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RESEARCH ARTICLE

The feasibility of identifying health inequalities in social prescribing referrals and declines using primary care patient records [version 1; peer review: 3 approved with reservations]

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Abstract

Background:

Social prescribing (SP) is part of universal personalised care and available to everyone in the UK National Health Service. However, emerging evidence suggests access disparities in social prescribing. This study aimed to investigate the feasibility of accessing and analysing data on social prescribing from primary care records. Our secondary aim was to examine exposure to social prescribing and compare characteristics of patients who decline/accept social prescribing referrals to explore possible health inequalities in access to social prescribing.

Methods:

Patient records (n=3086) were extracted from 11 GP practices across Northwest England for accepted, offered and declined social prescribing referrals. Patient demographics collected included sex, age, ethnicity, mental and physical health diagnoses. Patient characteristics in social prescribing referrals were compared to the overall practice population (practice information from Public Health

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Any reports and responses or comments on the article can be found at the end of the article.

England). Decline and acceptance rates were compared by group (e.g. male/female decline rates).

Results:

GP referral data showed inconsistent recording of wider determinants of health and variations in referral patterns on a practice-to-practice basis. Some variables had very poor rates of recording and did not yield useful information. Patient age, sex and mental and physical health conditions were consistently recorded. Other variables such as disability and housing status showed sporadic GP recording across our dataset. Our preliminary findings identified underrepresentation of younger age groups and Asians, and higher declined referrals among individuals with physical health diagnoses.

Conclusions:

The differing referral patterns between practices and recording discrepancies meant that many patient factors could not be used to assess trends in social prescribing referrals and declines. Preliminary results suggest that some patient groups may be underrepresented in referral data, however this needs further research and investigation. Consistency is required in social prescribing data recording in primary care. Data on wider determinants is needed to assess variations in referrals and declines and explore inequalities.

Keywords
social prescribing, health inequalities, representation, GP referrals, decline

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Introduction

Social prescribing (SP) is gaining traction in the UK as a wellbeing intervention and a means to bridge the gap between traditional healthcare and community services. There are many definitions of social prescribing. For the purpose of this paper, we use the Kings Fund definition.

"Social prescribing, also sometimes known as community referral, is a means of enabling health professionals to refer people to a range of local, non-clinical services. The referrals generally, but not exclusively, come from professionals working in primary care settings, for example, GPs or practice nurses."

Different SP models have evolved across England and Wales reflecting local needs, service provider expertise and commissioning contracts. Although SP is accessed almost universally through a GP referral, there is no one standard model[1]. It is therefore a complex non-medical intervention with numerous interacting components from systems and services to providers and patients[2,3].

General practitioners, nurses, and allied health care professionals can refer patients with a broad range of needs (e.g., reducing loneliness) and clinical conditions (e.g., long-term illness) to a local SP scheme. Social prescribing link workers (SPLWs) are not health care professionals and serve as the core contact for those who have been referred into social prescribing by the health care professional or GP. A SPLW sets up a personalised action plan and connects the referred patient to a range of local activities and community groups that offer practical, social and emotional support. These offers are generally provided by local agencies such as voluntary and community sector organisations (VCS).

Whilst there is considerable evidence to support the use of SP[4,5], a common criticism is a lack of robust evidence on its effectiveness[6–10]. SP has been suggested as a tool to reduce health inequalities by supporting individuals in areas of deprivation[11–14]. However, little is known on how SP affects health inequalities despite the recent push on SP activities across the UK, particularly within primary care. A recent review recommended more research into the impact of SP on inequalities[15]. Although SP may improve the social and behavioural determinants of long-term conditions and health inequalities, the opposite may be equally true: health inequalities may be exacerbated when access is affected by socio-economic contexts. Evidence suggests that where interventions, such as SP, focus on individual level changes (for instance, behaviour change) health inequalities may increase[16]. Research has also pointed to disparities in access, with groups such as young people, men and minority communities less represented in SP service user data[16–18]. Again, little is known about why these groups are not accessing health services as readily as others.

Typically, GPs first refer patients to SP. Patients can decline the offer at this referral stage. To gain a better understanding of the relationship between access to SP and the impact of health inequalities we need a better understanding of who is and who is not taking up the offer of SP. One way we can do this is by exploring the characteristics of those patients who self-exclude at the early (referral) stage, as well as those who go on to engage with SP-related services to help us identify specific population groups who do not engage as readily as others.

Our study aimed to investigate the feasibility of accessing and analysing data on SP declines and referrals from primary care records held by GP practices in the Northwest Coast and to gather preliminary evidence on possible health inequalities in the take-up of SP. This involved exploring the data on exposure to SP and comparing patient characteristics of declined or accepted SP referrals to identify any variations across different population groups.

Methods

GP practices in the Northwest of England were identified through existing NIHR infrastructure (Applied Research Collaboration Northwest Coast and Clinical Research Network Northwest Coast). Purposeful sampling was used to select practices in areas of high deprivation and populations with diverse ethnic groups. As this was a small, low-resource feasibility study it was important to identify practices that would have the capacity to participate, therefore a convenience sampling approach was further applied. Practices that were both formally recording social prescribing data and had practice managers that could support the research were included in the final sample. To align with capacity and provide enough insight into feasibility we aimed to recruit around 10 practices.

