Impact of a social prescribing intervention in North East England on adults with type 2 diabetes: the SPRING_NE multimethod study

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Scientific summary

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Scientific summary

Background

Link worker social prescribing enables health-care professionals (HCPs) to address patients' non-medical needs by linking patients to various services, and is key to the personalisation agenda in the 2019 *The NHS Long Term Plan*. Evidence for its effectiveness and how it is experienced is lacking.

Aims

To evaluate the impact and costs of a community-based link worker social prescribing intervention on the health and health-care utilisation of adults aged 40–74 years with type 2 diabetes mellitus (T2DM). In addition, to observe how link workers deliver the intervention and how patients engage with social prescribing, and to capture the experiences of participants with long-term conditions (LTCs) in receipt of social prescribing during and immediately after the first COVID-19 pandemic lockdown.

Objectives

- To measure the impact of the social prescribing intervention for adults with T2DM on glycated haemoglobin levels (HbA_{1c}; primary outcome), body mass index (BMI), blood pressure (BP), cholesterol level, smoking and health-care utilisation.
- To examine differential intervention effects in subgroups by gender, age, ethnicity, multimorbidity, BMI and deprivation level.
- To measure self-reported health-related quality of life (HRQoL) as a change in EuroQol-5 Dimensions, five-level version (EQ-5D-5L), scores at the 12-month follow-up.
- To establish the cost-effectiveness of the social prescribing intervention for health-care utilisation and outcomes.
- To examine the delivery of social prescribing by exploring link workers' daily practices.
- To examine patients' engagement with the social prescribing intervention.
- To examine the role of social prescribing during the early stages of lockdown.

Methods

Study design

The study design was a multimethods evaluation comprising three work packages (WPs).

Study population

The study population comprised community-dwelling patients aged 40–74 years with T2DM registered with general practices offering the intervention between April 2015 and March 2019. A substudy of HRQoL comprised individuals (irrespective of diagnosis) who completed a baseline assessment between June 2018 and July 2019.

Intervention

The intervention was a community-based link worker social prescribing intervention for people aged 40–74 years who had at least one of eight LTCs (i.e. diabetes type 1 or 2, chronic obstructive pulmonary disease, asthma, coronary heart disease, heart failure, epilepsy or osteoporosis, with or without anxiety and/or depression). Partially funded by a Social Impact Bond (SIB) and delivered by two not-for-profit

providers, the intervention aimed to improve health-related outcomes and quality of life of people with LTCs. Sixteen general practices referred participants for the study. Initial (pre-COVID-19) contact comprised a meeting with a link worker to complete the Well-being Star™ (WBS; Triangle Consulting Social Enterprise Ltd, Brighton, UK), a proprietary tool to help clients assess their state across eight parameters. Following this, the link worker and client co-produced a personalised action plan to address problems. Link workers supported clients to access a range of local services (e.g. physical activity classes and welfare rights) or to develop self-directed goals. Subsequent contact was either face to face or by telephone, text, e-mail or video call. Clients could be engaged with the intervention for approximately 3.5 years.

Work package 1: health outcomes and health-care utilisation

Work package 1 comprised a longitudinal analysis of Secondary Uses Service (SUS) data and Quality and Outcomes Framework (QOF) data. A range of estimated treatment effect values were derived for the following control conditions: (1) study-eligible patients in intervention practices (n = 16) in receipt of the intervention compared with study-eligible patients who received the intervention after a time interval; (2) study-eligible patients in intervention practices in receipt of the intervention compared with those who did not receive the intervention; (3) study-eligible patients in intervention practices receiving the intervention compared with study-eligible patients in non-intervention practices (n = 11); and (4) intention-to-treat (ITT) study-eligible patients in intervention practices compared with study-eligible patients not in intervention practices.

Yearly data from 1 April 2012 (4 years pre intervention) to 31 March 2019 (4 years post intervention) were used, resulting in 8357 observations for the primary outcome.

Difference-in-difference (DiD) two-way (individual and time) fixed-effects models were compared for primary (HbA_{1c} level) and secondary (BMI, BP, cholesterol level and smoking status) outcomes. To reflect the data distribution (considering density at zero and a long right-hand tail), a TPM was used to estimate health-care use and costs. Subgroup analysis was undertaken based on pre-treatment characteristics, by sex, age group (over or under 55 years of age), ethnic group (white or non-white), presence of obesity (BMI ≥ 30 kg/m^2), presence of comorbidity (none, one, two or more) and area-level socioeconomic deprivation deciles. Statistical analyses were conducted using Stata® (version 16; StataCorp LP, College Station, TX, USA) software.

