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The use and impact of social prescribing: A mixed methods feasibility study protocol

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Abstract

Introduction

Approximately 70% of health outcomes are due to social factors. Social prescribing aims to address social factors related to health but the evidence base behind it is limited partly due to a lack of data linking social prescribing activity and outcomes. This mixed methods feasibility study aims to explore approaches to measure and influence the uptake and impact of social prescribing.

Methods and analysis

The quantitative component of the study aims to: identify the characteristics of individuals who receive social prescriptions and describe the use and estimate the impact of social prescribing. We will utilise the Royal College of General Practitioners (RCGP) Research and Surveillance Centre (RSC) primary care sentinel network, which covers a population of over 4,000,000 patients. Data will be extracted for five years up to 31 January 2020 based on social prescribing codes recommended by NHS England national guidance and through a social prescribing taxonomy/ontology underpinned by concepts associated with health-related social factors.

The qualitative component aims to explore approaches to understand the contextual factors that will have influenced our quantitative findings with the goal of helping us identify mechanisms to encourage adoption of social prescribing in primary care while improving data quality. It will comprise up to three 90-120 minute focus groups for six to eight participants. The focus group outputs will be analysed using framework analysis and statements derived from the focus groups will be used to create a survey that surveyees can agree or disagree with.

Ethics and dissemination

All RCGP RSC data are pseudonymised at the point of data extraction. No personally identifiable data are required for this investigation. This protocol follows the Good Reporting of a Mixed Methods Study (GRAMMS) checklist. The study results will be published in a peer-reviewed journal and the dataset will be available to other researchers.

Summary: Strengths and limitations of this study

- A key strength of this study is that it uses an established and nationally representative sentinel network, The Royal College of General Practitioners Research Surveillance Centre (RCGP-RSC), which provides access to a large sample of real world evidence (RWE) data that has a high-level of data completeness.
- The practical and feasible approaches identified through our project could be adopted by NHS Digital and rolled out nationally across England, yielding information to improve our understanding of the current use and impact of social prescribing and also help to elucidate best practice for social prescribing.
- A limitation is that though nationally representative, because GP practices participate on a voluntary basis, there is slight underrepresentation of practices with more deprived patients, which means there may be some selection bias.
- Another limitation is that the identification of patient output and outcome metrics will be restricted by primary care clinical codes (i.e. Read, CTV3), which do not always align directly with the output and outcome metrics of interest.

Introduction

It is well established that social factors account for around 70% of health outcomes[1]:

"Societies that enable all citizens to play a full and useful role in the social, economic and cultural life of their society will be healthier than those where people face insecurity, exclusion and deprivation."[2]

Since the 19th century there have been initiatives such as social medicine[3] and community health[4] designed to address social factors related to health at individual and community levels. There are subtle differences between these initiatives but they all largely focus on needs that remain unaddressed in traditional biomedical models.

Social prescribing is a more recent initiative that has been developed to address social factors related to health. Social prescriptions have been used for several years across European countries as "a way of linking patients in primary care with sources of support within the community to help improve their health and well-being."[5] Social prescriptions are varied and include activities focused on health, education, skills development, sports and leisure/art activities.[6] If utilised well, they can help to deliver several benefits to individuals and health and care systems including[7]: giving a route for health and care systems to address social factors related to health; promoting self-care; support job creation by funnelling resources to local Voluntary, Community and Social Enterprise (VCSE) organisations; building stronger communities; reducing service utilisation including GP appointments, secondary care referrals and accident and emergency attendances.

A wide variety of approaches are included within the umbrella of social prescriptions. A recent systematic review[5] indicated that while there have been 15 studies into the effects of social

prescriptions, none were of sufficient quality to allow a strong recommendation for their use. More robust evidence is required to strategically inform the development of social prescriptions and to establish social prescriptions as an evidence-based intervention that clinicians feel comfortable in regularly using.

A major barrier to the generation of evidence that could facilitate evaluation of social prescribing is the lack of data on what social prescribing activity is taking place and the outcomes delivered for people taking up social prescribing. This stems from the lack of standardisation of recording, a limited list of formal codes associated with social prescribing as well as likely variation in the uptake, use and quality of data recorded by clinicians.

English general practice is an ideal location to assess the feasibility of measuring the uptake and impact of social prescribing. English general practices have a registration-based system (one patient registered with a single practice) and are highly computerised.[8] Computerised medical record (CMR) systems have been widely used for measuring quality and outcomes in general practice. Where data are likely to be complex, as we anticipate in this study, ontologies provide a formal method to specify how we will measure the uptake and impact of social prescribing.[9,10]

We can readily access a nationally representative sample of data through the Royal College of General Practitioners Research Surveillance Centre (RCGP-RSC) sentinel network, a network of over 500 general practices.[11, 12] Finally, England is also an ideal location for this study because there is a strong national push to promote social prescribing as a mechanism to improve patient and population outcomes while optimising resource utilisation (Box 1).

Box 1: Social prescribing in the English context

Social prescribing is part of NHS England's commitment, as highlighted in the NHS England Long Term Plan[13], to make personalised care business as usual across the health and care system. In January 2019, as part of its Universal Personalised Care Plan[14], NHS England announced a major expansion of social prescribing, as one of six components of the comprehensive model of personalised care. NHS England has produced a standard model, the link worker model, of social prescribing in partnership with stakeholders and it has created reference guidance[15, 16] that provides advice on implementing this link worker model.

To begin to address the gap in the evidence base around social prescriptions, NHS England worked with commissioners, practitioners, providers, evaluators and other stakeholder groups to create a consensus Common Outcomes Framework (COF)[17] on what outcomes and outputs should be measured to demonstrate the impact of social prescribing. Feedback from a wide range of stakeholders (including social prescribing connector schemes, primary care staff, local authorities, local NHS, voluntary community and social enterprises (VCSE) organisations, academics, researchers, public health leaders and other government agencies) was collected to inform the COF. The reference guide encourages the use of SNOMED codes to record social prescribing in patient records as well as the Patient Activation Measure and the ONS Wellbeing Measure to capture outcomes being delivered to patients.

Aim

To measure the uptake and impact of social prescribing and to explore approaches to improve data quality related to social prescribing using the RCGP RSC sentinel network.

Objectives

Our objectives encompass the development of measurement tools, measuring use and impacts as well as feeding back on variation between practices which may be the result of data quality as well as variation in care.

- To identify the characteristics of the individuals who are provided, or decline social prescriptions and the patient and health service outcomes related to their social prescription

- To develop a taxonomy and ontology to capture social prescribing referrals and interventions made in primary care
- To report inter practice variation and to explore opportunities to improve data quality and the quality of social prescribing in primary care.
- To explore the feasibility and willingness of primary care practitioners, including general practitioners and link workers, to routinely collect data (e.g. uptake, service use, health/wellbeing measures) and to use it to evaluate impact of the social prescribing link worker model.

