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Synopsis

A randomised feasibility trial of an intervention involving mental health support workers as link workers to improve dental visiting in people with severe mental illness: The Mouth Matters in Mental Health Study

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Abstract

Background: People with severe mental illness (e.g. bipolar disorder, psychosis) experience poor oral health compared to the general population. They are more likely to have decayed, missing or filled teeth, and periodontal disease, which can affect quality of life and functioning. It can add to the burden of living with severe mental illness. Dentists can prevent and treat oral health problems. However, people with severe mental illness experience profound and multifaceted barriers to attendance, including practical issues, financial difficulties and dental anxiety. Unfortunately, existing dental interventions have not addressed these issues. They have not helped people with severe mental illness to attend the dentist.

This project aimed to develop and evaluate a link work intervention, delivered by mental health support workers, to enable dental access in people with severe mental illness. The intervention attempted to help people to navigate dental systems and bridge the gap between services. There were four work packages:

Work package 1 involved 4 co-production workshops with patients, staff, and carers (7, 6, 8 and 12 attendees, respectively). We used this information to co-develop and refine the link work intervention and associated training materials. This step ensured that the intervention was relevant and helpful to people with mental health difficulties.

Work package 2 was a realist review to understand the contexts and resultant mechanisms by which link work interventions affect access to community healthcare services. A search of empirical and grey literature identified 31 reports. The analysis resulted in nine context, mechanism, and outcome configurations within three theory areas, providing useful information on how and why link work interventions might be helpful.

Work package 3 was a feasibility randomised controlled trial of a link work intervention to support dental access in people with severe mental illness who had not attended a routine dental appointment in the past 3 years. Seventy-nine

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out of the target 84 participants were randomised to receiving either treatment as usual or treatment as usual plus the link work intervention. The majority of the feasibility criteria were met and there was high engagement with the intervention. Uptake of an optional dental examination was low at follow-up (12.7%; 95% CI: 7.0% to 21.8%). There were no serious adverse events attributable to the intervention or trial procedures. Overall, the findings supported progression to a full trial.
Work package 4 was an embedded qualitative evaluation of the link work intervention and trial. Narrative-informed interviews were carried out with 18 participants in the trial (13 in the intervention arm, 5 in the treatment as usual arm) and 3 link workers. The qualitative data suggested high levels of interest and engagement from stakeholders, and need for dental intervention. The link work intervention offered practical and emotional support at different stages of access to address barriers to dental visiting at the individual, relational and organisational level. Overall, the project successfully developed and evaluated a link work intervention to enable dental access in people with severe mental illness.
Limitations: The authors followed participants up after 9 months and the feasibility of longer-term retention is unknown.
Future work: The next step is to explore the effectiveness and cost-effectiveness of the link work intervention through a full trial.
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Introduction

People with severe mental illness (e.g. psychosis, depression, bipolar disorder) experience worse oral health than the general population.[1] This includes higher rates of missing, decayed and filled teeth and periodontal disease.[2,3] In extreme cases, poor oral health can result in difficulties with basic everyday functions, like eating, drinking, and speaking, particularly in later life.[4] It can exacerbate some of the difficulties associated with mental illness, such as social anxiety, low self-esteem and demotivation.[5,6] Despite this, compared to other areas of physical health, little attention has been paid to support oral health in people with severe mental illness.

People with severe mental illness are more likely to clench their jaws and grind their teeth compared with the general population.[7] Grinding and clenching are linked with the wearing down of teeth and the need for fillings. Research has also suggested high rates of smoking and substance misuse in this population,[8,9] which can lead to poor oral health. In comparison with the general population, people with severe mental illness are less likely to engage with good oral health behaviours such as brushing their teeth twice a day or flossing.[10] They may also suffer from the iatrogenic effects of psychiatric treatments, which can contribute to xerostomia (dry mouth), increasing the risk of tooth decay and oral infections.[11] Taken together, people with severe mental illness represent a particularly 'at risk' group for poor oral health.

Dental services can assess and treat oral health problems and provide preventative care and advice. People with severe mental illness, however, face multiple, interacting barriers to dental attendance. Discharge dental policies often allow for little flexibility in attendance and are sometimes punitive in nature; by design, they have a greater impact on the most vulnerable in society, such as those who are more likely to have competing health appointments. For example, being late for an appointment, or cancelling/rearranging multiple appointments at short notice can result in discharge from dental practices. Psychiatric symptoms (e.g. paranoia, anxiety) can also act as direct barriers to attending appointments, increasing levels of anxiety in waiting rooms and during consultation.[6] People with severe mental illness may lack the motivation to navigate the sometimes challenging and complex processes around dental access. In England, a routine dental appointment under the NHS can be in excess of £300 for significant dental treatment. Not everyone who is in receipt of benefits is entitled to free or subsidised dental treatment, and the process of applying is complex. A recent meta-analysis suggests that people with severe mental illness were less likely to have attended a dentist, compared to the general population.[10] Supporting people with severe mental illness to access dental services for routine preventative and therapeutic work may represent an important step in improving oral health outcomes in this group. Currently, there exist no evidence-based interventions for improving the oral health of people with severe mental illness.[12,13]