11 GP practices participated in the study and completed IRAS Organisation Information Documentation for authorising sharing of practice data. Individual patient consent was not required as patient identifiable information was not included in the dataset.

Ethics

NHS Health Service Research approval for this study was granted in December 2021 (21/HRA/4891). Approval was also granted by University of Central Lancashire and University of Lancaster. Consent to participate was not applicable as the study used secondary anonymised data and did not involve human subjects.

Data collection

Data were extracted from11 GP practices across Northwest England over three regions: Liverpool (n=3), East Lancashire (n=4), Blackburn with Darwen (n=1) and Blackpool (n=3) during March 2022. A Clinical Research Network (CRN) lead (GP) developed a query to extract the data from EMIS systems (Liverpool extracted their own data and data from East Lancashire was extracted by a commissioning support unit data quality specialist). All cases were extracted since SP recording began within the practice (most cases between 2019–2022). One practice (practice 8) did not complete data collection and was omitted from analysis.

A standardised search and data extraction strategy was developed in conjunction with a GP representative to extract all patient records with a recorded social prescribing code. These codes were:

- T871691000000100 | Social prescribing offered (finding)
- 871711000000103 | Social prescribing declined (situation)
- 871731000000106 | Referral to social prescribing service (procedure)

Patient variables included in the search are shown in Table 1.

Demographics which were excluded from analysis due to high rates of missing data are indicated. Comparison data for overall practice populations (dated 2021) were accessed from practice profiles on Fingertips, Public Health England (May 2022).

Data analysis

Data were compiled in Microsoft® Excel® (Version 2211) and analysed using IBM® SPSS Statistics (Version 28). Data quality was assessed by identifying data missingness across the identified variables. 3086 total patient cases were available for study, however gaps in recording meant that some fields were excluded altogether, and some others did not include the whole cohort of patient cases. Other fields were only filled in the case of a positive result: mental illness, the four general health categories and carer status. In the health categories missing data indicated no diagnosis has been coded by the patient's GP.

Missing data in housing, employment, carer status and ethnic group was assessed for patterns between variables and on a practice-to-practice basis. For housing, employment and carer status recording differed on a practice-to-practice basis, suggesting that practice recording habits were a factor.

Data analysed included practice population comparisons and acceptance and decline rates.

Practice population comparison. Overall practice population data included total numbers of assigned male and female registered patients split into five-year age groups, the practice Index of Multiple Deprivation (IMD) decile and percentage representation of census ethnic minority groups. Comparison was drawn between the overall practice population and the SP population. All three SP codes ('referred', 'declined' and 'offered' as outlined in the Data Collection section above) were used to present the total numbers of those who had been 'exposed' to social prescribing through their GP. Further information on the ethnic group and IMD comparisons are detailed below under their respective headings.

Ethnicity. Comparison practice population data included percentage of each census-based ethnic group (Asian, Black, Mixed, Other). Where an ethnic group's proportion was less than 1% this was included in a general 'non-white' group (approx. 0.9% across all practices) and specific ethnic group was unavailable. This meant comparison was more approximate than for other demographics where whole numbers were available. Additionally, practice percentage of individual ethnic minority groups might have been slightly higher than shown due to the recording of a 'non-white' percentage in some practices.

IMD decile. Index of Multiple Deprivation decile data was presented at practice level.

Acceptance/decline rates. Ratios of acceptance and decline were compared by patient demographic. The three SP codes were used for comparison (declined, offered, referred). The declined code was used where individuals had turned down an offer of referral by their GP. The referred code was used for those referred to the service by their GP. The offered code was used when a patient was offered social prescribing and had neither accepted nor declined initially and therefore described as SP being considered by patient.

Three practices included free text with their SP coding which indicated that in some cases the 'offered' code did not reflect the actual situation. The text associated with ten 'offered' codes (practice 1: 0/31, practice 2: 1/296, practice 3: 9/250) indicated the patient had actually subsequently declined SP. One additional case was coded as 'offered' but rejected by the SPLW as the patient was 'too young for social prescribing'.

Rates were compared for each demographic using SPSS (Chi-square and Cramers V).

Results

All results are compiled in Table 2.

Table 1. Patient demographics included in each SP patient case.

Main demographics	Mental ealth	General health	Excluded	Excluded
Age	Mental illness	Respiratory	Marital status	Sexual orientation
Sex	Employment	Diabetes	Interpreter need	Non-english speaking
IMD	Housing	Obesity	Education status	Nationality
Ethnic group	Carer status	Heart Disease	Disability	

Table 2. Total numbers and percentages for each demographic under all 3 SP codes and by referrals and declines. The ‘Exposure and practice population’ column shows the total number of cases pulled under all three SP codes (total SP dataset) by whole number and percentage split for the demographic. A comparison to the percentage within the practice population is shown where data is available. Where there is missing data in the dataset this is indicated. The ‘Referral and decline’ rates column show comparisons between demographics and percentages within demographic (i.e. percentage of [male declines]/[male total SP dataset]) Relevant significant results are indicated with ▼ (low) or ▲ (high) and marked in bold. Chi-square with Cramer’s V (p<0.05).