Methods and Analysis

Study design

This mixed methods feasibility study follows the Good Reporting of a Mixed Methods Study (GRAMMS) checklist.[18] The study protocol combines qualitative and quantitative methods and will explore how the RCGP RSC can be used to establish the baseline of existing data, understand outcomes delivered and to explore approaches that can be used to understand and influence how link-worker based models are being implemented in English general practices.

The quantitative methods (WP1) will utilise the RCGP RSC database to test approaches to identify the use and impact of social prescribing.[11, 12] The qualitative methods (WP2) comprise focus groups and a survey that will be carried out with individuals with experience of primary care. The aim of WP2 is to explore approaches to understand the contextual factors that will have influenced our

quantitative findings with the goal of helping us to identify mechanisms to encourage adoption of social prescribing in primary care while improving data quality.

Study setting and sample

For WP1, we will use the sample of over 500 nationally representative GP practices contained within the RCGP RSC.[11,12] For WP2, we will approach and recruit people in person and through existing departmental contacts within the University of Oxford and University of Surrey Departments of Primary Care. Individuals will be recruited if they have any experience working within primary care and are within travelling distance of the University of Oxford or the University of Surrey to attend focus groups on our premises.

Data Collection and Data Management

Data collection from volunteer RCGP RSC practices

For this project we propose to use the RCGP RSC sentinel network. The RCGP RSC was established in 1967 and comprises Computerized Medical Records (CMRs) of pseudonymised data received from over 500 primary care practices across England, covering a population of over 4,000,000 currently registered patients. [11, 12]

RCGP RSC data is registration based, so that every patient is registered with only one practice at a time with each patient having a unique patient identifier, the National Health Service (NHS) number. The NHS number enables the transition of a patient's medical record to another practice when

he/she moves to a different location and for the patient's data to link with secondary care and other datasets.[8] Although within this study we will used pseudonymised NHS number throughout following RCGP RSC processes.

CMR data in UK primary care are captured primarily within two Electronic Health Record systems which utilise Read and CTV3 codes; both systems, however, will be transitioning to SNOMED CT. Read, CTV3 and SNOMED CT codes are used to collate data for primary care including diagnoses, processes of care, prescriptions, and results from laboratory-based data.

We will extract and analyse coded data from primary care practices for five years up to 31 January 2019. The data extract will include all instances of use of the codes highlighted in Table 1, which were derived from the NHS Outcomes Framework for social prescribing.[17]

Table 1: NHS Common Outcomes Framework (COF) for Social Prescribing codes. *(NB: codes in italics are not in the COF but will be included in the data extract)*

Readv2	**CTV3**	**SNOMED CT**	**Term description**
9NSE.	9NSE. XaaEA	871691000000100	Social prescribing offered (finding)
8IEp.	8IEp. XaaEB	871711000000103	Social prescribing declined (situation)
8T09.	8T09. XaaEC	871731000000106	Referral to social prescribing service (procedure)
	XagOR	*1084281000000109*	*Signposting to social prescribing service (procedure)*

8BAf.	*8BAf.* *XaQvz*	*515721000000104*	*Social prescribing for mental health* *(regime/therapy)*

We will also explore other ways of capturing information on the use of social prescribing through the use of a social prescribing ontology. Ontologies are frequently used in health care for modelling the semantics of medical concepts and to facilitate exchange of medical data between different health care service providers.[19] The social prescribing ontology will be underpinned by a taxonomy based on concepts associated with social prescribing practices and the wellbeing of social prescribing recipients. The primary purpose of the taxonomy and ontology is to harmonise data sources containing measures and indicators of social prescribing across various parts of the health system.

The taxonomy will cover several key concepts derived from the five ways to wellbeing model proposed by the New Economics Foundation[20] as well as Wilkinson and Marmot's[2] work on social factors related to health. The concepts will include: social gradient, stress, early life, social exclusion, work/unemployment, social support, addiction, food, transport, ethnic inequalities, health inequalities at older ages, neighbourhood housing and health, sexual behaviours). The ontology will describe these key concepts used within social prescribing. The social prescribing recipient will have one of more characteristics that would qualify them as a social prescribing recipient. In the ontology, these characteristics will be organised according to the biopsychosocial model.[21] The health care provider will consider these characteristics and decide if a social prescription will be beneficial. The social prescription will enable the social prescribing recipient to access one or more social prescription services. In addition to the services relevant to these concepts, we have also included an additional category, "information/advice service" which includes a range of services that do not fit directly within the scope of original conceptual model of wellbeing or social factors related to health, but have an indirect effect on wellbeing.

The social prescribing ontology has been implemented according to the web ontology language (OWL) within the Protégé ontology development environment and hosted on the BioPortal ontology repository.[22]

Data collection from focus groups and surveys

Focus groups

The focus groups will comprise up to eight participants, as recommended by best practice for this method[23] and will last between 90-120 minutes. The moderator will introduce the discussion topics, monitor the group dynamics to ensure views from all participants are adequately represented and to ensure all discussion topics are covered. A second moderator will take detailed notes of the discussion and help the moderator to keep to time. The focus groups will be recorded and transcribed verbatim.[24]

The topics of discussion will include:

(i) Understanding if and how social prescribing schemes are being utilised by primary care and how social prescribing activity is currently being recorded.

(ii) Understanding link worker-based models of social prescribing (including: estimation of investment in social prescribing schemes; estimation of number of link workers; referral process and pathways – e.g. who refers into the scheme; estimation of average amount of time link workers spend with patients; estimation of community groups referred to

and numbers of volunteers; nature of community groups referred to; estimation of number of personalised support plans co-produced with people receiving support)

(iii) Understanding if there a change in morale of primary care staff

(iv) Exploring views on the impact of these different models on patients (e.g. through measures like the Patient Activation Measure (PAM) and ONS wellbeing measure) and primary care (e.g. number of GP appointments, prescriptions for patients, number of secondary referrals).

(v) Exploring approaches that could be used to support primary care to improve data quality and recording of data related to social prescribing, including outcome and output metrics outlined in the NHS England Social Prescriptions COF.

Surveys

We will use the findings from the focus groups to develop an online survey to capture the degree of consensus with our focus group findings. The surveys will include statements for respondents to agree or disagree with. There will also be an opportunity for the respondents to explain why they agree or disagree with a statement.