Link work interventions attempt to address inequities in service provision.[14] In these, support workers are trained to offer emotional and practical support to help people to navigate the gap between clinical services. Link work interventions have mostly been used in primary care to link people accessing support through their general practitioner surgeries to community groups, third sector organisations and NHS healthcare services.[15] There have been examples

of small pilot studies of link work interventions supporting people using secondary mental health services to access peer-led community organisations.[16] There is some early indication that link work interventions can have a positive impact on participant's social, psychological and emotional well-being.[17,18] Most relevant to this report is the *ChildSmile* programme in Scotland, which employed link workers to enable vulnerable families to access dental services.[19] They found that families with a link worker were twice as likely to have attended a dentist, compared to those without. To the best of our knowledge, such an intervention has never been used to support people with severe mental illness accessing secondary care mental health services to attend a routine dental appointment.

Objectives

The aim of this project was to investigate the feasibility and acceptability of a link work intervention using support workers to increase planned dental care visits for patients with severe mental illness, and through this improve their oral health. It was considered to be at stage two of the MRC Complex Intervention Cycle. More specifically, our aims were:

1. to understand what constitutes best practice when delivering link work around dental visiting
2. to identify what training needs exist for support workers around link work
3. to determine whether patients with severe mental illness are willing to be randomised to a trial targeting dental visiting
4. to understand whether it is feasible to collect clinical outcome and planned dental appointment data in this population
5. to explore if, and how, patients with severe mental illness engage with a link work intervention
6. to understand the potential factors impacting (e.g. facilitators and barriers) acceptability and delivery.

Overall, the aim was to co-design a link work intervention and training materials with key stakeholders and learning from the wider literature, and then to assess its feasibility and acceptability in a randomised controlled trial and qualitative evaluation.

Methods and findings

There were four work packages to this project:

1. Stakeholder engagement workshops to refine the link work intervention manual and associated training materials.
2. A realist review to understand the contexts and resultant mechanisms by which link work interventions affect access to community healthcare services.
3. A feasibility randomised controlled trial evaluating a link work intervention for supporting people with severe mental illness to access a routine dental appointment.
4. An embedded qualitative evaluation of the link work intervention and associated trial protocols.

Each of the four work packages are described in more detail below.

Work package 1, stakeholder workshop (objectives 1–2)

The team completed four stakeholder workshops between May and August 2022 to develop and refine the link work intervention and associated training resources. These were attended by people with lived experience, carers and support workers from secondary care mental health services, and NHS dental staff. The exact number of attendees varied across workshops (7, 6, 8 and 12 attendees respectively) who were diverse in terms of age, ethnicity, and gender.

Consultants were invited to attend by staff based on patient and public involvement (PPI) consultant preferences and due to the constraints imposed by COVID-19, we conducted all workshops online via Teams (Microsoft Corporation, Redmond, WA, USA). Meetings were chaired by a clinician and person with lived experience. Feedback was used to iteratively inform the creation of the link work intervention manual. Examples of feedback were as follows:

- PPI consultants felt that more emphasis needed to be placed on supporting people at dental appointments, not just supporting them to find a dentist.
- They felt that it was important to emphasise the benefits of increased dental attendance, rather than the drawbacks of not attending, while also normalising the challenges.
- Consultants spoke about the importance of involving wider systems (e.g. families) where possible so that they could support future dental attendance after the link work intervention had finished.
- PPI consultants felt that the intervention would need to be very flexible accounting for different people's needs and barriers to dental attendance. In some instances, it was felt that a light touch approach would be needed. In others, that more hands-on and proactive support should be provided. The intervention was designed to allow for both.
- PPI consultants offered advice on how to manage expectations around finding a dentist, while building hope and motivation for the future.

Patient and public involvement consultants were invited to read and comment on drafts of the intervention manual and associated training materials, which were also presented at the final workshop for feedback and further refinement. The manual was also refined over the course of the project with input from the link workers delivering the intervention (work package 3) and the PPI panel. For example, towards the end of the feasibility trial, a frequently asked questions section was added to address commonly encountered difficulties within the intervention. This was written by the link workers in collaboration with the PPI panel.

Work package 2, realist review (objective 6)

The second work package was a realist review to understand contexts and resultant mechanisms by which link work interventions affect access within community healthcare settings. The review followed Realist And Meta-narrative Evidence Syntheses: Evolving Standards (RAMESES) guidelines and had a published protocol (PROSPERO: CRD42022302709). The authors completed a systematic search of empirical literature and explored multiple sources of grey literature. This was initially conducted in October 2022 and later updated in August 2024. Consultation with an expert panel generated initial broad theory areas, which were explored in detail and refined iteratively based on the literature. The search identified 31 reports. Twenty-eight of these were peer-reviewed studies and three were grey literature. Subsequently, the authors generated nine context, mechanism and outcome configurations within three theory areas. Derived theory areas related to 'adequate time in time pressured systems', 'the importance of link workers being embedded across multiple systems' and 'emotional and practical support for link workers'. These suggest that link workers across community healthcare settings require resource matched to levels of service and patient complexity and need, and highlight the negative consequences and outcomes of not doing so. The stability of service provision and places to link to are also essential in the success of link work, as is the link workers' ability to embed themselves within multiple systems. This can be challenging, and link workers often must navigate multiple roles, within communities, while also being perceived as a colleague and asset by referring services. If navigated effectively, this can lead to productive and thriving relationships and unique knowledge of local service offers. These, in turn, can build trust, self-confidence and understanding of the link working process in both patients and referrers, which can facilitate better access for patients. The findings have implications for the use and roll-out of link work interventions in community settings in the United Kingdom.