		Exposure and practice population			**Referral and decline rates**			
Demographic	**Category**	**Exposed (all codes)**	**Exposed %**	**Practice %**	**Referred**	**Percentage**	**Declined**	**Percentage**
Sex	Male	1287	41.7%	49.5%	441	34.3%	332	25.0%
	Female	1799	58.3%	50.5%	695	38.6%	401	22.3%
Age	0–14	22	0.7%	16.3%	16	72.7%	4	18.2%
	15–29	381	12.3%	17.7%	141	37.0%	73	19.2%
	30–44	598	19.4%	19.0%	261	43.6%	91	15.2%
	45–59	772	25.0%	20.0%	319	41.3%	143	18.5%
	60–74	710	23.0%	17.6%	235	33.1%	229	32.3%
	75–89	520	16.9%	8.6%	139	26.7%	160	30.8%
	90+	83	2.7%	0.9%	25	30.1%	23	27.7%
Ethnic group	White	2444	88.6%	93.5%	910	37.2%	599	24.5%
	Asian	74	2.7%	4.2%	26	35.1%	13	17.6%
	Black	89	3.2%	0.3%	30	33.7%	**9▼**	**10.1%**
	Mixed	62	2.2%	0.8%	20	32.3%	10	16.1%
	Other	89	3.2%	0.3%	24	27.0%	17	19.1%
	All non-whiten-w	314	11.4%	6.5%	100	31.8%	49	15.6%
IMD decile	1	1568	50.8%	50.0%	928	59.2%	398	25.4%
	2	311	10.1%		97	31.2%	76	24.4%
	3	236	7.6%		53	22.5%	20	8.5%
	4	254	8.2%		13	5.1%	15	5.9%
	5	244	7.9%	40.0%	20	8.2%	115	47.1%
	6	100	3.2%		8	8.0%	35	35.0%
	7	171	5.5%	10.0%	5	2.9%	30	17.5%
	8	147	4.8%		8	5.4%	34	23.1%
	9	46	1.5%		1	2.2%	0	0.0%
	10	6	0.2%		0	0.0%	0	0.0%
Mental illness	Diagnosis	2374	76.9%		890	37.5%	**486▼**	**20.5%**
	No diagnosis	714	23.1%		246	34.5%	**237▲**	**33.2%**
Employment status	Employed	32	6.5%		14	43.8%	9	28.1%
	Unemployed	324	66.1%		116	35.8%	**40▼**	**12.3%**
	Retired	134	27.3%		36	26.9%	**39▲**	**29.1%**
	Total	**490**						
	Missing data	2596						

		Exposure and practice population			Referral and decline rates			
Demographic	**Category**	**Exposed (all codes)**	**Exposed %**	**Practice %**	**Referred**	**Percentage**	**Declined**	**Percentage**
Housing status	Homeless	58	15.9%		22	37.9%	**2▼**	**3.4%**
	Supported living	198	54.2%		70	35.4%	**54▲**	**27.3%**
	Care/ children's home	31	8.5%		14	45.2%	6	19.4%
	Private home	78	21.4%		19	24.4%	13	16.7%
	Total	**365**						
	Missing data	2721						
Carer status	Carer	230	7.5%		85	37.0%	**38▼**	**16.5%**
	Receiving care	123	4.0%		49	39.8%	**10▼**	**8.1%**
	No carer status	2733	88.6%		1002	36.7%	675	42.7%
General health	No diagnosis	1507	48.8%		559	37.1%	**292▼**	**19.4%**
	1 Diagnosis	1030	33.4%		377	36.6%	252	24.5%
	2 Diagnoses	397	12.9%		153	38.5%	**121▲**	**30.5%**
	3 Diagnoses	132	4.3%		41	31.1%	**50▲**	**37.9%**
	4 Diagnoses	20	0.6%		6	30.0%	8	40.0%

Data gaps/quality

In all cases information for the patient's assigned sex and age was available. For the mental and physical health fields missing data meant no diagnosis had been coded in the patient's record by the GP. This meant that missing data was treated as absence of illness as in the case of diagnosed mental illness (76.9% n=2374) and no diagnosis of mental illness (23.1% n=714). These medical fields were therefore treated as complete with no true missing data.

Ethnic group was missing from patient records in 10.6% (n=328) cases. The pattern of missing data for ethnic group appeared to be random with similar rates across the practices. All analysis of ethnic group was carried out on the 89.3% (n=2758) where ethnic group was known. The average of all percentages across the ten practices was calculated and used to show comparison in Table 2. White ethnic minorities were not recorded in practice data. Our dataset did contain some white ethnic minority groups including Irish Travellers (n=4), however as we had no comparison data from the practice population, we excluded these from analysis.

Total numbers are shown in Table 2 and missing data where applicable. Data on the desired patient variables related to the wider determinants was not consistently recorded in patient records. Seven variables as highlighted in Table 1 were therefore excluded from the analysis. The disability field was only completed for 1.81% (n=56) of patients in the dataset, highlighting that this type of information may not be routinely collected in primary care.

Fields were excluded where total numbers made up less than 10% (n=308) over the whole dataset, or where subsequent grouping resulted in low numbers. Housing and employment status were included in the results table as they met this threshold but recording was poor for these fields. Missing data in employment status and housing status was 84.9% (n=2596) and 88.17% (n=2721) respectively. Available data therefore only represents a small proportion of the total sample data.