Data management

Where available, the following output and outcome information derived from the social prescribing COF[17] will be analysed for the study:

Output metrics

- characteristics of people referred: age, disability, gender reassignment, marriage or civil partnership, pregnancy and maternity, race, religion or belief, sex, sexual orientation
- referral criteria such as Long Term Conditions or receipt of social care packages

Outcome metrics – Impact on patients and health and care system

- Patient Activation Measures (PAMs)
- ONS wellbeing measures
- GP consultations
- A&E attendance
- Hospital bed days
- Number of medication prescriptions

Data analysis

Statistical and modelling analysis

Descriptive statistics will be used to report the findings and will focus on two key domains:

Social prescription use: Use of social prescribing will be identified using the codes listed in Table 1 as well as through the use of a social prescribing ontology. We will explore the use of both approaches individually and in combination to identify the method that works best.

Social prescription impact: We will explore methods to determine the impact of social prescribing as follows-

- Identify individuals who have received a social prescription as well as the details of the social prescription(s) they have received if it is possible to extract this from the existing RCGP RSC data (e.g. frequency, adherence, type of social prescription)
    - Where available, identify any clinical conditions of the individuals referred and the clinical condition for which the referral was made (e.g. a walking group to help a person with type 2 diabetes lose weight or a lunch club for an individual experiencing bereavement)
    - Where available, identify the characteristics of people referred (see output metrics above)
        - Attempt to identify matched cohorts of patients with similar characteristics but who did not receive a social prescription
            - Where available, identify the outcomes (see outcome metrics above) for both cohorts of patients

The goal of these analyses will be to explore if the RCGP RSC can be used to accurately capture the use and impact of social prescribing.

Analysis of focus groups and surveys

QSR NVivo 11 and Microsoft Excel will be used to organise and analyse focus group and survey data.[25] For the focus group data, we will use Framework Analysis, a well-established approach to observe similarities, discrepancies and interrelationships among the data.[26] Framework Analysis consists of a five-step process including:[27]

(1) familiarisation: reading the transcripts, reflecting on the research question, and keeping notes of potential ideas and recurring concepts.

(2) identifying a thematic framework: using a priori knowledge of the literature as well as the concepts from the first step to create a framework/index to sort the new material into a descriptive list of concepts that will be refined to represent the diversity, centrality, and dynamics of participants' attitudes.

(3) indexing: systematically applying the framework to the data, using a numerical system that will link them directly to the index. A second analyst will also use the framework to test the transparency of the method and compare his/her assumptions with the first analyst's.

(4) charting: the indexes will be used to create thematic charts, which will include a refined summary of major subjects that will have emerged in order to provide a more abstract view of the data.

(5) mapping and interpretation: interpreting the data as a whole.

For the survey, summary statistics will be used to describe the results based on key themes interrogated in the survey. The outputs of the survey will be used to identify opportunities and barriers at multiple levels:

- Individual stakeholder level
- GP practice level
- Regional level

Patient and public involvement

No patients or public were involved in the development of the research question or design of this study but, where possible, the GP practices we engage with for this study will be asked if they have lay members who would be willing to anonymously comment on the focus group themes.

Project management

The feasibility study will be a collaborative project led by Dr Anant Jani and Professor Simon de Lusignan, with Professor de Lusignan serving as the Principal Investigator. RCGP and NHS England will be collaborators and will oversee the project in collaboration with the principal investigator. The research and information governance framework for RCGP RSC sits within the University of Surrey's formal frameworks for information and research governance. The project team is supported by IT services dedicated to the Faculty and to the Department of Clinical and Experimental Medicine. Our secure analysis servers are optimised for routine healthcare data processing, to provide faster deliveries for our projects.

Ethics and Dissemination

Ethics

For WP1, consent will not be required for these data and we will not process data for people where opt-out codes are present. The data will be pseudonymized and encrypted before uploading to the Clinical Informatics Research Group secure server. Personal data will not be identifiable. This study is

considered to be an ''Audit of current practice'' when tested against the Health Research Authority (HRA)/Medical Research Council (MRC) ''Is my study research'' tool and therefore does not require specific ethical approval.[28] Approval for use of the data was acquired from the RCGP RSC Study Approval Committee.

Data extractions will be conducted in accordance with the Clinical Informatics and Health Outcomes Research Group's standard operating procedures for data extraction, pseudonymisation, and transfer described previously.[29]

Pseudonymisation, the standard approach for protecting patient's privacy defined by the European Data Protection Supervisor (EDPS),[30] involves the removal of all personal identifiers from data – such as name, date of birth, etc. To minimise the risk of re-identification, all strong identifiers (in this study, NHS number) are removed and data is kept encrypted during transfer and is stored on a secure network that meets NHS Information Governance standards.[30] For this study we need, for example, to be able to link outcome and output metrics (see below) associated with the patient before and after receiving a social prescription. Pseudonymisation allows us to do this without knowing any of the strong personal identifiers of that individual. All data processing and analysis in the present proposed study will be conducted within the secure IT environment of the Clinical Informatics and Health Outcomes Research Group, at the University of Surrey. The information security policies and procedures of the Research Group have been approved by the NHS Digital as meeting the Data Security and Privacy (DSP) standards psuedonymising as close to sources as possible. If patients have opted out of record sharing, we will not analyse their data.

For WP2, the University of Surrey Self-Assessment for Governance and Ethics (SAGE) assessment was completed.[31] SAGE indicated that a further ethics and governance application was not necessary for our qualitative analyses.

Dissemination

The outputs from our research will highlight and capture findings linked to our four objectives, namely:

- An analysis of social prescribing use across the RCGP RSC
- An analysis of the NHS COF social prescribing codes versus the codes from our ontology
- An overview of approaches utilised to determine how the impact of social prescribing could be estimated from different analytical approaches
- An analysis highlighting the findings from our focus groups about different social prescribing models used by practitioners and their willingness to use routine data collection to improve data quality and the outcomes that could be delivered by social prescribing

The outputs from the research will be disseminated primarily through peer review papers in high impact journals within the domains of primary care and health and care systems. We will also present findings at relevant seminars and conferences.

Discussion

Our feasibility study aims to: report baseline levels of social prescription utilisation and the patients within practices who are provided social prescriptions; establish a social prescribing taxonomy/ontology that can capture social prescribing referrals and interventions made in primary care; establish what data can be made available to practices to highlight inter practice variation; to establish what data can be used to enable future evaluation of social prescribing; to explore

approaches to understand the contextual factors that will have influenced our quantitative findings and which can inform the design and development of a more effective taxonomy/ontology for social prescribing; and to ultimately help us understand and encourage adoption of social prescribing in primary care while improving data quality. For the quantitative analyses, we will focus on the specific subgroup of those who are homeless to better understand how they can be identified through the RCGP RSC and to explore whether we can identify the interventions they received and the outcomes delivered to them.

Below we outline several strengths of our study and as well as some limitations which we hope to overcome.

Strengths

The key strength of this feasibility study is that is uses an established and nationally representative sentinel network. The practices within the sentinel network are nationally representative and they provide access to a sample of real world evidence (RWE) data. Further to this, the large sample size of this representative dataset and the high-level data completeness of the data are particular strengths of the RCGP RSC dataset.