Work package 3, feasibility randomised controlled trial (objectives 3–5)

The third work package was a pre-registered randomised controlled trial evaluating the acceptability and feasibility of a link work intervention to support people with severe mental illness to access a routine dental appointment (ISRCTN13650779; NCT05545228), and has a published protocol paper. The trial was conducted across three sites in the Northwest of England between September 2022 and April 2024. Participants were adults accessing secondary care mental health services who had not attended a routine dental appointment in the past 3 years. They were randomly allocated (1 : 1 ratio) to receiving either treatment as usual (TAU) or TAU plus a 9-month link work intervention. Participants completed research assessments at baseline and after 9 months. There was an optional dental examination, completed as part of the research assessment form, whereby a dental therapist could examine their teeth and gums. We also obtained dental visiting data through self-report and the NHS Business Services Authority (BSA).

In total, 161 participants were referred to the trial, which resulted in 79 randomisations. In terms of a priori 'traffic light' feasibility criteria, the trial recruited 94.0% of the target sample (green). In the intervention arm, 97.4% of participants attended at least one link work intervention session, with a mean of 4.1 [standard deviation (SD): 2.0; green]. Dental visiting data were available in 84.8% of participants, which was slightly below the target threshold of 90.0% (amber). Uptake of an optional dental examination was very low (12.7% after follow-up). There were no risk concerns; we identified 16 serious adverse events, but none were attributable to the intervention or trial procedures. Serious adverse events were equally distributed across the arms of the trial. There was a signal of increased dental visiting (self-report: 91.7% vs. 26.7%; NHS BSA: 55.3% vs. 12.1%), and oral health quality of life (6.7 vs. 1.9 points), in the link work intervention arm, compared to TAU. In participants attending a dentist, those in the link work arm attended an average of 3.2 planned dental appointments (SD: 1.9, n = 33), compared to 2.6 appointments in the TAU arm (SD: 1.5, n = 8). Overall, the trial procedures and intervention were observed to be feasible, acceptable and safe, and there was promise in terms of clinical outcomes, which requires exploration within a pragmatic trial.

Work package 4, qualitative workstream (objective 6)

The fourth work package was an embedded qualitative study to examine both the acceptability and feasibility of trial procedures alongside understanding if, and how, the intervention supported individuals with severe mental

illness to access dental care. Narrative-informed interviews were carried out with 18 participants in the trial (13 in the intervention arm, 5 in the TAU arm), 3 link workers and 4 research assistants across the 3 sites. Semistructured interviews were also conducted with staff involved in the trial including the link workers delivering the intervention, research assistants and the dental therapist. Interviews were carried out in two waves to capture experiences at different stages of the trial. Data analysis used an inductive and deductive approach and followed reflexive thematic analysis processes.

The pertinent findings on the acceptability and feasibility of trial processes show that:

- There were high rates of demand to participate in the study from referrers who recognised the dental need in this population and from participants themselves who had been struggling to access to dental care independently.
- Participants felt comfortable with the consent and assessment processes generally and felt supported by the research assistants to complete these processes.
- Expectations of the study were perhaps undersold, with most participants just expecting practical signposting to an available service rather than a package of tailored, personalised support. This was positively received.
- Low uptake of the dental examination was attributed to several factors: participants not perceiving a personal benefit to an examination without feedback, anxiety and shame about teeth at the start of the trial, practical barriers to coordinate the dental exam and assessment, and the additional time needed.
- Some participants in the TAU group were disappointed not to get support, while others were relieved to avoid going to the dentist.

The findings on the experiences of the intervention and delivering the intervention demonstrate that:

- The work of identifying and registering at appropriate services was laboursome and complex for the link workers, particularly given the current lack of NHS provision in some regions. Participants, recognising their previous failed attempts to find services, appreciated this practical wayfinding support on their behalf.
- The link workers played a larger role than anticipated accompanying and advocating for participants during appointments. This was seen as important to support participants to make informed decisions and mediate power imbalances.
- Participants and link workers reported that they were able to develop good working relationships within the six allocated face-to-face sessions. Regular contact over phone and text was seen as important to maintain rapport.
- Link workers reported that due to the spectrum of need among participants (both dental need and mental health need) some participants needed fewer appointments, while others would perhaps have benefitted from further sessions.
- Many dental practices were perceived to operate within strict policies that increased barriers to attendance. Practices were perceived to be lacking in flexibility and accommodation, including at entry to the service and during appointments. Specialist community dentistry services, for those who met eligibility criteria, were considered a more appropriate service by participants and link workers.

