrating lower odds of improvement among patients with one and multiple LTCs.

The cumulative negative effect of multimorbidity on reliable recovery observed among patients with multiple LTCs aligns with previous research indicating that the presence of an LTC is associated with poorer treatment outcomes (Delgadillo et al., 2017; Ronaldson et al., 2025). However, the present study extends this evidence further by demonstrating that these effects persist when considering the clinical outcome of 'reliable recovery' (i.e., symptom scores fall below clinical cut-offs and reduction represents a reliable and clinically significant change; Jacobson & Truax, 1992), rather than 'recovery' alone (i.e., symptom scores fall below clinical cut-offs, no reliable and clinically significant change is required). This distinction is crucial, as reliable recovery offers a more robust and conservative indicator of meaningful clinical change, reducing the risk of measurement error.

These findings suggest that, under routine NHS-TT treatment provision, patients with LTCs, particularly those with multimorbidity, derive less clinical benefit from psychological treatment than patients without LTCs, despite demonstrating comparable or greater engagement with the services. The present findings therefore highlight a disparity in treatment benefit, rather than inequity in access, and point to the need for continued refinement of how evidence-based therapies are adapted and delivered for patients with more complex physical health needs. Addressing this gap is not only essential for improving patients' quality of life but may also contribute to broader societal and economic benefits, such as increased transitions from unemployment to employment and reduced reliance on secondary healthcare services (Gruber et al., 2021; Toffolutti et al., 2021).

In response to these challenges, national guidance was issued in 2018 to support the development of new LTC pathways within the NHS-TT services, emphasising the need for tailored and integrated

physical and mental healthcare for the LTC population (National Collaborating Centre for Mental Health, 2018). Importantly, this guidance does not suggest that entirely new therapies are needed for this population. Instead, evidence-based therapies already used in NHS-TT services should be utilised but with minor adjustments, including increased consideration of the impact of LTCs (and potentially associated problematic beliefs/behaviours) on mental health problems, promotion of LTC self- management strategies, and modifications to treatment delivery to account for LTC-specific factors.Nevertheless, the services included in the present study had not yet implemented formal LTC-specific pathways during the study period. As such, the findings reflect outcomes under standard NHS-TT provision and should not be interpreted as an evaluation of tailored LTC pathways, which are currently under development. Although emerging evidence suggests that tailored interventions may yield improved outcomes for people with LTCs compared to standard approaches (Kenwright et al., 2017; Wroe et al., 2018), the extent and effectiveness of LTC pathway implementation across services remain unclear and warrant systematic evaluation.

Consistent with current research (Ronaldson et al., 2025), our findings also underscore the importance of incorporating multimorbidity into LTC-specific assessment and treatment planning. With the prevalence of multimorbidity projected to rise significantly over the coming years (Kingston et al., 2018), there is a growing need for psychological services to adopt more nuanced approaches to assess and respond to the complex needs of patients with multiple co-occurring conditions. Indeed, it is likely that individuals with specific combinations of LTCs (e.g., diabetes and hypertension) may require different support than patients with one specific LTC (e.g., diabetes alone). This should also be a focus for future research, considering that previous studies have demonstrated that certain LTCs are associated with poorer outcomes compared to other LTCs (e.g., asthma, diabetes; Ronaldson et al., 2025).

In terms of treatment engagement, our analysis showed that patients with one or multiple LTCs were significantly more likely to have a planned discharge than those without an LTC. This finding

aligns with a recent study that reported no significant differences in assessment or treatment uptake between patients with and without LTCs, suggesting a consistent attendance among the LTC population (Jenkinson et al., 2025). It is therefore critical to note that although patients with LTCs show greater treatment engagement, which has been previously associated with greater motivation to change and better treatment outcomes (Verbist et al., 2022), they are still less likely to experience symptom improvement. One possible explanation for the increase in treatment engagement could be the proliferation of remote therapy delivery since the COVID-19 pandemic (Capobianco et al., 2022; Nguyen et al., 2022), and the associated reduction of physical barriers to treatment attendance. However, in our study, mode of therapy delivers neither the relationship between LTC status and discharge status nor the relationship between LTC status and clinical outcomes. Nevertheless, the latter aligns with previous research indicating that remote therapy demonstrates similar outcomes to in-person provision (Capobianco et al., 2022; Paton et al., 2024).