We think that the introduction of a standard methodology for adoption and delivery of social prescribing by GP practices could increase the chances of being able to show benefits. Furthermore, the recording of detailed information on social prescribing (including type, treatment duration, costs and outcomes) is also needed to facilitate the adoption and improvement in the use of social prescriptions. The practical and feasible approaches identified through our project could be adopted by NHS Digital and rolled out nationally across England, yielding information to improve our understanding of the current use and impact of social prescribing and also help to elucidate best

practice for social prescribing. Furthermore, our findings could also serve as a source of information for other countries looking to introduce social prescribing into their health and care systems.

Limitations

Though nationally representative, because GP practices participate on a voluntary basis, there is slight underrepresentation of practices with more deprived patients,[32] which means there may be some selection bias. Furthermore, identification of patient output and outcome metrics will be restricted by primary care clinical codes (i.e. Read, CTV3), which do not always align directly with the output and outcome metrics of interest. Finally, because of the limited number of people we can recruit for the focus groups and survey, the experiences of the primary care practitioners we recruit for WP2 will be limited and may not be able to capture the contextual factors experienced by the entire sentinel network.

We will report additional strengths and limitations identified while undertaking the study in the final manuscript.

Conclusion

This feasibility study will enable us to test approaches to understand the use and impact of social prescriptions. Once established, we plan on using our approaches to create a dashboard for GP practices to understand their use of social prescriptions in near real time.

Authors' contributions: AJ, HL, UH, LM, FF, II and SdL were involved in the design of the study protocol; AJ, HL, VTB and SdL were involved in writing and reviewing the manuscript.

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Competing interests statement: None of the authors have a competing interest.

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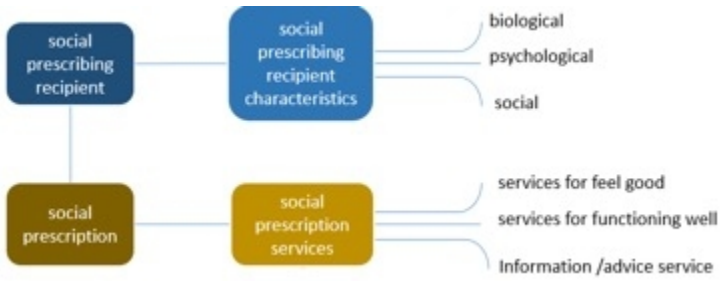
Figure Legends

Figure 1: Upper level design of the social prescribing ontology



Upper level design of the social prescribing ontology

128x48mm (72 x 72 DPI)

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The use and impact of social prescribing: A mixed methods feasibility study protocol

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The use and impact of social prescribing: A mixed methods feasibility study protocol

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Abstract

Introduction

Social prescribing aims to address social determinants of health, which account for 80-90% of health outcomes, but the evidence base behind it is limited due to a lack of data linking social prescribing activity and outcomes.

Methods and analysis

The objective of the quantitative component of this feasibility study is to identify the characteristics of individuals who receive social prescriptions and describe the use and estimate the impact of social prescribing; the latter will be done on a homeless subgroup. We will utilise the Royal College of General Practitioners (RCGP) Research and Surveillance Centre (RSC) primary care sentinel network, whose general practices cover a population of over 4,000,000 patients. Social prescribing data will be extracted on all recorded patients for five years up to 31 January 2020.

The objective for the qualitative component of the study is to explore approaches to understand the contextual factors that will have influenced our quantitative findings to identify mechanisms to encourage adoption of social prescribing in primary care while improving data quality. It will comprise up to three 90-120 minute advisory group meetings for six to eight participants. Participants will be recruited based on their experience of delivering primary care within Oxfordshire and Surrey. The advisory group outputs will be analysed using framework analysis and statements derived from the advisory group meetings will be used to create a survey instrument consisting of statements that surveyees can agree or disagree with.

Ethics and dissemination

All RCGP RSC data are pseudonymised at the point of data extraction. No personally identifiable data are required for this investigation. This protocol follows the Good Reporting of a Mixed Methods Study (GRAMMS) checklist. The study results will be published in a peer-reviewed journal and the dataset will be available to other researchers.

Summary: Strengths and limitations of this study

- A key strength of this feasibility study is that it uses an established and nationally representative sentinel network, The Royal College of General Practitioners Research Surveillance Centre (RCGP RSC), which provides access to a large sample of real world evidence (RWE) data that has a high-level of data completeness.
- The practical and feasible approaches identified through our project could be adopted by NHS Digital and rolled out nationally across England, yielding information to improve our understanding of the current use and impact of social prescribing and also help to elucidate best practice for social prescribing.
- A limitation is that though nationally representative, because GP practices participate on a voluntary basis, there is slight underrepresentation of practices with more deprived patients, which means there may be some selection bias.
- Another limitation is that the identification of patient output and outcome metrics will be restricted by primary care clinical codes (i.e. Read, CTV3), which do not always align directly with the output and outcome metrics of interest.

Introduction

It is well established that 80-90% of health outcomes are linked social determinants of health including health-related behaviours, socioeconomic and environmental factors.[1]:

"Societies that enable all citizens to play a full and useful role in the social, economic and cultural life of their society will be healthier than those where people face insecurity, exclusion and deprivation."[2]

Since the 19th century there have been initiatives such as social medicine[3] and community health[4] designed to address these social determinants of health at individual and community levels. There are subtle differences between these initiatives but they all largely focus on needs that remain unaddressed in traditional biomedical models.

Social prescribing is a more recent initiative that has been developed to address social determinants of health. Social prescriptions have been used for several years across European countries. NHS England defines social prescribing as "a way of linking patients in primary care with sources of support within the community to help improve their health and well-being."[5] Social prescriptions are varied and include activities focused on health, education, skills development, sports and leisure/art activities. If utilised well, they can help to deliver several benefits to individuals and health and care systems including[5]: giving a route for health and care systems to address social determinants of health; promoting self-care; support job creation by funnelling resources to local Voluntary, Community and Social Enterprise (VCSE) organisations; building stronger communities; reducing service utilisation including GP appointments, secondary care referrals and accident and emergency attendances.

A wide variety of approaches are included within the umbrella of social prescriptions. A 2017 systematic review[6] indicated that while there have been 15 studies into the effects of social prescriptions, none were of sufficient quality to allow a strong recommendation for their use. Since 2017, studies using quantitative and qualitative methods have been done to determine the impact of social prescribing but most of these studies have had small sample sizes that may not have been representative of the full breadth of individuals receiving social prescriptions.[7,8] More robust evidence is required to strategically inform the development of social prescriptions and to establish social prescriptions as an evidence-based intervention that clinicians feel comfortable in regularly using.

