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Impact of the rollout of the national social prescribing link worker programme on population outcomes: evidence from a repeated cross-sectional survey

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Abstract

Background: Social prescribing link workers have been rolled out nationally through the Additional Roles Reimbursement Scheme. Link workers connect people to advice and support to address the non-medical and social issues affecting their health and well-being.

Aim: To determine whether the rollout of social prescribing link workers through primary care networks improved population outcomes.

Design and Setting: 4,132,676 respondents from repeated cross-sections of the General Practice Patient Survey (2018 to 2023) combined with administrative workforce data.

Method: We used logistic regression models to relate the number of full-time equivalent social prescribing link workers per 50,000 patients to five population outcomes.

Results: An additional full-time equivalent link worker per 50,000 patients was associated with higher probabilities of respondents with long-term conditions having confidence in managing long-term condition(s) (Odds Ratio (OR)=1.006; 95% confidence interval (CI)= 1.001 to 1.010) and having enough support from local services (OR=1.005; 95%CI=1.001 to 1.008). For all respondents, the same size increase in link workers was associated with a higher probability of having a good experience at their general practice (OR=1.015; 95%CI=1.004 to 1.027). For respondents with mental health needs, this increase in link workers was associated with a higher probability of having their mental health needs understood (OR=1.012; 95%CI=1.003 to 1.021).

Conclusions: The rollout of link workers was associated with small improvements in patient experience and slightly better outcomes for population groups specifically targeted for social prescribing. Future work is required to determine whether the scheme is financially sustainable and to ensure it does not widen existing health inequalities.

Keywords: Social Prescribing, Population Outcomes, Primary Care

How this fits in: The 2019 NHS Long-Term Plan stimulated a rapid expansion of social prescribing link workers. We find this was associated with improved outcomes for individuals specifically targeted for social prescribing and had spillovers through improving overall patient experience with general practice. Employment of social prescribing link workers has had the intended outcomes specified in the NHS Long-Term Plan. Future work is required to determine whether the scheme is financially sustainable for social prescribing as a whole and to ensure it does not widen existing health inequalities.

Summary sentence: The national rollout of social prescribing link workers was associated with improvements in patient experience and targeted population outcomes.

1 Introduction

Social prescribing link workers connect people referred from primary care to sources of support in the community. These can include activities and services that address practical, social, and emotional needs affecting health and wellbeing. The 2019 NHS Long-Term Plan stimulated a rapid expansion of provision with a commitment to recruit 1,000 social prescribing link workers across the country by 2021(1). This was later boosted by a further commitment that every patient in England should have access to a social prescribing link worker by 2022 (2). To support these commitments, funding for social prescribing link workers was made available through the Additional Roles Reimbursement Scheme (ARRS) (3). Primary Care Networks (PCNs), groups of general practices working together to meet the needs of their population(4), could apply for reimbursement to employ people in the additional roles they perceived most important to meet the needs of their local population.

Social prescribing link workers aim to provide more positive health and wellbeing outcomes for people with long-term condition(s), who may require support for their mental health, are lonely or isolated, and/or have complex social needs (5). Patients can self-refer or be referred by a healthcare professional within general practice to a social prescribing link worker. The link worker will then work with the patient to identify and connect them to activities, groups or services within their local community that align with their needs to support their overall health and wellbeing. From the NHS perspective (5), the intended impacts are on the wider determinants of health and should ensure each patient:

- I. feels more in control and able to manage their own health and wellbeing
- II. is more physically active
- III. is better able to manage practical issues, such as debt, housing, and mobility
- IV. is more connected to others and less isolated or less lonely.

We have a good understanding of how the social prescribing link worker role can work to support access and engagement with services (6,7). Qualitative research shows that patients who do engage generally report positive experiences when it meets their needs and expectations (8,9). However, research examining the effects of social prescribing has been sub-optimal and subject to a high risk of bias (10–13). Much of this evidence is derived from small scale studies limited by poor design and reporting, making it difficult to reliably judge how and in what circumstances social prescribing could deliver benefits. Only a few well-conducted, empirical evaluations of impact exist (14–17) and have so far failed to demonstrate improved health and wellbeing for service users, but suggest that finding ways to improve access and engagement with services may lead to better overall outcomes.