Due to the sporadic nature of GP recording for these variables it is also uncertain if they are an up-to-date reflection of patient status. In the carer status category missing data might mean the recording party is unaware of the patient's status as a carer/receiving care or that the patient is carrying out this role on an unofficial basis. For this reason, missing data cannot be reliably assumed in all cases to mean a patient is not a carer/receiving care.

Data quality varied between fields. Recording was completed in all cases for the patients' age, sex and IMD; in most cases for ethnic background (85% n=2758); and in the event of a positive result in the health fields. Data quality was much less robust for the carer, employment and housing status fields, due to missing data, recording uncertainty and the non-medical nature of these fields.

Preliminary analysis

Preliminary analysis suggests over representation in exposure to social prescribing amongst older age groups compared to the general practice population. However, the analysis also suggests that older age groups are more likely to decline SP. There was some preliminary evidence to suggest higher decline rates in White British people compared to ethnic minority groups and a lower exposure for the Asian ethnic group. In our sample there were more women than men. Those with physical health diagnoses were more likely to decline referral than those without, and those with mental health diagnoses were less likely to decline than those without.

Differences in referral rates were explored in Table 3. There was some variation by locality which will have implications for future research.

GP referral patterns

Discrepancies in SP activity were apparent on a practice-by-practice basis. Some practices were much more active than others in offering referral. Distribution of the SP codes differed between practices also. This is shown in Table 3.

Discussion

This study aimed to assess the feasibility of using data organised against primary care SP codes to explore SP referral patterns and take up. Secondly, the study aimed to examine exposure and referral/decline patterns in patients to give insight into possible health inequalities in accessing SP.

The dataset was relatively simple to access once approvals were in place and provided a broad overview from 10 different practices across the region. This provided a useful insight into referral trends by region, area and by practice. The extent of practice-by-practice and regional variation in our dataset suggests that SP activity is very heterogeneous. However, data quality was insufficient to provide an accurate reflection of referral and declines across the selected patient variables. Practice rates varied for declined, offered and referred codes and it is unclear whether declines by patients are always being recorded by GPs. Repetition of this project with larger datasets might provide more robust evidence on social prescribing referral trends for sex, age, ethnic group and mental and physical health diagnoses. For the wider determinants of health (e.g. disability, employment status etc) with poorer rates, homogeneity and reliability of recording by GPs, repetition is unlikely to yield useful information unless data recording is improved. Our preliminary findings highlight that further research is required to elucidate why GP recording for these variables is poor and what strategies could support better data collection.

Table 3. An overview of referral patterns for each of the 10 practices included in the study. Total numbers are shown for the overall practice population and the total patients coded under any of the 3 SP codes (referred, declined, offered). This is then presented as a percentage of the overall practice population. Total numbers and percentages are also provided for each region. Percentage breakdown by SP code is presented for each practice.

	Liverpool			**East Lancs**				**Blackpool**			
	practices:			**practices:**				**practices: s**			
	1	**2**	**3**	**4**	**5**	**6**	**7**	**9**	**10**	**11**	**Total**
Practice total	9335	6896	7976	25043	6265	4909	15054	12750	12348	8147	108723
SP total	759	492	543	146	75	136	347	225	244	119	3086
SP practice %	8.13%	7.13%	6.81%	0.58%	1.20%	2.77%	2.31%	1.76%	1.98%	1.46%	
Regional total	24207			51271				33245			108723
Regional SP total	1794			704				588			3086
Regional SP %	7.41%			1.37%				1.77%			
% Referred	44%	28%	26%	75%	76%	68%	34%	25%	28%	19%	
% Offered	4%	60%	46%	23%	20%	21%	59%	61%	62%	67%	
% Declined	52%	12%	28%	3%	4%	12%	7%	14%	10%	13%	

Data on housing, carer status and disability for example were generally poorly recorded in the sample. However, practices in our study also showed variation in recording of the demographic data between them, suggesting inconsistencies in data recording within primary care. Moscrop *et al.* 2019 highlight that although an individual's social and economic circumstances can influence their health care access and outcomes, data relating to these circumstances are not regularly assessed or collected. Collecting such data could improve health equity by enabling a better understanding of who is or is not accessing services and how to better target service provision based on need[19].

Our findings demonstrate the need for better data recording in SP as did other research studies exploring the outcomes of SP[6,7]. Patient characteristics must be consistently recorded to explore who is or is not being offered social prescribing and those who are not taking up the offer. Without such data, referring organisations may unknowingly be contributing to inequity of access by only referring certain population groups. Watt 2013 stated that it is 'widely recognised that many health improvement initiatives may have widened inequalities in health as a result of differential uptake by different social groups'[20].

Our preliminary findings from the available data also suggest potential inequalities in uptake of SP, with differences in acceptance and decline rates amongst difference patient demographics that require further investigation. In our sample, younger age groups were underrepresented. Representation also varied between ethnic groups with underrepresentation in the Asian ethnic group. In addition, our findings suggested that users with diagnosed health conditions in the four fields assessed (respiratory, diabetes, obesity, heart disease were more likely to decline referral than those without diagnoses. Such potential variations in uptake are of particular significance to health equity, particularly when such groups may face poor health and additional barriers in accessing services[16–18]. The underrepresentation of ethnic minorities in SP has also been highlighted by the 'Social Prescribing Observatory', National Academy for Social Prescribing (NASP) and other research reports[17,18].