A major barrier to the generation of evidence that could facilitate evaluation of social prescribing is the lack of data on what social prescribing activity is taking place and the outcomes delivered for people taking up social prescribing. This stems from the lack of standardisation of recording, a limited list of formal codes associated with social prescribing as well as likely variation in the uptake, use and quality of data recorded by clinicians.

To address these barriers and overcome some of the challenges faced with other studies, we propose a feasibility study utilising a large nationally representative dataset of English general practice to enable us to test approaches to understand the use and impact of social prescriptions. English general practice is an ideal location to assess the feasibility of measuring the uptake and impact of social prescribing. English general practices have a registration-based system (one patient registered with a single practice) and are highly computerised.[9] Computerised medical record (CMR) systems have been widely used for measuring quality and outcomes in general practice. Where data are likely to be complex, as we anticipate in this study, ontologies provide a formal method to specify how we will measure the uptake and impact of social prescribing.[10,11]

We can readily access a nationally representative sample of data through the Royal College of General Practitioners Research Surveillance Centre (RCGP RSC) sentinel network. The RSC is one of the longest established primary care sentinel networks in Europe, currently consisting of over 1000 general research ready practices and covering a population of over 4,000,000 patients, who are broadly representative of the English population.[12,13] The RCGP RSC's dataset consists of twice weekly pseudonymised coded extracts of general practice electronic health record data from all major clinical systems.[12, 13] Finally, England is also an ideal location for this feasibility study because there is a strong national push to promote social prescribing as a mechanism to improve patient and population outcomes while optimising resource utilisation (Box 1).

Box 1: Social prescribing in the English context

Social prescribing is part of NHS England's commitment, as highlighted in the NHS England Long Term Plan[14], to make personalised care business as usual across the health and care system. In January 2019, as part of its Universal Personalised Care Plan[15], NHS England announced a major expansion of social prescribing, as one of six components of the comprehensive model of personalised care. NHS England has produced a standard model, the link worker model, of social prescribing in partnership with stakeholders and it has created reference guidance[16, 17] that provides advice on implementing this link worker model.

To begin to address the gap in the evidence base around social prescriptions, NHS England worked with commissioners, practitioners, providers, evaluators and other stakeholder groups to create a consensus Common Outcomes Framework (COF)[18] on what outcomes and outputs should be measured to demonstrate the impact of social prescribing. Feedback from a wide range of stakeholders (including social prescribing connector schemes, primary care staff, local authorities, local NHS, voluntary community and social enterprises (VCSE) organisations, academics, researchers, public health leaders and other government agencies) was collected to inform the COF. The reference guide encourages the use of SNOMED codes to record social prescribing in patient records as well as the Patient Activation Measure and the ONS Wellbeing Measure to capture outcomes being delivered to patients.

Aim

This feasibility study will enable us to test approaches to understand the use and impact of social prescriptions.

Objectives

Our objectives encompass the exploration of the development of measurement tools, measuring use and impacts as well as feeding back on variation between practices which may be the result of data quality as well as variation in care.

- To identify the characteristics of the individuals who are provided, or decline social prescriptions and the patient and health service outcomes related to their social prescription, the latter of which will be done on a subgroup of individuals recorded as being homeless
- To develop a taxonomy and ontology to capture social prescribing referrals and interventions made in primary care
- To report inter practice variation and to explore opportunities to improve data quality and the quality of social prescribing in primary care.
- To explore the feasibility and willingness of primary care practitioners, including general practitioners and link workers, to routinely collect data (e.g. uptake, service use, health/wellbeing measures) and to use it to evaluate impact of the social prescribing link worker model.

Methods and Analysis

Study design

This feasibility study will enable us to test approaches to understand the use and impact of social prescriptions. Our study follows the Good Reporting of a Mixed Methods Study (GRAMMS) checklist.[19] The study protocol combines qualitative and quantitative methods and will explore how the RCGP RSC can be used to establish the baseline of existing data, understand outcomes delivered and to explore approaches that can be used to understand and influence how link-worker based models are being implemented in English general practices.

The quantitative methods (WP1) will utilise the RCGP RSC database to test approaches to identify the use and impact of social prescribing.[12, 13] The qualitative methods (WP2) comprise advisory group meetings that will be carried out with individuals with experience of primary care, which will be used to inform the design of a survey. WP2 will help us explore approaches to understand the contextual factors that will have influenced our quantitative findings with the goal of identifying mechanisms to encourage adoption of social prescribing in primary care while improving data quality.

Study setting and sample

For WP1, we will use the sample of over 1000 nationally representative GP practices contained within the RCGP RSC.[12,13] For WP2, we will approach and recruit people in person and through existing departmental contacts within the University of Oxford and University of Surrey Departments of Primary Care as well as through our contacts within primary care networks in Oxfordshire and Surrey, where members of our study team work. Individuals will be recruited if they have any experience working within primary care (which will include general practitioners, practice nurses, allied health professionals and link workers) and are within travelling distance of the University of

Oxford or the University of Surrey to attend advisory group meetings on our premises or via a virtual platform if circumstances do not permit face to face meetings (e.g. because of COVID-19).

Data Collection and Data Management

Data collection from volunteer RCGP RSC practices

For this project we propose to use the RCGP RSC sentinel network. The RCGP RSC was established in 1967 and comprises Computerized Medical Records (CMRs) of pseudonymised data received from over 1000 primary care practices across England, covering a population of over 4,000,000 currently registered patients. [12, 13]

RCGP RSC data is registration based, so that every patient is registered with only one practice at a time with each patient having a unique patient identifier, the National Health Service (NHS) number. The NHS number enables the transition of a patient's medical record to another practice when he/she moves to a different location and for the patient's data to link with secondary care and other datasets.[9] Although within this study we will used pseudonymised NHS number throughout following RCGP RSC processes.

CMR data in UK primary care are captured primarily within two Electronic Health Record (EHR) systems which utilise Read and CTV3 codes; both systems, however, will be transitioning to SNOMED CT. Read, CTV3 and SNOMED CT codes are used to collate data for primary care including diagnoses, processes of care, prescriptions, and results from laboratory-based data.

We will extract and analyse coded data from primary care practices for five years up to 31 January 2020. The data extract will include all instances of use of the codes highlighted in Table 1, which were derived from the NHS Outcomes Framework for social prescribing.[18]

Table 1: NHS Common Outcomes Framework (COF) for Social Prescribing codes. *(NB: codes in italics are not in the COF but will be included in the data extract)*

Readv2	**CTV3**	**SNOMED CT**	**Term description**
9NSE.	9NSE. XaaEA	871691000000100	Social prescribing offered (finding)
8IEp.	8IEp. XaaEB	871711000000103	Social prescribing declined (situation)
8T09.	8T09. XaaEC	871731000000106	Referral to social prescribing service (procedure)
	XagOR	*1084281000000109*	*Signposting to social prescribing service (procedure)*
8BAf.	*8BAf. XaQvz*	*515721000000104*	*Social prescribing for mental health (regime/therapy)*

We will also explore other ways of capturing information on the use of social prescribing through the use of a social prescribing ontology. Ontologies are frequently used in health care for modelling the semantics of medical concepts and to facilitate exchange of medical data between different health care service providers.[20] The social prescribing ontology will be underpinned by a taxonomy based on concepts associated with social prescribing practices and the wellbeing of social prescribing recipients.