To date, research on the rollout of ARRS-funded social prescribing link workers has focused on examining how provision expanded (18), showing that areas with the highest reported need

had lower levels of provision of social prescribing link workers and suggesting that an inverse care law exists in social prescribing (19).

This paper adds to this literature by estimating the associations between ARRS-funded social prescribing link workers and population outcomes. We selected outcomes that reflected the stated NHS aims for social prescribing (5) from a nationally representative survey conducted on patients from all general practices in England. We then estimated the associations between the rollout and these outcomes, and conducted sensitivity analyses to test the robustness of the results.

2 Methods

2.1 Patient questionnaires

We used data from the annual General Practice Patient Survey. This was sent to a sample of individuals registered with each general practice in England between January and March and received around 700,000 responses (20) each year. We used data from six years of the survey (2018-2023) covering the periods before and after the introduction of the social prescribing link worker expansion. Table A.1 contains the response rate for each survey year. Alongside questions on service use and experience, it asked respondents about their age, gender, ethnicity, and employment status. Area-level measures of deprivation (measured by the income domain of the Indices of Deprivation (21)) and rurality (measured by the Office for National Statistics rural-urban classifications (22)) are also available.

2.2 Population outcomes

We selected the following outcomes from the General Practice Patient Survey:

- Confidence in managing long-term condition(s)
- Support from local services and organisations
- Not feeling isolated from others
- Having a good experience at their general practice
- Having their mental health needs understood by a healthcare professional

These were either closely related to the stated aims set out by the NHS (5) or reflected two further hypothesised effects of social prescribing. The first of these was that social prescribing link workers would improve patient experience by contributing to better access and availability and alleviation of GP pressure (23–25). The second possible effect was on helping to address mental health needs (12), because this was one of the target health conditions for this initiative (5). The outcomes are summarised in Table 1, along with the aim or hypothesised effect to which they are linked. Appendix Table A.2 contains the hypothesised impacts of social prescribing link workers on outcomes, whether these effects could be direct or indirect, and the reasoning underpinning these expected effects.

Table 1: Outcomes assessed within the General Practice Patient Survey

Variable	Question	Coded as positive (=1)	Coded as negative (=0)	Exclusions
NHS Aim: feels more in control and able to manage their own health and wellbeing				
Confidence managing Long Term Condition	<i>How confident are you that you can manage any issues arising from your condition (or conditions)?</i>	Very confident or Fairly confident	Not very confident or Not at all confident	No LTC or Not Applicable or Don't Know
NHS Aim: better able to manage practical issues, such as debt, housing and mobility				
Support	<i>In the last 12 months, have you had enough support from local services or organisations to help you to manage your condition (or conditions)?"</i>	Yes – definitely or Yes – to some extent	No or I haven't needed support	No LTC or Not Applicable or Don't Know
NHS Aim: is more connected to others and less isolated or less lonely.				
Not Isolated	<i>Have you experienced any of the following over the last 12 months? <u>Options:</u> Problems with your physical mobility Two or more falls that have needed medical attention Feeling isolated from others None of these</i>	Any option(s) other than "Feeling isolated from others"	Feeling isolated from others	No options selected
Alleviate General Practice pressures				
Good GP experience	<i>Overall, how would you describe your experience of your GP practice?</i>	Very good or Fairly good	Neither good nor poor, Fairly poor, or Very poor	-
Address mental health needs				
Mental Health Needs Understood	<i>During your last general practice appointment, did you feel that the healthcare professional recognised and/or understood any mental health needs that you might have had?</i>	Yes – definitely or Yes – to some extent	No – not at all	Did not apply to my last appointment or I did not have any mental health needs

Source: General Practice Patient Survey Questionnaire. LTC – Long-term condition. All not answered or multi coded responses are excluded.

2.3 Social Prescribing Link worker employment

We used administrative data on social prescribing link worker employment from the Primary Care Network (PCN) Workforce – quarterly release (26), which collates data from PCN ARRS claims. Because most social prescribing link workers are employed to work across practices within a PCN, we measured the availability of social prescribing link workers at the PCN level. To account for variation in PCN size, we calculated Full-Time Equivalent (FTE) social prescribing link workers per 50,000 patients registered with practices in the PCN. This is the average population size of a PCN. Given that the General Practice Patient Survey was completed from January to March, we linked the survey responses to staff numbers as at the end of the previous December.