Participants and staff reported that the intervention was acceptable and feasible. All the participants interviewed in the intervention arm had been able to access dental care in some form. Participants said that they felt more comfortable returning to services because of the intervention (positive recursivity) and were making progress towards their individual oral health goals (such as being out of pain, getting needed treatment, getting dentures). Further information can be found in the qualitative paper (see *Box 1*).

BOX 1 Publications related to this work

Hilton C, Morris A, Burnside G, Harris R, Aggarwal V, Procter S, *et al*. A two-arm, randomised feasibility trial using link workers to improve dental visiting in people with severe mental illness: a protocol paper. *Pilot Feasibility Stud* 2023;**9**:157. https://doi.org/10.1186/s40814-023-01383-2

Palmier-Claus JE, Morris A, French P, Griffiths R, Aggarwal V, Berry K, *et al*. A link work intervention to facilitate dental visiting in people with severe mental illness: a two-arm, multisite, assessor blind, randomised feasibility trial with dental record linkage. *Community Dent Oral Epidemiol* 2025;**53**:580–6. https://doi.org/10.1111/cdoe.70002

Golby R, Lobban F, Laverty L, Velemis K, Aggarwal V, Berry K, *et al*. Understanding how, why and for whom link work interventions promote access in community healthcare settings in the United Kingdom: a realist review. *Health Expect* 2024;**27**:e70090. https://doi.org/10.1111/hex.70090

Laverty L, Palmier-Claus JE, Harris RV, Catton N, Lodge C, Morris A, Lobban F. Mediating candidacy: qualitative study of a link work intervention to support individuals with severe mental ill health to access dental care. *Soc Sci Med* 2025;**378**:118044. https://doi.org/10.1016/j.socscimed.2025.118044

Discussion/interpretation

Principal findings and achievements per project outcome

The project successfully completed all four work packages within the allocated levels of funding. Four PPI workshops

were completed on time and to target, and resulted in a co-designed intervention manual and associated training materials. The realist review was also completed on time and offered insights into the contexts and mechanisms that might affect outcomes in link work interventions. The feasibility randomised controlled trial recruited to target and demonstrated excellent levels of engagement with the intervention. The team were able to obtain both self-report and NHS BSA data, but rates of dental examinations were low. The qualitative study recruited participants and staff from across all three sites, and from both arms of the trial. The findings help to contextualise the trial results, offering explanations for low uptake of the dental examination and experiences of dental attendance. The qualitative study was also able to examine the different offers of support and the impact these had on the access journey. Taken together, this was a large and ambitious project that achieved its goals, while bringing together academics and clinicians from different specialities (e.g. dentistry, mental health, sociology), and laying the foundation for a full trial to establish the effectiveness of a link work intervention for improving dental access in people with severe mental illness.

Contribution to existing knowledge

There currently exist no evidence based, scalable interventions for improving the oral health of people with severe mental illness. The Three Shires trial[20] is the largest evaluation in the UK to date and found no effects of a brief oral health checklist of any oral health outcome. The results of the current feasibility randomised controlled trial suggest that a link work intervention for supporting dental access in people with severe mental illness is feasible, acceptable, and safe. Signals in the data suggest that the intervention has promise in terms of improving access and oral health quality of life. However, this requires further investigation within the context of a full trial conducted in larger number of participants across the UK. If found to be effective, the research would add to evidence suggesting that link work interventions can support dental access in vulnerable populations. Indeed, the *ChildSmile* programme in Scotland has demonstrated the benefits of link work in vulnerable families.[19] Previous small-scale evaluations have shown that link work intervention can also be applied to people with severe mental illness to support peer-based community initiatives, but these have not focused on dental access.[16] Further research is therefore important for improving oral health outcomes in people with severe mental illness.

The findings of the trial add to existing literature suggesting very high rates of oral health problems and clinical need in people with severe mental illness. Indeed, baseline data in the feasibility trial showed high rates of orofacial pain, dental anxiety, and relatively low oral health quality of life in the sample. Furthermore, a quarter of participants had attended an emergency dental appointment in the past 3 years. Emergency dental care can sometime necessitate more intrusive treatments (e.g. extractions) and be costly to the NHS. It is often considered symptomatic of high need paired with low access to services. We observed high rates of risk factors for poor oral health including elicit substance use, smoking, and alcohol consumption. Taken together, the data support the hypothesis that people with severe mental illness constitute a high-risk group for poor oral health.

Our feasibility trial suggests that it is possible to collect data on the EuroQol-5 dimension version[21] in this population. This outcome is sometimes used to understand the cost-effectiveness of interventions. In the future, it will be important to establish the cost-effectiveness of the link work intervention. Emergency dental care and accident and emergency visits can be costly to the NHS. Ensuring that people with severe mental illness receive appropriate early preventative treatment and advice could reduce emergency visits and prove cost-saving in the long term. However, this requires investigation within a future cost-effectiveness evaluation.