The primary purpose of the taxonomy and ontology is to harmonise data sources containing measures and indicators of social prescribing across various parts of the health system (Figure 1).

The taxonomy will cover several key concepts derived from the five ways to wellbeing model proposed by the New Economics Foundation[21] as well as Wilkinson and Marmot's[2] work on social factors related to health. The concepts will include: social gradient, stress, early life, social exclusion, work/unemployment, social support, addiction, food, transport, ethnic inequalities, health inequalities at older ages, neighbourhood housing and health, sexual behaviours). The ontology will describe these key concepts used within social prescribing. The social prescribing recipient will have one of more characteristics that would qualify them as a social prescribing recipient. In the ontology, these characteristics will be organised according to the biopsychosocial model.[22] The health care provider will consider these characteristics and decide if a social prescription will be beneficial. The social prescription will enable the social prescribing recipient to access one or more social prescription services. In addition to the services relevant to these concepts, we have also included an additional category, "information/advice service" which includes a range of services that do not fit directly within the scope of original conceptual model of wellbeing or social factors related to health, but have an indirect effect on wellbeing.

The social prescribing ontology has been implemented according to the web ontology language (OWL) within the Protégé ontology development environment and hosted on the BioPortal ontology repository.[23]

Advisory groups and surveys

Advisory groups

The advisory groups will comprise up to eight participants and will adopt methods and best practice normally used for focus groups[24] and will last between 90-120 minutes. The moderator will introduce the discussion topics, monitor the group dynamics to ensure views from all participants are adequately represented and to ensure all discussion topics are covered. A second moderator will take detailed notes of the discussion and help the moderator to keep to time. The advisory groups will be recorded and transcribed verbatim.[25]

The discussion topics were agreed in consultation with the NHS England personalised care team working on social prescribing. The key topics will include:

(i) Understanding if and how social prescribing schemes are being utilised by primary care and how social prescribing activity is currently being recorded.

(ii) Understanding link worker-based models of social prescribing (including: estimation of investment in social prescribing schemes; estimation of number of link workers; referral process and pathways – e.g. who refers into the scheme; estimation of average amount of time link workers spend with patients; estimation of community groups referred to and numbers of volunteers; nature of community groups referred to; estimation of number of personalised support plans co-produced with people receiving support)

(iii) Understanding if there a change in morale of primary care staff

(iv) Exploring views on the impact of these different models on patients (e.g. through measures like the Patient Activation Measure (PAM) and ONS wellbeing measure) and primary care (e.g. number of GP appointments, prescriptions for patients, number of secondary referrals).

(v) Exploring approaches that could be used to support primary care to improve data quality and recording of data related to social prescribing, including outcome and output metrics outlined in the NHS England Social Prescriptions COF.

Surveys

We will use the findings from the advisory groups to develop an online survey to capture the degree of consensus with our advisory group findings. The surveys will include statements for respondents to agree or disagree with. There will also be an opportunity for the respondents to explain why they agree or disagree with a statement.

Data management

Where available, the following output and outcome information derived from the social prescribing COF[18] will be analysed for the study:

Output metrics

- characteristics of people referred: age, disability, gender reassignment, marriage or civil partnership, pregnancy and maternity, race, religion or belief, sex, sexual orientation
- referral criteria such as Long Term Conditions or receipt of social care packages

Outcome metrics – Impact on patients and health and care system

- Patient Activation Measures (PAMs)
- ONS wellbeing measures
- GP consultations
- A&E attendance
- Hospital bed days

- Number of medication prescriptions

Data analysis

Statistical and modelling analysis

Descriptive statistics will be used to report the findings and will focus on two key domains:

Social prescription use: Use of social prescribing will be identified using the codes listed in Table 1 as well as through the use of a social prescribing ontology. We will explore the use of both approaches individually and in combination to identify the method that works best.

Social prescription impact: We will explore methods to determine the impact of social prescribing by focusing on individuals recorded as being homeless:

- We will first identify individuals who have received a social prescription and who are recorded as being homeless. We will then explore methods to determine the details of the social prescription(s) they have received from the existing RCGP RSC data (e.g. frequency, adherence, type of social prescription)
    - Where available, we will attempt identify any additional clinical conditions of the individuals referred
    - Where available, we will attempt to identify the characteristics of people referred (see output metrics above)
        - We will attempt to identify matched cohorts of homeless people with similar characteristics but who did not receive a social prescription

- Where available, identify the outcomes (see outcome metrics above) for both cohorts of homeless people

The goal of these analyses will be to explore if the RCGP RSC can be used to accurately capture the use and impact of social prescribing.

Analysis of advisory groups

QSR NVivo 11 and Microsoft Excel will be used to organise and analyse advisory group meeting outputs.[26] We will use Framework Analysis, a well-established approach to observe similarities, discrepancies and interrelationships among the data.[27] Framework Analysis consists of a five-step process including:[28]

(1) familiarisation: reading the transcripts, reflecting on the research question, and keeping notes of potential ideas and recurring concepts.

(2) identifying a thematic framework: using a priori knowledge of the literature as well as the concepts from the first step to create a framework/index to sort the new material into a descriptive list of concepts that will be refined to represent the diversity, centrality, and dynamics of participants' attitudes.

(3) indexing: systematically applying the framework to the data, using a numerical system that will link them directly to the index. A second analyst will also use the framework to test the transparency of the method and compare his/her assumptions with the first analyst's.

(4) charting: the indexes will be used to create thematic charts, which will include a refined summary of major subjects that will have emerged in order to provide a more abstract view of the data.

(5) mapping and interpretation: interpreting the data as a whole.

For the survey, summary statistics will be used to describe the results based on key themes interrogated in the survey. The outputs of the survey will be used to identify opportunities and barriers at multiple levels:

- Individual stakeholder level
- GP practice level
- Regional level

Survey results will be used to inform the survey design for a larger and subsequent study.

Patient and public involvement

No patients or public were involved in the development of the research question or design of this study. For the advisory group meetings, the GP practices we engage with for this study will be asked to invite patients who would be willing to serve on our advisory group and/or anonymously comment on the advisory group themes, as per INVOLVE guidelines.[29]

Project management

The feasibility study will be a collaborative project led by Dr Anant Jani and Professor Simon de Lusignan, with Professor de Lusignan serving as the Principal Investigator. RCGP and NHS England will be collaborators and will oversee the project in collaboration with the principal investigator. The research and information governance framework for RCGP RSC sits within the University of Surrey's formal frameworks for information and research governance. The project team is supported by IT services dedicated to the Faculty and to the Department of Clinical and Experimental Medicine. Our secure analysis servers are optimised for routine healthcare data processing, to provide faster deliveries for our projects.