2.4 Statistical Methods

The rollout of ARRS-funded social prescribing link workers can be treated as a natural experiment. This type of methodology has been used in previous public policy evaluations where national rollout was not under the control of the research team (27,28). All PCNs start to be ‘exposed’ at the same time, but the level of social prescribing link worker employment varies both over time and place. The measure of exposure, therefore, changes with an increasing trend in the number of social prescribing link workers over time and variations across PCNs in the numbers of social prescribing link workers they employ. We related this aggregate measure of exposure to population outcomes.

As the outcomes are binary, we estimated logistic regression models and included year indicators plus information on respondents’ age, gender, ethnicity, employment status, deprivation and rurality (the full list of variables is shown in Supplementary Table S.7). We presented the magnitude of the estimated effects in two ways, first as odds ratios and second as average marginal effects showing the changes in outcomes associated with one additional FTE social prescribing link worker per 50,000 population.

The dataset is structured as a series of cross-sections of respondents nested within general practices that are themselves nested within PCNs. We clustered the standard errors at the PCN level, as this is the level at which exposure is determined (29). All analyses were conducted in Stata v18 using the *logistic* command. Further details of the statistical analysis are shown in Supplementary Box 1.

The NHS Direct Enhanced Services contract (5) specifies some specific target populations for social prescribing. We ran three sets of models, some including all respondents and some focusing only on respondents in these target groups. These are summarised in Table 2, with further details provided in Supplementary Tables S.3 and S.4.

Table 2: Samples used for each model and outcome.

Model	Outcome				
	Confidence managing Long Term Condition	Support	Not Isolated	Good GP experience	Mental Health Needs Understood
1	n/a	n/a	All respondents	All respondents	n/a
2	Respondents with LTC(s)	Respondents with LTC(s)	Respondents with LTC(s)	Respondents with LTC(s)	Respondents with LTC(s) & MH Needs
3	Respondents with MH needs and LTC(s)	Respondents with MH needs and LTC(s)	Respondents with MH needs	Respondents with MH needs	Respondents with MH needs

Note: “n/a” indicates not applicable because no model estimated. LTC – Long Term Condition, MH – Mental Health

2.5 Supplementary Analyses

In the first supplementary analysis, we considered the relationship between population outcomes and other direct patient care roles introduced in the ARRS alongside social prescribing link workers. These other roles include: Pharmacists (including those in training), Health and wellbeing coaches, Care co-ordinators, Mental health practitioners, First contact physiotherapists, Paramedics, Nursing associates (including in training), Occupational Therapists, Physician associates and Advanced practitioners. PCNs may opt to employ these staff over social prescribing link workers or alongside them to meet both clinical and wider needs of their patients, and some of the outcomes we measure could be due to employment of these roles instead of or in addition to link workers.

As the Additional Roles Reimbursement Scheme represents a large increase in roles within primary care and social prescribing link workers represent a small but significant proportion of that increase, we ran a supplementary analysis that assessed the associations between outcomes and the scheme as a whole (including the total FTE for all roles hired under the ARRS) and the proportion of those roles that are social prescribing link workers.

The main analysis assumes the constant effects of social prescribing link worker provision. In the next supplementary analysis, we allow for the odds ratios of social prescribing link workers to vary by deprivation level, measured by deciles of income deprivation. We do this in two ways: initially, through an interaction model, and then by subgroup analysis when we identify a significant variation by deprivation.