Strengths and weakness

There was strong PPI involvement throughout the project. In work package 1, stakeholder involvement greatly shaped the link work intervention manual, ensuring alignment with the priorities and preferences of people with lived experience. To date, very few link work intervention manuals have been published and made freely available, limiting the transparency and replicability of their use. Our next step is to evaluate the efficacy of the link work intervention in a full trial. After this time, if found to be effective, we plan to make the link work intervention manual accessible and freely available.

The feasibility randomised controlled trial has several strengths including a pre-registered protocol and oversight from a clinical trials unit. It was conducted across three NHS sites with differing geographies and levels of dental access, increasing the generalisability of the findings. Dental attendance data were recorded through self-report, but also the NHS BSA. The latter provided a more conservative estimate of dental attendance, but still showed a marked difference between the arms of the trial, favouring the link work intervention over TAU. The triangulation and comparison of different data sources is a major strength of this work.

One possible limitation of the feasibility trial was the lack of a longer-term follow-up assessment, which would have allowed for exploration of whether improvements in dental attendance and oral health quality of life were maintained after the intervention had ended. However, we did demonstrate that obtaining and analysing NHS BSA data were feasible. Therefore, it would be relatively straightforward to add follow-up time points in the future with little additional staff costs. It is also worth noting that the emphasis of the intervention was on supporting participants to access a dentist in people who had not attended in over 3 years, rather than to maintain dental attendance in those already attending over time. Therefore, it could be considered that the trial was able to meet its aims.

Reflections and challenges

The feasibility study met all of its main objectives, but did require a short (3 months) uncosted extension to allow time for integration of the BSA data into the main data set. The process of applying for NHS BSA data was relatively lengthy, and may require greater time allocation in a future trial. Furthermore, we waited 2 months after the final intervention window had closed before submitting the final data request to the NHS BSA. When designing the study, we felt that this would allow enough time for NHS dentists to have submitted their data for remuneration to the NHS BSA. However, it is possible that some NHS dentists had not yet submitted, resulting in missing data. This may explain some of the discrepancy in the rates of dental attendance between the self-report and NHS BSA data. In a future trial, it may be preferable to allow for greater time before submitting a data request to the NHS BSA.

We found low rates of uptake for the dental examination. The reasons for this varied across participants. Many participants declined the dental examination, possibly due to finding it too anxiety provoking or burdensome. This was acceptable within our protocol because we did not wish to prevent the most vulnerable/dental phobic participants from taking part. On other occasions, participants consented, but were unable to make any of the appointment slots that were available with a dental therapist. The dental therapist was less flexible than the research assistants in offering appointments (e.g. in the evenings) and it was more difficult for them to rearrange appointments if cancelled or missed. Eight participants who completed the dental examination at baseline requested that the follow-up assessment be conducted remotely via telephone/video conferencing software, which prevented the repeated completion of the dental examination at follow-up. It is our experience that delivery of clinical assessments must be as flexible and accessible as possible, particularly with difficult to engage populations, such as people with severe mental illness. It is possible that the dental examination is ill suited to research in this group or that changes to the protocol are required before a definitive trial to make it easier for people to attend the dental examination. Certain alternative approaches may be more acceptable and easier to administer in people with severe mental illness. For example, one option may be to ask participants to count their number of missing teeth, which may lead to less missing data, but provide a less accurate measure of tooth loss. Our PPI panel and Trial Steering Committee were in favour of this alternative, less-burdensome approach when conducting a full trial.

Challenges faced

Recruiting marginalised populations into clinical trials is always challenging and requires substantial coordination and the engagement of stakeholders and clinical services. However, the research team were able to recruit 79 of the target 84 participants, which was in the green in terms of feasibility criteria. This was likely helped by the broad inclusion criteria and clear need in terms of oral health support. One site recruited slightly below target (23/28 participants), but this was still in the green in terms of feasibility criteria, and was largely due to staff sickness. Without this, it is likely that this site would also have met its recruitment target in full. In the future, if possible, it may be important to put in place contingencies to account for staff absence should it occur (e.g. multiple research assistants at each site).

The link work intervention aimed to support access to dental services, in the context of stretched dental practices and limited access. There are now several areas of England and Wales considered dental deserts with very little NHS dental availability and large waiting lists.[22] This is true of part of the Northwest of England where there is a scarcity of NHS dentists picking up new patients. In terms of the intervention, this often required the link workers to be proactive in finding participants in the intervention arm appointments. At times, they were forced to drive participants long distances, explore private appointments, or put people on long waiting lists. Regular clinical supervision was utilised to problem solve and offer support around these issues. Regardless of the helpfulness of link work interventions, widespread improvements in access may not be possible without wider policy change and increased resource in terms of dental appointments in the UK.

Engagement with partners and stakeholders

Stakeholder engagement was key to the delivery of this research. This started in the link work interventions

development (work package 1), but continued throughout the project. Please see our PPI section for more information. We actively engaged with clinical services, particularly community mental health teams and early intervention for psychosis services, who discussed the research with their service users and, where appropriate, referred people into our trial. We also engaged and worked closely with the research and development teams at the participating trusts to ensure that local policies and standard operating procedures were followed. We have subsequently disseminated the findings at the NHS organisations, including an easy-to-read infographic summarising the results. The realist review convened an expert panel, which included leading experts on link work interventions, allowing it to benefit from a wealth of experience and prior learning.