Ethics and Dissemination

Ethics

For WP1, consent will not be required for these data and we will not process data for people where opt-out codes are present, which is currently 2.74%.[30] The data will be pseudonymized and encrypted before uploading to the Clinical Informatics Research Group secure server. Personal data will not be identifiable. This study is considered to be an ''Audit of current practice'' when tested against the Health Research Authority (HRA)/Medical Research Council (MRC) ''Is my study research'' tool and therefore does not require specific ethical approval.[31] Approval for use of the data was acquired from the RCGP RSC Study Approval Committee.

Data extractions will be conducted in accordance with the Clinical Informatics and Health Outcomes Research Group's standard operating procedures for data extraction, pseudonymisation, and transfer described previously.[32]

Pseudonymisation, the standard approach for protecting patient's privacy defined by the European Data Protection Supervisor (EDPS),[33] involves the removal of all personal identifiers from data – such as name, date of birth, etc. To minimise the risk of re-identification, all strong identifiers (in this study, NHS number) are removed and data is kept encrypted during transfer and is stored on a secure network that meets NHS Information Governance standards.[33] For this study we need, for example, to be able to link outcome and output metrics (see below) associated with the patient before and after receiving a social prescription. Pseudonymisation allows us to do this without knowing any of the strong personal identifiers of that individual. All data processing and analysis in the present proposed study will be conducted within the secure IT environment of the Clinical Informatics and Health Outcomes Research Group, at the University of Surrey. The information security policies and procedures of the Research Group have been approved by the NHS Digital as meeting the Data Security and Privacy (DSP) standards psuedonymising as close to sources as possible. If patients have opted out of record sharing, we will not analyse their data.

For WP2 where participants in the advisory group meetings are serving as advisors rather than research participants, University of Surrey Self-Assessment for Governance and Ethics (SAGE)[34] assessment indicated that a further ethics and governance application was not necessary for the analyses linked to this part of the feasibility study.

Dissemination

The outputs from our research will highlight and capture findings linked to our four objectives, namely:

- An analysis of social prescribing use across the RCGP RSC
- An analysis of the NHS COF social prescribing codes versus the codes from our ontology

- An overview of approaches utilised to determine how the impact of social prescribing could be estimated from different analytical approaches
- An analysis highlighting the findings from our advisory group meetings about different social prescribing models used by practitioners and their willingness to use routine data collection to improve data quality and the outcomes that could be delivered by social prescribing

The outputs from the research will be disseminated primarily through peer reviewed papers in high impact journals within the domains of primary care and health and care systems. We will also present findings at relevant seminars and conferences.

Discussion

Our feasibility study aims to enable us to test approaches to understand the use and impact of social prescriptions. We look to achieve this aim through several objectives including: reporting baseline levels of social prescription utilisation and the patients within practices who are provided social prescriptions; establishing a social prescribing taxonomy/ontology that can capture social prescribing referrals and interventions made in primary care; establishing what data can be made available to practices to highlight inter practice variation; establishing what data can be used to enable future evaluation of social prescribing; exploring approaches to understand the contextual factors that will have influenced our quantitative findings and which can inform the design and development of a more effective taxonomy/ontology for social prescribing; and ultimately helping us understand and encourage adoption of social prescribing in primary care while improving data quality. For the quantitative analyses, we will focus on the specific subgroup of those who are homeless to better understand how they can be identified through the RCGP RSC and to explore whether we can identify the interventions they received and the outcomes delivered to them.

Below we outline several strengths of our study and as well as some limitations which we hope to overcome.

Strengths

The key strength of this feasibility study is that is uses an established and nationally representative sentinel network. The practices within the sentinel network are nationally representative and they provide access to a sample of real world evidence (RWE) data to quantify current national use of social prescribing. Further to this, the large sample size of this representative dataset and the high-level data completeness of the data are particular strengths of the RCGP RSC dataset.

We think that the introduction of a standard methodology for adoption and delivery of social prescribing by GP practices could increase the chances of being able to show benefits. Furthermore, the recording of detailed information on social prescribing (including type, treatment duration, costs and outcomes) is also needed to facilitate the adoption and improvement in the use of social prescriptions. The practical and feasible approaches identified through our project could be adopted by NHS Digital and rolled out nationally across England, yielding information to improve our understanding of the current use and impact of social prescribing and also help to elucidate best practice for social prescribing. Furthermore, our findings could also serve as a source of information for other countries looking to introduce social prescribing into their health and care systems.

Limitations

Though nationally representative, because GP practices participate on a voluntary basis, there is slight underrepresentation of practices with more deprived patients,[13] which means there may be some selection bias. Furthermore, identification of patient output and outcome metrics will be restricted by primary care clinical codes (i.e. Read, CTV3), which do not always align directly with the output and outcome metrics of interest. Finally, because of the limited number of people we can recruit for the advisory group meetings and survey, the experiences of the primary care practitioners we recruit for WP2 will be limited and may not be able to capture the contextual factors experienced by the entire sentinel network.

We will report additional strengths and limitations identified while undertaking the study in the final manuscript.

Conclusion

This feasibility study will enable us to test approaches to understand the use and impact of social prescriptions. Once established, we plan on using our approaches to create a dashboard for GP practices to understand their use of social prescriptions in near real time.

Authors' contributions: AJ, HL, UH, LM, FF, IY and SdeL were involved in the design of the study protocol; AJ, HL, LM, VTB and SdL were involved in writing and reviewing the manuscript.

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Competing interests statement: None of the authors have a competing interest.

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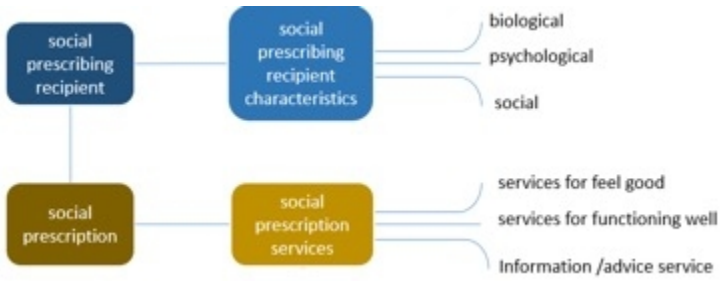
Figure Legends

Figure 1: Upper level design of the social prescribing ontology



Upper level design of the social prescribing ontology

128x48mm (72 x 72 DPI)

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The use and impact of social prescribing: A mixed methods feasibility study protocol

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The use and impact of social prescribing: A mixed methods feasibility study protocol

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Abstract

Introduction

Social prescribing aims to address social determinants of health, which account for 80-90% of health outcomes, but the evidence base behind it is limited due to a lack of data linking social prescribing activity and outcomes.