Future research is needed to identify if these results are reflective of social prescribing referrals more generally. Understanding how GPs make decisions about candidates for referral is important to identify both the appropriateness of referrals and any biases and pre-conceptions that may be impacting certain population groups[18,20,21].

Limitations

The heterogeneity in referral patterns and variations in recording may not have given us a full picture of declines however the data has highlighted possible differences in referral and decline rates for some population groups.

Using the practice patient population data (Fingertips, Public Health England) for comparison was useful in assessing exposure to SP but had some limitations: ethnicity information included only practice percentage by major ethnic group (e.g. 3.2% Asian); IMD was only listed for the practice location: half of the practices in our sample were located in an area of high deprivation which may impact the findings. The SP dataset provided a useful overview of referral patterns but lacked context. Although the practice-to-practice and demographic-based variation in referral patterns was clear, the dataset did not provide any insight into the reasons behind this. More research is needed in this area.

Conclusion

There is potential to use primary care data on SP to assess who is being referred and who is declining the offer of SP. However, there are concerns that this data is currently not robust enough. A consensus in GP recording of social prescribing codes and patient demographics is required to allow full assessment of patient records for studies of this kind in the future. It is particularly important that more robust data on the wider determinants of health is routinely collected if we are to demonstrate impacts on health inequalities and understand which population groups are benefiting from accessing SP and which may not be. This would allow for assessment of inequalities in referral and uptake of SP and how these may be addressed for specific population groups.

Social prescribing is a universal personalised care scheme which should be available to all and equitable access of the service is an integral part of that. However, our preliminary findings suggest variations may exist in decline and referral rates for SP in primary care amongst some patient population groups, particularly those with long term conditions, ethnic minority groups and younger people. Highlighting the need for further research to assess the actual prevalence of this and explore what factors may be contributing to any variations and how they may be addressed. Exploring referral behaviours will also help identify if any biases are at play and if professionals are indirectly excluding certain population groups.

Data availability

The HRA agreement for our study does not allow dissemination of the raw data beyond the primary research team. However, metadata comprising total numbers within our demographic fields is available to readers on request. Please contact the corresponding author for details (ral-izzi@uclan.ac.uk).

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Open Peer Review

Current Peer Review Status: ? ? ?

Version 1

Reviewer Report 23 June 2023

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Andrew Moscrop
Luther Street Medical Centre, Oxford, England, UK

This paper demonstrates two important points: despite claims that social prescribing will reduce health inequalities, current patterns of data collection are inadequate to a) support those claims, and b) monitor the equitable distribution of offers and uptake of social prescribing.

A few comments follow, mostly on presentation and clarity.

On the Abstract

- I found the abstract not as clear as it could be.
- ‘Exposure to social prescribing’ is ambiguous – it could mean being offered, or actually having experience of social prescribing, or something else.
- I am not sure that the phrase ‘health inequalities in access to social prescribing’ (included in the abstract and elsewhere) is appropriate. Inequalities, yes. But health inequalities, no.
- ‘Underrepresentation of younger age groups and Asians’ is also ambiguous – it might mean that they were not offered, or did not take up an offer.
- The results section of the abstract is a bit repetitive. Perhaps it could be made tighter? For example:

  “GP referral data showed inconsistent recording of health determinants. Patient age, sex and mental and physical health conditions were consistently recorded. Other variables only sporadically recorded by GPs included disability, housing status (*and name others*).
- Variations in referral patterns were found between GP practices. Our preliminary findings identified underrepresentation of younger age groups and Asians, and higher declined referrals among individuals with physical health diagnoses.”

- The conclusion says that some patient factors could not be used to assess trends – I think this is a very significant finding and the patient factors that could not be used (but which might have been very relevant) should be mentioned specifically – disability, carer status, housing, employment, education are mentioned. (Was occupation considered?)

- Also, I think that talking about 'variations' might be unnecessarily euphemistic at this point. And i would suggest aiming to condense the key messages of the paper. So perhaps along the lines of:

  "Inconsistent recording of patient data means that it is not possible to assess variations in social prescribing patterns that may exist across patient groups. To identify and monitor inequalities in social prescribing, consistent recording of data is required on relevant patient factors (these may include disability, carer status, housing, employment, education, as well as the more reliably-recorded age, gender, ethnicity). Preliminary results suggest that inequalities exist in social prescribing, with some patient groups underrepresented in referrals."

On Presentation of data

- Table 1 made little sense to me and it's content might be better explained in a short paragraph.

- Table 2 is very busy and unclear. I think part of the problem is that the labels on the columns are inadequate – they do not stand alone to convey the information of the column's content.

- Table 3 might not be necessary? It reveals only that differences exist between practices and regions, but these differences are not explained or explored further by the present study.

Data

- The inclusion of IMD data seemed unhelpful. From what I understand, this data was only obtained at the practice level (not for individual patients), which makes it an extremely blunt tool in the analysis. If I have misunderstood and the authors feel it worth including, then they should explain why, and explain the IMD score – specifically, the point that a lower IMD score (or IMD decile in this case) denotes greater deprivation.

Thanks for the opportunity to read and comment on this paper. As mentioned, i think it makes an important contribution.

Is the work clearly and accurately presented and does it cite the current literature?

Partly

Is the study design appropriate and is the work technically sound?

Yes

Are sufficient details of methods and analysis provided to allow replication by others?