Individual training and capacity-strengthening activities

The project has resulted in a link work intervention manual and a battery of associated training materials. This includes multiple sets of training slides, videos of link workers outlining and explaining the intervention, and a frequently asked question page. These will strengthen our ability to train link workers in the intervention in the future. Liverpool Clinical Trials Centre now have a database and randomisation system that could easily be updated for a definitive trial. The team have been able to disseminate the findings of the project widely and to different audiences (see *Impact and learning*) and the feedback has been helpful in considering broad, future actions around addressing oral health inequalities in people with severe mental illness.

Institutional capacity strengthening

The trial strengthens the research portfolio of the participating university and NHS organisations. There were no direct benefits in terms of infrastructure development given the nature and design of the work completed.

Patient and public involvement

The Mouth Matters in Mental Health Trial integrated PPI throughout its design, delivery, intervention and dissemination activities, leveraging the expertise of individuals with lived experience of mental health throughout each phase of the research process. The PPI group comprised people with lived experience of severe mental illness, including carers, as well as independent mental health support workers, who were recruited through participating NHS trusts, mental health charities, and Spectrum Connect (a database of people with severe mental illness who have agreed to be contacted about such opportunities), ensuring representation from different ethnic and sociodemographic backgrounds, and genders.

Throughout the Mouth Matters in Mental Health trial, a dedicated PPI panel made up of a core group of nine individuals with lived experience convened quarterly over eight sessions to provide continuous support, advice and feedback on the research. Research and clinical staff joined PPI meetings to integrate opportunities for shared learning. For example, research assistants received training from the PPI panel in how to communicate the research effectively. Link workers were also able to receive feedback on how they would introduce and discuss the intervention with participants at their first session, through an observed role-play. We provided training to the PPI panel to help them to understand key research processes. For example, a session was delivered by the qualitative lead (Louise Laverty) on thematic analysis with experiential exercises. The chief investigator also conducted a training session on trial design and the stages of evidence development. All PPI meetings and workshops were conducted online via Microsoft Teams at the request of the panel and due to concerns about COVID-19.

Overall, the PPI group had a positive influence on both the design and delivery of the Mouth Matters in Mental Health trial. Chris Lodge is service user research at Lancaster University and co-lead the PPI for this project. David Shiers is a carer and co-investigator and was instrumental in advising on and supporting the completed work. This ensured that there was PPI representation at the majority of management meetings. We also had PPI representation on the Trial Steering Committee.

Key outcomes resulting from PPI involvement include the link worker manual; a topic guide for the qualitative work package based on narrative approaches; theme generation and refinement following participant and link worker interviews; a dissemination strategy developed in conjunction with the knowledge of key messages and audiences from those with lived experience and carers; a co-produced lay infographic of the study findings; and interpretation of the findings and discussion of further research towards a full trial. The PPI process highlighted the importance of incorporating diverse voices in developing intervention resources to ensure they are both practical and tailored to meet people's needs. The PPI group significantly influenced the link worker training package through, for example, emphasising the importance of providing support in dental waiting and treatment rooms. PPI involvement ensured that service users were central to decision-making throughout.

An adequate budget to support PPI across the trial proved crucial. While the core advisory group's size generally facilitated effective conversations and interactions, it occasionally resulted in low meeting attendance. Therefore, starting with a larger PPI group may help address this issue. Engaging PPI members from a wide geographical area was achieved through remote and online meetings, improving accessibility and inclusivity. However, this approach also highlighted the need for strategies to engage PPI members with lower digital literacy.

Equality, diversity and inclusion

Steps were taken to ensure high standards of equality, diversity and inclusion (EDI) were embedded throughout the research process, from participant recruitment and involvement of PPI members to the dissemination of findings. Our participant recruitment strategy was informed by the NIHR's EDI framework. Ethnic diversity was of particular importance given that people from ethnic minority groups' backgrounds are disproportionately likely to be diagnosed with severe mental illness. We therefore targeted our recruitment strategy towards services in ethnically diverse areas. Resultingly, over 24% of the sample coming from a minoritised ethnicity and over 61% of participants lived in the two most socially deprived areas in the UK according to the index of multiple deprivation.

Participant inclusion criteria were designed to be as comprehensive and pragmatic as possible, aiming to include most service users accessing secondary care mental health services who had not visited a dentist in the past three years. This 3-year benchmark was based on National Institute for Health and Care Excellence (NICE) recall guidance, which allows patients at low risk to be seen every two years, implying those absent for three years, likely lack dental access. Exclusions were necessary to ensure the safety of research participants and others. Additionally, we budgeted for interpreter and translator services to support individuals from diverse backgrounds and cultures. Interpreters for different languages were employed multiple times throughout the trial. To facilitate participation for those with additional needs, we selected meeting venues accessible by public transport and suitable for those with mobility issues. We paid taxi services for those requiring them and people brought carers as required. Often research assistants would complete assessments at participant's own homes, while following safe visiting practices, because this was more convenient or appropriate for them.