3 Results

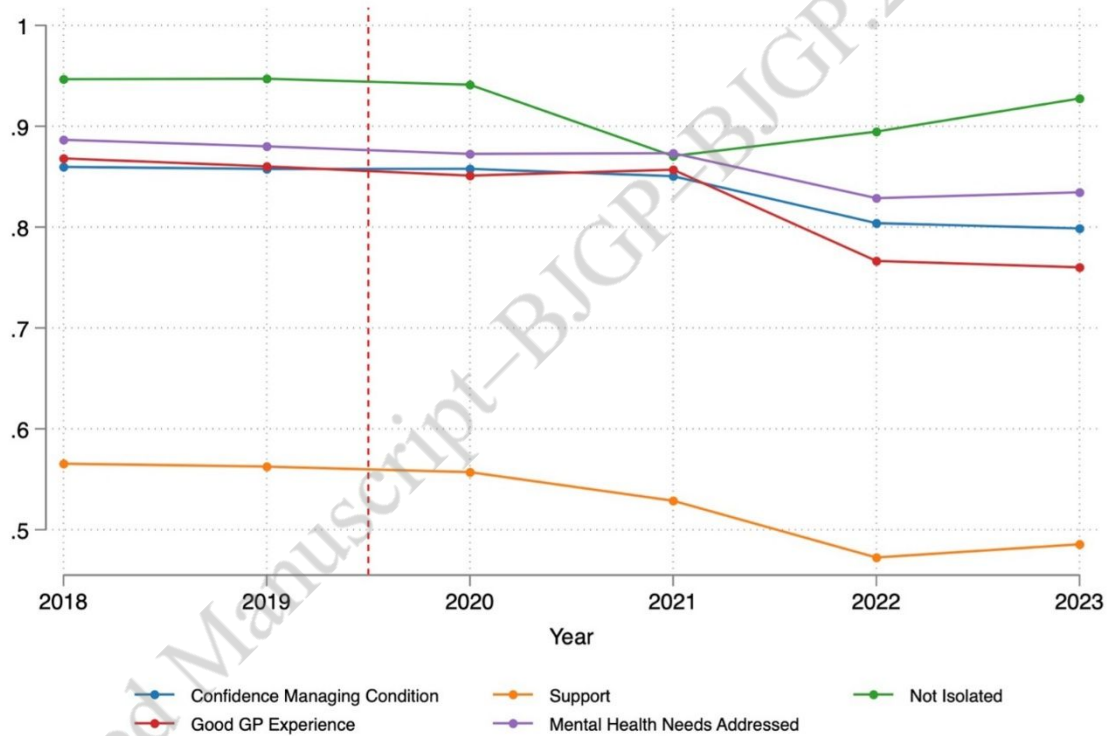
3.1 Summary statistics

Our analysis sample included 4,132,676 respondents from 6,991 general practices in 1,268 Primary Care Networks. We compared descriptive statistics for the population, the GPPS

sample, and the samples used to analyse each outcome in Supplementary Table S.3. The survey is broadly representative of the population, but with a higher proportion of respondents from older age categories, from white ethnicities, whose gender is female and those living in rural areas.

Figure 1 shows the annual trends in average outcomes across respondents in each year. The red dotted line indicates when the additional roles reimbursement scheme was introduced. The average outcomes were stable before the ARRS and decreased during the COVID-19 pandemic. By 2023, average outcomes had stabilised at a lower level, except for the percentage of respondents not feeling isolated, which returned to the pre-COVID-19 level. The raw outcome responses are summarised in Supplementary Table S.4.

Figure 1: Mean values of outcomes, 2018-2023



Supplementary Figure S.1 shows annual trends in social prescribing link workers across the study period based on workforce data from 1,268 primary care networks. The box plots indicate an increase over time and high variability in FTE social prescribing link workers per 50,000 between PCNs in each year.

3.2 Main Findings

Table 3 presents the associations of social prescribing link worker provision with the five population outcomes. All Odds Ratios (OR) were positive and significantly different from one, with the exception of not feeling isolated from others. They ranged from 1.005 (95%

confidence interval (CI)= 1.001 to 1.008) for having enough support from local services (Model 2) to 1.015 (95%CI=1.004 to 1.027) for a good experience at their general practice (Model 1).

For an average respondent with a long-term condition(s), these associations represent improvements in outcomes of 0.07 percentage points (pp) for probability of reporting confidence in managing long-term conditions and 0.11pp in the probability of reporting having enough support from local services. For an average respondent, we find a 0.21pp increase in the probability of reporting a good experience at their general practice. For an average respondent with mental health needs, the probability of reporting their needs were understood increased by 0.14pp.

The findings remain robust and qualitatively the same when the models are limited to patients with long-term conditions only (Table 3, Model 2). This suggests that for outcomes such as good GP experience and mental health needs addressed, the average marginal effects are the same for those with or without long-term conditions. Similarly, when the analysis is limited to patients who report mental health needs (Table 3, Model 3), the results remain qualitatively the same. For two outcomes, confidence in managing their long-term condition(s) and support from local services, the results become not statistically significant when limited to those with long-term conditions. This may be due to the reduced sample size.