Yes

If applicable, is the statistical analysis and its interpretation appropriate?

Yes

Are all the source data underlying the results available to ensure full reproducibility?

No

Are the conclusions drawn adequately supported by the results?
Yes

Competing Interests: No competing interests were disclosed.

Reviewer Expertise: I feel able to comment on the measuring and monitoring of healthcare inequalities, and on relevant data recording.

I confirm that I have read this submission and believe that I have an appropriate level of expertise to confirm that it is of an acceptable scientific standard, however I have significant reservations, as outlined above.

Author Response 24 Aug 2023

Rachel Al-Izzi

Thank you for taking the time to review our paper. We are grateful for the feedback you provided and will outline our response to your comments here.

On your comments about the 'Abstract' section lacking clarity, including some ambiguous phrases, repetition in the results section, and the need to specifically name the demographics which were poorly recorded:
Thank you for your comment. We reviewed the abstract and made various minor changes for clarity in the 'Background' section which now reads: 'Social prescribing (SP) is part of universal personalised care and available to everyone in the UK National Health Service. However, emerging evidence suggests access disparities in social prescribing. This study aimed to investigate the feasibility of using primary care records to access and analyse data on social prescribing. Our secondary aim was to compare characteristics of patients who are offered referral, referred to or decline referral for social prescribing to explore possible inequalities in access to social prescribing.'
Also in the results section: 'GP referral data showed inconsistent recording of wider determinants of health. Patient age, sex and mental and physical health conditions were consistently recorded. Other variables (marital status, interpreter need, education, disability, sexual orientation, non-English language, nationality) were recorded only sporadically and could not be used for analysis. Practices varied in referral patterns.'
Conclusion section: 'Recording discrepancies meant that many patient factors could not be used to assess trends in social prescribing referrals and declines. Primary care data recording must be consistent to understand SP referral trends and inequalities relating to the wider determinants of health. Preliminary results suggest some patient groups may be underrepresented in SP referrals, however this requires further investigation.'
Thank you for your input on this. We hope these edits have addressed your points on clarity and the importance of our findings on recording wider determinants of health.

Data Presentation

On your comment on Table 1 being unclear:

Thank you for your comment. Table 1 has now been revised for clarity. All excluded fields are contained in one column titled 'other fields excluded due to missing data' and general and mental health columns have been combined. We hope this has made this table clearer.

On your comment on Table 2 being too busy, unclear and the column labels being inadequate:
Thank you for your insight. Table 2 has now been revised to align with your comments. I have removed the percentages columns and the 'referred' column and reduced to three columns headed: 'Referred/offered/declined (all codes)', 'Comparison practice population %' and 'Declined code only (% within demographic)'. Percentages and total numbers have been included in one column instead of listed separately as previous. We hope that in doing this we have reduced the busyness of the table and created column labels which are more descriptive of the information in the table.

On your comment on Table 3 being unnecessary and not interpreted in the text:
Thank you for your comment. We agree we did not fully explore this area of the study. We acknowledge your comment but opted to keep Table 3 to reflect the differing referral patterns. We have added to the 'Limitations' section to reflect the relevance of this. The section now reads: 'The heterogeneity in referral patterns and variations in recording may not have given us a full picture of declines however the data has highlighted possible differences in referral and decline rates for some population groups. Variation in coding behaviour means that this data cannot be used as a fully reliable indicator of referral patterns. Declines might not be consistently recorded.'

On your comment on the IMD decile information included, ?what information we had access to and a description of the meaning of IMD decile:
Thank you for your comment, we appreciate there was a lack of clarity in our paper on the IMD. We hope we have rectified this by adding to the 'IMD decile' paragraph in the 'Data analysis' section: 'Index of Multiple Deprivation deciles indicate the deprivation level for the postcode associated with each patient. Decile 1 is the 10% most deprived areas in England and decile 10 is the 10% least deprived areas in England. IMD decile is available for all 3086 patients in our dataset, but in the comparison data pulled from practice populations, IMD data was only available at the GP practice level.'

Competing Interests: No competing interests were disclosed.

Reviewer Report 23 June 2023

https://doi.org/10.3310/nihropenres.14451.r29420

? **Denise Ann Taylor**

Victoria University of Wellington, Wellington, Wellington, New Zealand

Thank you for asking me to review this paper on whether referrals to social prescribing can be used to detect bias/inequity on the types of people attending. I have the following comments to make on an overarching level to start.

1. In many places, people can self-refer to social activities, and/or they are introduced to social prescribing by friends or neighbours who are taking part in these activities. I remain unconvinced these would be entered into a GP database.

2. The authors report not finding diagnoses of mental illness. This is the point of social prescribing that social activities are attended by people with social determinants of low mood or mental health or anxiety (for example) before a frank mental illness is diagnosed. It is about preventing the worsening of mental health and encouraging engagement in activities that improve the individual's mood and mindset by engaging with others that seem the same as them. That is not to say I haven't seen people with severe mental health diagnoses taking part in social activities, as I have been involved in such a project. The activities take the individual outside of their distress by offering an alternative activity to focus on.

3. The focus of social prescribing is to de-medicalise the situation and not classify life events as illnesses because we know that antidepressants are of little benefit to any person with mild to moderate depression (NICE NG222), but they do add to the increased risk of suicide ideation, bleeding (especially if a person is taking aspirin for cardiovascular disease) and weight loss and nausea in the short-term, amongst other adverse effects.