Health-related quality of life

A within-cohort comparison was undertaken of EQ-5D-5L scores for all referred individuals who attended an initial meeting with a link worker between July 2018 and June 2019, with a 12-month follow-up (July 2019–June 2020). Descriptive statistics were computed on demographic variables (pre-COVID-19 and post-COVID-19 groups), EQ-5D-5L scores, EQ-5D (EuroQol-5 dimensions) health-state summary values and EQ-visual analogue scale (EQ-VAS) values. Linear regression analyses explored whether or not participant characteristics could explain difference in EQ-5D scores from baseline to follow-up; regression discontinuity design (RDD) was used to investigate the impact of COVID-19 on EQ-5D-5L and EQ-VAS scores.

Work package 2: economic evaluation

Cost-effectiveness analysis was undertaken from the perspective of the health-care provider. Exploratory analysis was conducted using the UK Prospective Diabetes Study Outcomes Model 2© (UKPDS-OM2). The modelled population was sampled based on a combination of baseline data available from work package 1 and from the literature. Outcome measures were incremental cost-effectiveness ratios (ICERs) demonstrating the ratio of differences in the costs between the intervention and the comparator, and the difference in benefits. Sensitivity analysis was used to ascertain robustness of the different estimates derived.

Work package 3: qualitative study

Qualitative research was undertaken comprising (1) link worker ethnography over a 10-month period and (2) client ethnography over 20 months with 19 purposively sampled individuals. Methods included participant observation, focus groups, shadowing, semistructured interviews and photo-elicitation interviews. Data collected by link workers during client contact were also obtained. During the initial lockdown period, semistructured interviews were undertaken with 29 participants in the HRQoL study to explore the impact of COVID-19 on their lives and the role of social prescribing. Thematic content analysis was achieved by line-by-line coding of all textual and visual data.

Results

Health outcomes and health-care costs

Consistently, the intervention was found to impact on levels of HbA_{1c} and blood pressure. The size of the impact varied depending on the treatment and control groups. ITT analysis estimated that the overall impact on HbA_{1c} levels was small and clinically non-significant, but statistically significant (i.e. −1.11 mmol/mol); when accounting for the time-varying nature on the treated, statistically significant reductions in levels of HbA_{1c} of −4.57 mmol/mol were observed. These represent reductions of between 2% and 8% compared with the control group. Similar trends were observed for BP, with a decrease of 1.5 percentage points (not statistically significant) in the ITT analysis, rising to a seven-point reduction for individuals 3 years post treatment compared with the controls. There was little evidence of an effect on levels of cholesterol level, BMI or smoking status.

Subgroup analysis showed that improvements in levels of HbA_{1c} were higher among those living in areas of higher socioeconomic deprivation. Improvements in BP were greater for the ethnically non-white and, marginally, for people living in areas of higher socioeconomic deprivation.

Health-care cost estimates ranged from £18.22 (for individuals with one extra comorbidity) to −£50.35 (for individuals with no extra comorbidity), the latter being approximately 16% of the pre-treatment mean inpatient non-elective costs. For the treatment group, there was a shift from unplanned care (non-elective and accident and emergency admissions) to planned care (elective and outpatient care). Although not statistically significant, these may be economically significant changes.

Health-related quality of life

No statistically significant differences were found between baseline and the 12-month follow-up EQ-5D-5L score for pre-COVID and post-COVID groups.

Economic analysis

The intervention was found to be, on average, more costly and more effective than current practice. The reduction in costs associated with clinical complications and improvement in HRQoL were minor. The mean cost of the intervention itself was £1345 per participant, the incremental mean health gain was 0.004 quality-adjusted life-years (QALYs) (95% confidence interval −0.022 to 0.029) and the ICER was £327,250 per QALY gained. These findings are based on the assumption that the intervention has a 4-year duration of effect.

Link worker and client experiences of social prescribing

Link work was shaped and constrained by the requirement to meet targets and generate payments. The day-to-day delivery of social prescribing spanned a spectrum ranging from support work and supported linking though to focusing on motivating behaviour change, reflecting variation in both provider and individual link worker practices. The degree of link worker face-to-face work with clients was generally less than desired by link workers because of the pressures to ensure referrals and completion of the outcome metrics. Directly addressing the social determinants of health within this set of practices was often difficult.