Unadjusted models are provided in Supplementary Table S.6 and demonstrate that the odds ratios and p-values are similar without covariate adjustment. Supplementary Table S.7 shows the effects of the covariates included in the models in Table 3.

Table 4 quantifies these associations for an average-sized PCN and for the national population. Employing an additional FTE social prescribing link worker in an average PCN would be associated with 56 more people feeling supported, 71 more people reporting that their mental health needs were understood, and 104 more people reporting a good experience of their GP practice. Scaled up to the national population, these represent improvements for approximately 65,000, 90,000, and 130,000 people.

Table 3: The association of one FTE link worker per 50,000 patients on population outcomes (Odds ratios, 95% confidence intervals, p-values and average marginal effects from logistic regressions).

	(1) Confidence managing Long Term Condition	(2) Support	(3) Not Isolated	(4) Good GP experience	(5) Mental Health Needs Understood
Model 1: (all respondents)					
Odds ratio			1.001	1.015	
95% C.I.			(0.996 to 1.005)	(1.004 to 1.027)	
p-value			0.74	0.009	
Average Marginal Effect			0.01 p.p.	0.21 p.p.	
Mean outcome value			92.0%	82.8%	
Observations			4,132,676	4,176,144	
Model 2: (respondents with long-term conditions)					
Odds ratio	1.006	1.005	1.001	1.015	1.013
95% C.I.	(1.001 to 1.010)	(1.001 to 1.008)	(0.996 to 1.006)	(1.003 to 1.027)	(1.003 to 1.022)
p-value	0.01	0.02	0.65	0.01	0.009
Average Marginal Effect	0.07 p.p.	0.11 p.p.	0.01 p.p.	0.20 p.p.	0.15 p.p.
Mean outcome value	83.8%	52.9%	89.4%	83.3%	86.0%
Observations	2,299,456	2,280,909	2,422,598	2,451,230	1,037,073
Model 3: (respondents with mental health conditions)					
Odds ratio	1.004	1.004	0.999	1.013	1.012
95% C.I.	(0.998 to 1.010)	(0.999 to 1.009)	(0.994 to 1.004)	(1.001 to 1.025)	(1.003 to 1.021)
p-value	0.16	0.14	0.75	0.04	0.006
Average Marginal Effect	0.06 p.p.	0.09 p.p.	-0.01 p.p.	0.17 p.p.	0.14 p.p.
Mean outcome value	77.9%	59.8%	86.8%	83.3%	86.1%
Observations	970,385	961,748	1,618,935	1,642,426	1,651,360

Note: 95% Confidence Intervals based on clustered standard errors at PCN (N=1,268) level in parentheses, Models include individual- and area-level adjustment factors; these are listed in Table S.7. FTE – Full-Time Equivalent. Model 1 - All respondents, Model 2 – Respondents with at least one long-term condition, Model 3 – Respondents who declare having mental health needs. P.p. is percentage point. Average marginal effect (AME) represents the increase in the probability of achieving the outcome for a one unit increase in FTE link worker per 50,000. To estimate the percentage point, we multiply the AME by 100.

Table 4: Estimated numbers of additional patients with positive outcomes associated with an additional social prescribing link worker per 50,000 patients in an average and in all PCNs

	(1) Confidence managing Long Term Condition	(2) Support	(3) Not Isolated	(4) Good GP experien ce	(5) Mental Health Needs Understo od
Model 1:					
In an average PCN			0	104	
In all PCNs			0	131,872	
Model 2:					
In an average PCN	37	56	5	98	75
In all PCNs	46,916	71,008	6,340	124,264	95,100
Model 3:					
In an average PCN	32	47	-4	83	71
In all PCNs	40,576	59,596	-5072	105,244	90,028

Note: The PCN Effects are calculated by multiplying the average marginal effect by the exposure scale, in this case 50,000 population, which reflects the average PCN size(see Supplementary Table S.5). The Population effect are then calculated by multiplying the PCN effect by the number of PCNs in England in 2023 (1268)

3.3 Supplementary Analysis

3.3.1 Inclusion of other direct patient care roles employed under the ARRS

Statistics on the rollout of these roles are given in Supplementary Figure S.2 and Supplementary Table S.5. Our findings for social prescribing link workers remain robust at the same significance and magnitude (in Supplementary Table S.8).