Having established the need for a more personalised approach to psychological treatment for the LTC population, this might be particularly important for certain subgroups.In our study, patients with LTCs and a diagnosis of mixed anxiety and depression were less likely to recover, whereas patients with depression were more likely to recover when both were compared to those with anxiety-related disorders. Importantly, diagnostic moderation patterns varied depending on outcome definition and analytic approach. For reliable recovery, depression emerged as the most robust diagnostic moderator, replicating across both imputed and complete-case analyses, whereas poorer outcomes for mixed anxiety and depression were observed only in the imputed dataset. In contrast, when reliable improvement was examined in sensitivity analyses, mixed anxiety and depression was consistently associated with lower odds of improvement across both imputed and complete-case datasets. This pattern is consistent with previous literature showing that comorbid anxiety and depression is associated with greater clinical severity, chronicity, and poorer treatment outcomes than either condition alone (Lamers et al., 2011).

However, the finding that patients with LTCs and depression were more likely to reliably recover than those with anxiety-related disorders contrasts with national data indicating slightly higher recovery rates for anxiety-related disorders than for depression (48% vs. 45%; NHS Digital, 2024), suggesting that recovery patterns may differ in the context of comorbid LTCs. This interpretation aligns with findings from the COMPASS programme, a digital CBT intervention specifically designed for LTC patients, which showed treatment effects to be larger for depression than for anxiety (Seaton et al., 2023). Therefore, a subgroup of patients with LTCs and anxiety-related conditions may represent a particularly complex clinical presentation that warrants further research and potentially more intensive or specialised support pathways.

Our study may also add to the evidence that low-intensity interventions such as iCBT can be effective for LTC patients, even in the presence of comorbidities (Lee et al., 2023), since treatment intensity (Step 2 vs. Step 3) significantly moderated the LTC–recovery relationship in our main model (but not in our sensitivity analysis). This aligns with broader research showing that patients with complex clinical needs, including those with LTCs, can still benefit from brief or digital treatments, provided these are appropriately targeted (Seaton et al., 2023)

Surprisingly, the interaction between LTC status and functional impairment, as measured by the WSAS, was not statistically significant. One possible explanation is that the WSAS primarily assesses functional impairment resulting from mental health symptoms and may not fully capture the functional limitations associated with physical health conditions. Jones et al. (2025) recently highlighted that existing measures may lack the sensitivity and specificity required to adequately capture LTC-related functional challenges, prompting the development of tailored transdiagnostic tools for this population. Future research and clinical practice should consider supplementing generic functioning measures with LTC-specific assessments to more accurately identify support needs and evaluate treatment outcomes in this group.

To our knowledge, this is the first study to investigate potential moderators of the negative relationship between LTC status and clinical outcomes in the context of psychological services. To enhance reliability, our findings need to be replicated by future research and explore further potential moderators not currently investigated. To optimise the support offered to patients with the greatest needs, it is important to identify subgroups of patients with LTCs who respond less favourably to standard treatment. This may also help with triage and the stratification of care, ensuring that patients receive the most appropriate treatment aligned to their specific needs, and thus making best use of limited resources in publicly funded mental health services.