The trial aimed to improve access for patients with severe mental illness through a responsive and inclusive delivery model using mental health link workers. These workers employed a personalised care model, which prioritised patient needs. Lived experiences and PPI feedback were integral to developing this model, ensuring it was tailored and inclusive. Flexibility was a key feature of the trial measures. Participants who did not wish to complete the dental examination were still allowed to enrol in the trial. Self-report assessments could be completed remotely via telephone or video calls. This process was based on recruitment methods from previous trials and shaped by PPI feedback and was found to be inclusive and fair. Regarding the qualitative work package, audio-recording interviews was optional to give everyone the opportunity to participate. Three participants wanted to be interviewed, but were not comfortable being audio-recorded. Instead, the qualitative researcher took detailed written fieldnotes that were typed up at the end of each interview.

Participants were reimbursed £20 for each assessment (baseline and nine months), plus any additional costs incurred for travel or online participation, in line with INVOLVE guidance. Participants were recognised and thanked in letters sent during the project and in dissemination materials, while maintaining confidentiality. There were no payments for engaging with the intervention sessions. Reimbursements for PPI members' time and expenses were based on INVOLVE rates, with accommodations made for virtual attendance at online sessions.

Our dissemination strategy aimed to reach a wide range of stakeholders. We therefore prioritised producing both academic publications alongside lay summaries. We worked in collaboration with our PPI members to develop this strategy and produce a trial infographic which is accessible to a non-academic audience. As far as possible, we also involved a PPI representative in our dissemination activities, with the PPI-lead co-presenting with other investigators at several events. Given the importance of improving dental outcomes for this vulnerable population, and the broad issues affecting dental access across the UK, we will continue to use our findings to produce evidence informed policy recommendations to improve access to this underserved population.

Overall, embedding practices which promote EDI throughout the research process were crucial. By ensuring diverse voices were heard and considered, we developed resources that reflected the needs of participants, especially those from marginalised populations. The inclusive recruitment strategies, flexible participation options, and comprehensive support systems employed in this trial underscore the importance of EDI in research. These efforts not only aimed to enhance the accessibility and relevance of the research, but also foster a more

equitable and responsive dental care environment for individuals with severe mental illness.

Impact and learning

The main impact of the project was the co-design of a link work intervention with key stakeholders, and data attesting to its feasibility, acceptability and safety. The next stage is to evaluate the effectiveness of the intervention within a full trial. If found to be effective, the link work intervention may address inequities in dental access and oral health outcomes in people with severe mental illness. Future implementation work could ascertain the most effective way that this could be integrated into secondary care mental health services. It could be explored alongside other programmes and interventions for improving the oral health of people with severe mental illness. Overall, the goal is to ensure that poor oral health is not an inevitable consequence of mental illness. The next step is to apply for a full trial to explore the effectiveness of the link work intervention. Our team have already begun discussions with possible additional sites and collaborators. Over the forthcoming months, we will continue these meeting to ensure the timely submission of a grant application.

Our wider dissemination strategy is ongoing with findings to date shared across a variety of stakeholders (clinical, academic, voluntary sector, service users, carers) and settings (university, NHS trusts, conferences) to capture audiences within and beyond academia. We have published four papers to date (see *Box 1*). In addition to our planned academic publications, our broad dissemination approach aims to ensure that each dissemination activity is appropriate for and tailored to diverse audiences and we have co-developed this approach with the PPI panel. Where possible, lived experience contributions in the research have been presented by the PPI lead, such that the voice of the lived experience group has become integrated into the results and discussions around the next steps of the research.

To date, our specific dissemination outputs have included presentations at NHS research events and training days in Greater Manchester Mental Health NHS Foundation Trust, Pennine Care NHS Foundation Trust, and Lancashire and South Cumbria NHS Foundation Trust. We also completed an online dissemination event on the 7 May 2024, which was attended by 77 people from across a range of universities and NHS organisations. In terms of conferences, we have presented the project at the British Association for Behavioural and Cognitive Practitioners 2023 Conference and the National Association of Link Workers Conference 2024. Both were attended by a mix of academics and clinicians. We plan to attend the Medical Sociology Conference in September 2024 to present the findings of the qualitative work package. We have completed invited talks at a restart dental care prioritisation event, University of New South Wales Sydney, and a UK Research and Innovation Closing the Gap Network funded *'Right to Smile'* event. This latter hybrid event, supported by live blogging, received over 300 Tweets and 9 million impressions on X [X Corp. (formerly Twitter) Bastrop, TX, USA].

In collaboration with the PPI panel, we have produced a lay infographic of the trial findings which will be posted on our dedicated Mouth Mattes X account (@MouthMatters_UK). At the start of the trial, we issued a press release (www.lancaster.ac.uk/health-and-medicine/research/spectrum/research/the-mouth-matters-in-mental-health-study/) to outline Mouth Matters purpose, aims and objectives. We now intend to produce a follow up press release now the trial has been completed.