3.3.2 ARRS as a whole and proportion of social prescribing link workers

The results (Supplementary Table S.9) highlight a small positive association with the number of FTE ARRS roles for three out of five outcomes (support, good experience and mental health). However, it is inconsistent across models. For PCNs with a higher proportion of social prescribing link workers, there is a significant positive association with confidence in managing their long-term condition(s) (Model 2) and not being isolated (Model 1), with the remaining outcomes being insignificant. This model supports the notion that we are assessing the impact of social prescribing in our main model (Table 3) rather than an increased number of roles within primary care.

3.3.3 Association with health inequalities.

For outcomes, good GP experience (Model 1) and mental health needs understood (Model 3), in Supplementary Table S.10, we find no significant differences in the odds ratios of social prescribing link workers across the level of area deprivation. For having enough support from

local services (Model 2), we find some evidence that the least deprived areas have significantly higher odds ratios than the most deprived areas. These odds ratios in the subgroup analysis in Supplementary Table S.11 are positive and do not provide evidence that they vary across deciles. For confidence managing long-term condition(s) (Model 2) and not being isolated (Model 1), the more deprived areas have larger positive odds ratios. Within the subgroup analysis, these odds ratios support those effects for not being isolated and for confidence managing long-term condition(s), the odds ratios demonstrate effects in favour of less deprived areas.

4 Discussion

4.1 Summary

The number of social prescribing link workers employed through the ARRS was associated with small positive changes in population outcomes that were aligned with the NHS's specified aims for social prescribing (5). There was also an improvement in the overall experience that all respondents reported with their general practice.

The odds ratios are small in magnitude at the individual level but represent meaningful associations at the population level. For context, by March 2023, 3.2% of the registered GP population had been referred to social prescribing (30,31), so any effect on responses to the national GP Patient Survey will be very diluted. Our findings suggest that an additional FTE social prescribing link worker per 50,000 population in all PCNs (approximately one extra link worker per average PCN) was associated with an increase nationally in approximately 47,000 people reporting confidence in managing their long-term condition(s) and 132,000 people reporting having a good GP experience.

4.2 Strengths and limitations

This is the first study to quantitatively estimate the effects of the national rollout of social prescribing link workers in England, with a large sample size of over four million individuals from 2018 to 2023. This scale allows us to estimate associations on population outcomes robustly. Previous systematic reviews have highlighted that the current evidence is sub-optimal when it comes to estimating the impact of social prescribing (10–13). This paper addresses concerns of small sample sizes, lack of counterfactuals (10) and uncontrolled studies with short time frames (11). The outcomes – confidence managing long term condition(s), support and not isolated align with three of the four NHS aims for social prescribing (5) and additional related themes – alleviating pressure in GP services and mental health needs. This allowed the estimation of the direct and indirect associations of social prescribing link worker employment in a PCN. The use of administrative records of workforce

data was an additional strength. This contained full-time equivalent social prescribing link workers (and other roles) hired under the Additional Roles Reimbursement Scheme, which were scaled to account for PCN population size. This meant we could determine the associations of the varying levels of provision across PCNs. The study evaluates the national rollout as a natural experiment to assess the relationship between an exogenous increase in social prescribing link workers on population outcomes. The results were further strengthened by including other direct patient care roles under the ARRS within the models.

Despite some key strengths, there were limitations to our findings. Firstly, we used repeated cross-sectional data, not longitudinal data. This meant we were not following the same respondents across the study period. Secondly, we do not know whether an individual respondent to the survey had been referred to a social prescribing link worker. Finally, there could be a non-linear relationship of the provision of social prescribing link workers, such that outcomes do not continue to improve as much at higher levels of link worker provision. We re-estimated the regression models allowing for this non-linearity and the results were very similar.