The value of an effective and supported signposting and referral system in which link workers regularly liaise with the onward activity and the client was clearly demonstrated, as was the wide-ranging and positive impacts of provider support groups. Multimorbidity and complex social issues, coupled with reduced economic, social and health capital, were key factors influencing the level of support required, and there was huge variation in the circumstances of those referred into the intervention. However, the type and amount of support provided differed considerably, not always mirroring need, and an interventional 'drift' was observed over time, from supported to unsupported linking, more akin to signposting. Complex health and social problems could result in setbacks that required ongoing and sometimes intensive support to address. Some clients, primarily those in stable situations with access to a range of resources, responded to the intervention as anticipated following a relatively straightforward linear trajectory to better health. A linear pathway to better health was not always possible for those experiencing uncertain contexts because of a combination of factors including poverty, unemployment, discrimination, multimorbidity and poor mental health. The need to address the social determinants of health was most apparent when more intensive support was required, but such support was often limited owing to the performative pressures driving link work and the focus on behavioural change.

The COVID-19 pandemic had a profound effect on the lives of some study participants and caused the intervention to switch to remote provision. The focus at the start of the first lockdown was on supporting people to cope and ensuring that medicines and food were supplied. Those with complex health problems who were shielding and living in socioeconomically deprived circumstances experienced the greatest difficulties, as many lacked the social, economic or environmental capital needed to make life bearable during lockdown. Support from a link worker was very important to some during lockdown, although contact with link workers was variable.

Discussion

Interpretation of findings and relationship to prior knowledge

This is the first large-scale multimethod study to combine quasi-experimental methods, economic evaluation, qualitative and ethnographic research to evaluate the impact of a social prescribing intervention on people with T2DM. The effectiveness analysis suggests that the intervention has a small, clinically non-significant but statistically significant, impact on the level of HbA_{1c} and a small effect on blood pressure, accompanied by a (statistically non-significant) shift from unplanned care to planned care that may be economically significant. The intervention was effective, but not cost-effective. Detailed qualitative data highlighted the multiple pressures on link workers in generating referrals and meeting targets and how this conflicted with delivering a personalised intervention. When client need and the type and amount of support offered were aligned, the value of the intervention was clearly visible. However, setbacks were common and intensive support to overcome particularly challenging circumstances or setbacks was not always provided. Holistic social prescribing, fully embedded within primary care, that provides supported linking to navigate social determinants of health, and which acknowledges the non-linearity of health improvement, is challenging to deliver, but offers opportunities for improvements in health and well-being.

Strengths and limitations of the methods

The study was rigorously, ethically and legally conducted to internationally acceptable standards, it adhered to accepted reporting protocols and was overseen by an independent Study Steering Committee. The strengths of the study lie in the use of multimethods comprising robust quantitative and qualitative methods that allow the intervention to be examined from different perspectives, as well as in the particular strengths of our quantitative and ethnographic approaches.

The quasi-experimental design included large numbers of observations with sufficient power to detect effects and the ITT approach overcomes a number of problems associated with observational data.

The application of a well-established T2DM simulation model to provide a cost per QALY gained is a key strength.

The use of participant observation, complemented by interviews and focus groups, over an extended period of time enabled the intervention to be viewed from the perspectives of both link workers and clients rather than relying on self-report. The number of data generated afforded a considerable degree of triangulation and assurance about reliability of our interpretation.

Key limitations were (1) the reduced sample size as a result of non-participation of seven general practices; (2) incompleteness and unreliability of some of the Quality and Outcomes Framework data; (3) unavailability of accurate data on intervention intensity and patient comorbidity; (4) reliance on an exploratory analysis with significant sensitivity analysis; and (5) limited perspectives from voluntary, community and social enterprise organisations.

Implications for the delivery of social prescribing

The intervention evaluated in this study is a particular model of social prescribing, funded via a Social Impact Bond and operating with specific targets. Nevertheless, the findings have wider implications for the rapidly developing social prescribing policy and practice landscape across the UK: (1) embedding social prescribing within primary care requires careful planning, and health-care practitioner 'buy-in' cannot be assumed; (2) social prescribing needs to be well integrated with local community infrastructure and, for this to be successful, well-funded public and voluntary sector services are essential; (3) sufficient capacity to provide supported linking requires careful consideration of link worker caseload; (4) identifying measurable and relevant outcome measures reflecting the breadth and scope of social prescribing is unattainable, although it may be possible to use robust measures to examine health-care usage; and (5) claims that social prescribing can reduce health inequalities are premature, but social prescribing can mitigate upstream pressures.

Recommendations for further research

1. Qualitative research to explore primary care engagement with social prescribing to explore how NHS social prescribing is being operationalised and embedded within primary care networks.
2. Research into the integration of NHS social prescribing with voluntary and community sectors, particularly onward referral mechanisms, capacity and costs.
3. Further evaluation of the impact of social prescribing on health-care usage and costs, including medication.
4. Research on the wider effects of social prescribing.
5. Further research exploring the capacity required for social prescribing to address social determinants of health.

Trial registration

This trial is registered as ISRCTN13880272.

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