Implications for decision-makers

At this stage, it is too early to make any strong recommendations regarding policy or commissioning. However, if found to be effective, it would be important to explore the possibility of a link worker role within secondary care mental health services. Importantly, the realist review suggests that link workers require resource matched to levels of service and patient complexity and need, and highlights the negative consequences and outcomes of not doing so. There is also clear need for effective and regular clinical training and supervision for link workers, which has implications for the use and roll-out of link work interventions in community settings across the UK. The current landscape of dental provision in England and Wales is poor and variable making access difficult for the general population. Vulnerable groups needing additional support to access services, such as individuals with severe mental illness, are likely to suffer disproportionally. The qualitative study evidences a high burden of work to navigate and access services. If high-street NHS dental services cannot offer care to these vulnerable groups, there is a need to commission other services to meet this need. For example, some participants in this study benefitted from attending special care dental services that were regarded as better able to provide appropriate care (longer appointments, clinicians with awareness of mental health issues).

Research recommendations

The next step is to apply to conduct a full trial exploring the effectiveness, and cost-effectiveness, of the link

work intervention. Possible primary outcomes include the attendance at a routine dental appointment and/or oral health-related quality of life. If found to be effective, an evaluation of how the link work intervention could be integrated into clinical systems is necessary, before its widespread adoption. It may also be interesting to explore the application of link work interventions for other physical health-related appointments in people with severe mental illness, which could lead to the creation of a more generic link worker role within clinical services. However, it is important that the recognition of oral health as a problem is not lost, when considered alongside other physical health challenges. Lastly, peer-led support worker roles are increasingly common within NHS services. It may be fruitful to explore how this link work intervention could be adapted for use by peer-link workers.

Conclusions

The link work intervention manual and its training materials were co-designed with people with lived experience. Its design is consistent with key mechanisms leading to positive outcomes observed in the realist review. The intervention and trial design were found to be feasible, acceptable, and safe. There was a signal for better dental access and improved oral health quality of life in the intervention arm, compared to TAU. The qualitative data also suggest that there were high levels of interest from referrers and participants in taking part in the study, reflecting the challenges of accessing NHS dental care over the past few years. Participants and link workers described the intervention positively, recognising that the person-centred approach was particularly appropriate to meet a spectrum of needs within this group. The link workers were able to offer practical and emotional support along the access journey to address multiple barriers at the individual, relational and organisational level. Overall, the findings support the full-scale evaluation of the intervention in an effectiveness trial.

Additional information

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Data-sharing statement

All data requests should be submitted to the corresponding author for consideration. Access to anonymised data may be granted following review.

Ethics statement

The project received approval from an NHS research ethics committee (Wales Research Ethics Committee 2; ID: 304696; Date: 2 August 2022).

Information governance statement

Lancaster University is committed to handling all personal information in line with the UK Data Protection Act (2018) and the General Data Protection Regulation (EU GDPR) 2016/679. Under Data Protection legislation Lancaster University is the Data Processor; University of Liverpool is the Data Controller, and we process personal data in accordance with their instructions. You can find out more about how we handle personal data, including how to exercise your individual rights and the contact details for LCTC's Data Protection Officer here: https://lctc.org.uk/privacy

Disclosure of interests

Full disclosure of interests: Completed ICMJE forms for all authors, including all related interests, are available in the toolkit on the NIHR Journals Library report publication page at https://doi.org/10.3310/GJJP0425.

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Department of Health and Social Care disclaimer

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This synopsis was published based on current knowledge at the time and date of publication. NIHR is committed to being inclusive and will continually monitor best practice and guidance in relation to terminology and language to ensure that we remain relevant to our stakeholders.

Study registration

The review was registered on PROSPERO (CRD42022302709).

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Award publications

This synopsis provided an overview of the research award *An intervention using mental health support workers as link workers to improve dental visiting in people with severe mental illness: A feasibility study*.

Other articles published as part of this thread are:

Palmier-Claus J, Morris A, French P, Griffiths R, Aggarwal V, Berry K, *et al*. A link work intervention to facilitate dental visiting in people with severe mental illness: a two-arm, multi-site, assessor blind, randomised feasibility trial with dental record linkage. *Community Dent Oral Epidemiol* 2025;**53**:580–6. https://doi.org/10.1111/cdoe.70002

Laverty L, Palmier-Claus J, Harris R, Lodge C, Caton N, Morris A, Lobban F. Mediating candidacy: qualitative study of a link work intervention to support individuals with severe mental ill health to access dental care. *Soc Sci Med* 2025;**378**:118044. https://doi.org/10.1016/j.socscimed.2025.118044

Golby R, Lobban F, Laverty L, Velemis K, Aggarwal V, Berry K, *et al*. Understanding how, why and for whom link work interventions promote access in community healthcare settings in the United Kingdom: a realist review. *Health Expect* 2024;**27**:e70090. https://doi.org/10.1111/hex.70090

For more information about this research, please view the award page (www.fundingawards.nihr.ac.uk/award/NIHR132853).

About this synopsis

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List of abbreviations

BSA	Business Services Authority
EDI	equality, diversity and inclusion
NICE	National Institute for Health and Care Excellence
PPI	patient and public involvement
TAU	treatment as usual

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