**Strengths and limitations**

This study has several key strengths. First, it is the first large-scale analysis to investigate potential moderators of the relationship between physical LTCs and psychological treatment outcomes in NHS-TT, offering new insights into engagement and reliable recovery across diagnostic and treatment subgroups. Second, the use of reliable recovery as the primary outcome enhances the clinical significance of findings, , while post hoc sensitivity analyses using reliable improvement demonstrated the robustness of results to alternative outcome definitions. In addition, by distinguishing between patients with single versus multiple LTCs, the study provides important evidence on the cumulative burden of multimorbidity that has become an increasingly common challenge in modern healthcare. Including only post-pandemic referrals in our analysis (September 2021 to September 2024), reflects the current landscape of therapy provision, including both remote and in-person delivery. The large, naturalistic sample (N = 44,957) drawn from seven NHS services also enhances the generalisability and ecological validity of findings. Lastly, missing data were handled using a robust non-parametric imputation method (*missForest*), preserving data structure without relying on parametric assumptions.

Nevertheless, our findings should be considered in light of the study's limitations. LTC status was based on patients' self-report, and nearly half of LTCs were recorded under a broad "Other" category, limiting the ability to examine specific conditions. This category reflects clinician-selected options when conditions do not map onto predefined categories and was not accompanied by free-text or structured diagnostic coding, which restricted further disaggregation. This limitation not only highlights the need for more accurate record keeping but also encourages future research to consider linking primary care and NHS-TT data. Such linkage would enable a more valid assessment of patients' LTC status and facilitate the investigation of how specific LTCs, as well as the most prevalent LTC combinations, impact treatment outcomes. This study was also limited by the absence of therapist-level variables, hence we could not account for practitioner effects. For example, it was unknown whether practitioners had received specialised training on treating people with LTCs or the extent to which treatment may or may not have been considered LTCs.

Provisional diagnosis should also be interpreted with caution. Diagnoses in NHS-TT are mostly assigned at initial assessment and are not based on structured diagnostic interviews; as such, they may not fully capture evolving clinical formulations or presentation complexity. In addition, some cases had missing diagnostic data. Diagnostic moderation findings should therefore be interpreted as reflecting broad clinical groupings rather than disorder-specific effects. We also did not account for clustering by service, as this was not included in the preregistered analysis plan. This may have introduced unmeasured service-level variation, and future work should incorporate multilevel or cluster-adjusted models to explore whether service-specific factors are associated with clinical outcomes within the population of patients with LTCs. The sample was also restricted to services within the Northwest of England, and therefore, the results may not generalise to other regions with different demographics and clinical populations. However, similar findings have been observed in other regions, such as London (Ronaldson et al., 2025; Seaton et al., 2022), and the reliable recovery rate observed in the total study sample is comparable to the national rate observed in 2023-2024

(44.1% vs 47.1%; NHS England, 2024). In addition, treatment intensity reflected the final step of care reached during the episode, consistent with NHS-TT outcome reporting conventions; as a result, step-up transitions and step-specific intake baselines could not be examined. Finally, outcomes were assessed only at discharge, and future research should explore long-term trajectories of recovery and relapse in this population.

## Conclusion

Consistent with previous research, this study highlights the comparably poor treatment outcomes experienced by patients with LTCs in stepped-care mental health services, with multimorbidity further exacerbating clinical outcomes. Our findings extend the evidence base further by demonstrating that this negative relationship persists when considering the more conservative treatment outcome of reliable recovery, and by identifying key moderators of the relationship, namely anxiety-related diagnoses. These findings underscore the importance of ensuring that patients with LTCs receive care that adequately addresses more complex needs. Further research is warranted to examine whether particular subgroups (e.g., specific LTCs or combinations, perceptions of LTCs, or interactions with mental health and clinical factors) are especially vulnerable to poorer outcomes, to inform more personalised and effective interventions.

## Acknowledgements

This study was supported through expertise from the NIHR HealthTech Research Centre in Long Term Conditions (D4D). The views expressed are those of the author(s) and not necessarily those of the NIHR or the Department of Health and Social Care. We also acknowledge Strategic Research Funding from Greater Manchester Mental Health NHS Foundation Trust, which supported time for Dr Ben Lorimer and Patient and Public Involvement (PPI) activities.

## Funding Statement

This research was supported by the Strategic Research Funding from Greater Manchester Mental Health (GMMH) NHS Foundation Trust.

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