4. Social prescribing offers a non-pharmacological approach to addressing low mood and also supports individuals in building links with like-minded people to feel included back into society and their local community.

5. One might expect older people to be more frequent attendees at social prescribing facilities as ageing is a well-known mood depressor in its own right, and many older people may be property-rich but cash poor, especially if their partner has passed away, leading to isolation and loneliness and other precursors of poor mental health.

I think this was an interesting study, but it seemed there was a lack of understanding of how social prescribing works at times. I note that the study was completed in a geographical place where I know little about health deficits, and findings may be completely different in other geographical areas. This is because social prescribing is generally built to suit the needs of local residents, young and old.

In terms of publication, the authors should consider whether the indicators they chose are appropriate for capturing social prescribing, which is aimed at de-medicalisation. Furthermore, to actually look at deficits/inequity, when referring people to social prescribing, it may have been appropriate to select known areas of deprivation against geographical areas with less social deprivation. This may have been the case, but I don't know the geographical areas sufficiently well to judge this.

Is the work clearly and accurately presented and does it cite the current literature?

Partly

Is the study design appropriate and is the work technically sound?
Partly

Are sufficient details of methods and analysis provided to allow replication by others?
Partly

If applicable, is the statistical analysis and its interpretation appropriate?
I cannot comment. A qualified statistician is required.

Are all the source data underlying the results available to ensure full reproducibility?
No

Are the conclusions drawn adequately supported by the results?
Partly

Competing Interests: No competing interests were disclosed.

Reviewer Expertise: Social prescribing pathways for mental health and other activities that are necessary to address inequity in the local population that I have worked and researched in. Health and Diversity and inequity.

I confirm that I have read this submission and believe that I have an appropriate level of expertise to confirm that it is of an acceptable scientific standard, however I have significant reservations, as outlined above.

Author Response 24 Aug 2023

Rachel Al-Izzi

Thank you for taking the time to review our paper. We are grateful for the feedback you provided and will outline our response to your comments here.

On your comment (1) about the many models of social prescribing:
Thank you for this comment and we appreciate that GP databases do not record all social prescribing activity. We have edited the 'Introduction' section (3rd paragraph) to clarify this as follows: 'Although SP is often accessed through a GP referral, there is no one standard model. Other agencies can refer to social prescribing and although link workers are usually involved, some models exist without them. It is therefore a complex non-medical intervention with numerous interacting components from systems and services to providers and patients. In this paper we will examine GP practice referrals to SP.'

On your comments (2-5) on mental illness, general health conditions, the de-medicalised and non-pharmacological approach of social prescribing, and the fit of older people within the service:
Thank for your comments 2-5 and your helpful insights into SP. We understand the role of

SP is not focused on general or mental health diagnoses but feel our aim has been misunderstood. The relevance of health and mental health in this paper was to investigate which groups were accessing social prescribing or declining. These variables were used to explore if those with a diagnosis were being referred by GPs or were declining (potentially indicating inappropriate referrals or barriers to access). We have added a passage in the 'Data collection' section following Table 1 to clarify this: 'These Demographics were chosen to reflect key social determinants of health (individual personal circumstances that affect health and wellbeing). The aim was to understand representation of these factors in our dataset and how they might influence rates of decline.'

On your comment (I think this was an interesting study, but it seemed there was a lack of understanding of how social prescribing works at times. I note that the study was completed in a geographical place where I know little about health deficits, and findings may be completely different in other geographical areas. This is because social prescribing is generally built to suit the needs of local residents, young and old.)
Thank you for your comment: we hope this has been addressed in our response to your comment (1) above, that our focus was on a specific SP pathway (GP practice referrals).

On your comment about our chosen variables and the importance of comparing areas of higher deprivation with areas of lower deprivation:
Thank you for your comment. We chose our variables based on the social determinants of health and have added a line to reflect this in the 'Data collection' section following Table 1: 'These Demographics were chosen to reflect key social determinants of health (individual personal circumstances that affect health and wellbeing). The aim was to understand representation of these factors in our dataset and how they might influence rates of decline.' We considered factors which might influence take up/decline. We agree that it would have been really useful to explore both areas of deprivation and those which are less deprived. However, due to study time limitations we had to accept practices that had the capacity and willingness to participate in the study. This is definitely something we can consider in future studies.

Competing Interests: No competing interests were disclosed.

Reviewer Report 26 April 2023

https://doi.org/10.3310/nihropenres.14451.r29088

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Andrea E. Williamson
Undergraduate Medical School, College of Medicine, Veterinary and Life Sciences, University of Glasgow, Glasgow, Scotland, UK

This is an important topic in terms of understanding better the context of social prescribing in general practice and also the contribution it might make to tackling or exacerbating health inequalities. The sampling is pragmatic appropriate and justified. The data is not publicly available which is normal in the UK for data of this nature. Excellent General Practice research! Thank you!

The main issue that needs addressed is that the paper currently conflates coding behaviour and action. The data are likely to reflect BOTH coding and referral behaviour and it is not possible with this data set to know what the gap is. Mainly, the patient is offered/is referred etc., but the clinician does not code it. This needs to be made clear at certain points in the paper - see suggestions for change below in the specific minor section.