4.3 Comparison with previous literature

Our study addresses previous calls for the need for large scale, robust evidence to support social prescribing link workers (10,13). The positive odds ratios we find from the rollout of social prescribing link workers add to the evidence from the few robust empirical evaluations conducted previously (14–17). This was particularly true in managing mental health conditions (14), as we found that higher numbers of social prescribing link workers was associated with higher probabilities of having mental health needs addressed. Our study did not use self-reported measures of physical or mental health (15,17) or healthcare cost-savings (16) as in previous literature. However, the findings of patients having increased confidence in managing conditions and improvement in overall GP experience suggest this may be associated with relative improvements in physical or mental health and quality of healthcare services. This is on the hypothesised pathway of social prescribing link workers – patients have better management of their condition (17), which reduces healthcare utilisation (16).

4.4 Implications for Research and/or Practice

Our results indicate positive associations with social prescribing at a population level. Areas with higher provision had improved outcomes, which was robust when other roles funded via the ARRS and thought to impact patients' outcomes were included. This provides evidence to support the usefulness of social prescribing link workers; however, some key factors need to be addressed regarding sustainability. The ARRS only reimburses the link worker role, which involves directing patients to services and activities in the community that aim to improve their

health and well-being. These services are generally provided and funded by the voluntary and charity sector and, in part, by local authorities. These sites will require extra funding to meet the increased demand that social prescribing poses. This is another factor for determining long-term sustainability and whether the scheme is cost-effective. It was estimated in 2022/23, the scheme cost the NHS £130 million (26,32); however, this underestimates the total cost as it does not include the cost of the onward referral destinations. For future evaluations, understanding the total cost of social prescribing would provide pivotal evidence for long-term sustainability.

Our findings were unable to support the NHS aim for patients to feel more connected, less lonely, or less isolated. This could be due to the wording of the question within the General Practice Patient Survey. Further qualitative or quantitative work should explore this, as isolation is a known predictor of mortality (33).

We were unable to identify who was engaging with social prescribing. Past evidence has highlighted that those from higher socio-economic status engage in community activities similar to social prescribing (34). To ensure that social prescribing does not contribute to known health inequalities, future work should assess whether access has been equitable by evaluating patient characteristics of referrals.

Finally, policymakers and commissioners are interested in whether social prescribing referrals reduce unplanned hospital admissions. This study was unable to shed light on this outcome. Future findings should use linked healthcare records to determine whether and for whom the scheme has had the intended effects.

4.5 Conclusion

The rollout of social prescribing link workers was associated with small improvements in outcomes for individuals specifically targeted for social prescribing and had spillover on improving the overall experience at GPs. This supports the NHS intended patient outcomes of social prescribing link worker provision as set out in the NHS Long-Term Plan. Future work is required to determine the economic sustainability of social prescribing as a whole and to ensure it does not widen existing health inequalities.

Ethics Approval

No ethical approval was required for this study.

Transparency Statement

The authors (the manuscript's guarantors) affirm that the manuscript is an honest, accurate, and transparent account of the study being reported, that no important aspects of the study have been omitted, and that any discrepancies from the study as originally planned and registered have been explained.

Competing Interests

All authors have completed the ICMJE uniform disclosure form at www.icmje.org/disclosure-of-interest/ and declare: support from the National Institute for Health and Care Research (NIHR). No other competing interests.

Contribution Statement

AW, EA, JW, MB, MS, LM and PW made substantial contributions to the design of the study. All authors contributed to analysis, and interpretation of the data. AW and EA drafted the paper, and JW, MB, MS, LM, CS, SM and PW all revised drafts. All authors gave final approval for the version to be published and are accountable for the integrity of the work

Data Sharing

Owing to data sharing restrictions, the data used in this study cannot be shared directly. Researchers may, however, apply to use the General Practice Patient Survey linked with other publicly available health datasets, such as Primary Care Network workforce data, ONS Rural-Urban classifications, and the index of multiple deprivations.

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Patient and Public Involvement Statement

We have consulted with the members of our study Patient and Public Involvement Panel to ensure that a patient/ public perspective informed our evaluation plans and the work as it progressed. We discussed which outcomes to assess and the implications of findings in practice. Panel members have a range of different socio-economic and cultural backgrounds and bring a range of skills, knowledge, voluntary and lived experience, so a diverse public voice has informed the research and the methods we have used.

Dissemination to participants and related patient and public communities

After publication, the results will be disseminated to policymakers, including those at NHS England. With the help of our patient and public involvement and clinical colleagues, we will disseminate the study results after publication with patients, the public, and healthcare professionals through press releases, media communications, social media postings, and presentations at scientific conferences.

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