To conceivably try and address that gap, you could in future research match CLW data from the CLW organisations to the practice data – as this is likely to be much more accurate and would help interrogate this gap in more depth. I am not aware of any papers that have done that yet. It makes sense that organisations who are funded to provide this service will be more likely to have accurate data on referrals. Of course that sheds no light on ‘offered’ or ‘declined’ referrals.

Minor comments:

Intro paragraph 3:
There are now community links workers in services beyond general practice, including in mental health services. So although this statement about it mostly being in GP was true some years ago, the landscape has changed. Also SP is often, but not exclusively, delivered through CLW. For example, in many Inclusion Health settings, GPs, nurses pharmacists will do their own SP referrals as well as working with a CLW. In summary it is complex and many models and practices co-occur. Amend the intro to better reflect this please.

Data Analysis Practice population - *recorded* as being exposed to SP rather than definitely being exposed, needs amended.

Acceptance/declined rates - is this description of how the codes were used what you *assumed* GPs were doing with them? Feasibly some may code offer then also code accepted/declined in the same contact. Coding behaviours are variable by clinician and by any given day etc, as I’m sure you know. You need to state this is an assumption. The next paragraph goes onto describe some examples of this complexity. Suggest you frame it thus. Helps the reader understand the complexity of the coding context.

Typo in table 1 mental ‘ealth’

Also the headings do not make sense. Employment, housing are social determinants of health. Could include carer role there too. Suggest have a heading for that, then general health include mental illness. Have excluded all as one column - at the moment that reads strangely and I find myself thinking there is a typo and one might actually be included (even though that’s not the case).

Say in the text what IMD 1 and 10 means as otherwise the reader cannot readily interpret table 2.

Is the work clearly and accurately presented and does it cite the current literature?

Yes

Is the study design appropriate and is the work technically sound?
Yes

Are sufficient details of methods and analysis provided to allow replication by others?
Yes

If applicable, is the statistical analysis and its interpretation appropriate?
Yes

Are all the source data underlying the results available to ensure full reproducibility?
No

Are the conclusions drawn adequately supported by the results?
Partly

Competing Interests: No competing interests were disclosed.

Reviewer Expertise: Academic GP, Inclusion Health and tackling health inequalities expertise, experience of using large GP data sets in research.

I confirm that I have read this submission and believe that I have an appropriate level of expertise to confirm that it is of an acceptable scientific standard, however I have significant reservations, as outlined above.

Author Response 27 Apr 2023

Rachel Al-Izzi

Thank you for your report and comments which were really useful feedback for us. We've taken them on board and will apply them once our paper is re-opened for amending. We hope you're happy with the revised version when it comes out!

Competing Interests: No competing interests were disclosed.

Author Response 24 Aug 2023

Rachel Al-Izzi

Thank you for taking the time to review our paper. We are grateful for the feedback you provided and will outline our response to your comments here.

On your first comment for coding behaviours vs actions and whether clinicians are recording accurately, and your query in the minor comments section on duplicate codes: Thank you for your comment. There were no cases where multiple codes were given to one patient but we had not clarified this in the text so we are grateful for your input here. We have now rectified this by adding text to the ‘Acceptance/decline rates’ paragraph of the

‘Data analysis’ section: 'The dataset was checked for duplicate patients: none were found and only one code was associated with each patient record.' Re coding behaviours we added text reading: 'Coding patterns were variable and it seems use of these codes differs by clinician/practice. This is detailed in our ‘Limitations’ section at the end of this paper.' We have also added further detail to our ‘Limitations’ section reading: 'Variation in coding behaviour means that this data cannot be used as a fully reliable indicator of referral patterns. Declines might not be consistently recorded.'

On your comment for matching CLW data with our referral data:
Thank you for your comment. This is definitely a worthwhile area to explore in the future.

On your comment regarding the SP landscape and the many models which exist:
Thank you for your comment which we've taken on board. The ‘Introduction’ section has now been amended to read: 'Although SP is often accessed through a GP referral, there is no one standard model. Other agencies can refer to social prescribing and although link workers are usually involved, some models exist without them. It is therefore a complex non-medical intervention with numerous interacting components from systems and services to providers and patients.' We hope this better reflects the current UK landscape of SP.

On your comment (Data Analysis Practice population - recorded as being exposed to SP rather than definitely being exposed, needs amended):
For clarity this has now been changed to: 'All three SP codes (‘referred’, ‘declined’ and ‘offered’ as outlined in the Data Collection section above) were used to present the total numbers of those who had been ‘offered/declined’ social prescribing through their GP.' This now also reflects the wording used throughout the text and in the tables.

Thank you for drawing attention to the typo which has now been corrected.

On your comment about Table 1 (unclear heading and unnecessary extra columns):
Thank you for your insight - Table 1 has now been changed to reflect your comments with one 'excluded' column and one 'medical diagnoses' column.

On your comment about IMD deciles and making this information clear to the reader:
Thank you for your comment. In the IMD decile section under the 'Data Analysis' header, the following passage is now included to explain IMD deciles: 'Index of Multiple Deprivation deciles indicate the deprivation level for the postcode associated with each patient. Decile 1 is the 10% most deprived areas in England and decile 10 is the 10% least deprived areas in England.'

Competing Interests: No competing interests were disclosed.