Methods and analysis

The objective of the quantitative component of this feasibility study is to identify the characteristics of individuals who receive social prescriptions and describe the use and estimate the impact of social prescribing; the latter will be done on a homeless subgroup. We will utilise the Oxford Royal College of General Practitioners (RCGP) Research and Surveillance Centre (RSC) primary care sentinel network, whose general practices cover a population of over 4,000,000 patients. Social prescribing data will be extracted on all recorded patients for five years up to 31 January 2020.

The objective for the qualitative component of the study is to explore approaches to understand the contextual factors that will have influenced our quantitative findings to identify mechanisms to encourage adoption of social prescribing in primary care while improving data quality. It will comprise up to three 90-120 minute advisory group meetings for six to eight participants. Participants will be recruited based on their experience of delivering primary care within Oxfordshire and Surrey. The advisory group outputs will be analysed using framework analysis and will be used to create a survey instrument consisting of statements that surveyees, who will consist of primary care practitioners within the RCGP RSC, can agree or disagree with.

Ethics and dissemination

All RCGP RSC data are pseudonymised at the point of data extraction. No personally identifiable data are required for this investigation. This protocol follows the Good Reporting of a Mixed Methods Study (GRAMMS) checklist. The study results will be published in a peer-reviewed journal and the dataset will be available to other researchers.

Summary: Strengths and limitations of this study

- A key strength of this feasibility study is that it uses an established and nationally representative sentinel network, The Royal College of General Practitioners Research Surveillance Centre (RCGP RSC), which provides access to a large sample of real world evidence (RWE) data that has a high-level of data completeness.
- The practical and feasible approaches identified through our project could be adopted by NHS Digital and rolled out nationally across England, yielding information to improve our understanding of the current use and impact of social prescribing and also help to elucidate best practice for social prescribing.
- A limitation is that though nationally representative, because GP practices participate on a voluntary basis, there is slight underrepresentation of practices with more deprived patients, which means there may be some selection bias.
- Another limitation is that the identification of patient output and outcome metrics will be restricted by primary care clinical codes (i.e. Read, CTV3), which do not always align directly with the output and outcome metrics of interest.

Introduction

It is well established that 80-90% of health outcomes are linked social determinants of health including health-related behaviours, socioeconomic and environmental factors.[1]:

"Societies that enable all citizens to play a full and useful role in the social, economic and cultural life of their society will be healthier than those where people face insecurity, exclusion and deprivation."[2]

Since the 19th century there have been initiatives such as social medicine[3] and community health[4] designed to address these social determinants of health at individual and community levels. There are subtle differences between these initiatives but they all largely focus on needs that remain unaddressed in traditional biomedical models.

Social prescribing is a more recent initiative that has been developed to address social determinants of health. Social prescriptions have been used for several years across European countries. NHS England defines social prescribing as "a way of linking patients in primary care with sources of support within the community to help improve their health and well-being."[5] Social prescriptions are varied and include activities focused on health, education, skills development, sports and leisure/art activities. If utilised well, they can help to deliver several benefits to individuals and health and care systems including[5]: giving a route for health and care systems to address social determinants of health; promoting self-care; support job creation by funnelling resources to local Voluntary, Community and Social Enterprise (VCSE) organisations; building stronger communities; reducing service utilisation including GP appointments, secondary care referrals and accident and emergency attendances.

A wide variety of approaches are included within the umbrella of social prescriptions. A 2017 systematic review[6] indicated that while there have been 15 studies into the effects of social prescriptions, none were of sufficient quality to allow a strong recommendation for their use. Since 2017, studies using quantitative and qualitative methods have been done to determine the impact of social prescribing but most of these studies have had small sample sizes that may not have been representative of the full breadth of individuals receiving social prescriptions.[7,8] More robust evidence is required to strategically inform the development of social prescriptions and to establish social prescriptions as an evidence-based intervention that clinicians feel comfortable in regularly using.

A major barrier to the generation of evidence that could facilitate evaluation of social prescribing is the lack of data on what social prescribing activity is taking place and the outcomes delivered for people taking up social prescribing. This stems from the lack of standardisation of recording, a limited list of formal codes associated with social prescribing as well as likely variation in the uptake, use and quality of data recorded by clinicians.

To address these barriers and overcome some of the challenges faced with other studies, we propose a feasibility study utilising a large nationally representative dataset of English general practice to enable us to test approaches to understand the use and impact of social prescriptions. English general practice is an ideal location to assess the feasibility of measuring the uptake and impact of social prescribing. English general practices have a registration-based system (one patient registered with a single practice) and are highly computerised.[9] Computerised medical record (CMR) systems have been widely used for measuring quality and outcomes in general practice. Where data are likely to be complex, as we anticipate in this study, ontologies provide a formal method to specify how we will measure the uptake and impact of social prescribing.[10,11]

We can readily access a nationally representative sample of data through the Oxford Royal College of General Practitioners Research Surveillance Centre (RCGP RSC) sentinel network. The RSC is one of the longest established primary care sentinel networks in Europe, currently consisting of over 1000 general research ready practices and covering a population of over 4,000,000 patients, who are broadly representative of the English population.[12,13] The RCGP RSC's dataset consists of twice weekly pseudonymised coded extracts of general practice electronic health record data from all major clinical systems.[12, 13] Finally, England is also an ideal location for this feasibility study because there is a strong national push to promote social prescribing as a mechanism to improve patient and population outcomes while optimising resource utilisation (Box 1).

Box 1: Social prescribing in the English context

Social prescribing is part of NHS England's commitment, as highlighted in the NHS England Long Term Plan[14], to make personalised care business as usual across the health and care system. In January 2019, as part of its Universal Personalised Care Plan[15], NHS England announced a major expansion of social prescribing, as one of six components of the comprehensive model of personalised care. NHS England has produced a standard model, the link worker model, of social prescribing in partnership with stakeholders and it has created reference guidance[16, 17] that provides advice on implementing this link worker model.

To begin to address the gap in the evidence base around social prescriptions, NHS England worked with commissioners, practitioners, providers, evaluators and other stakeholder groups to create a consensus Common Outcomes Framework (COF)[18] on what outcomes and outputs should be measured to demonstrate the impact of social prescribing. Feedback from a wide range of stakeholders (including social prescribing connector schemes, primary care staff, local authorities, local NHS, voluntary community and social enterprises (VCSE) organisations, academics, researchers, public health leaders and other government agencies) was collected to inform the COF. The reference guide encourages the use of SNOMED codes to record social prescribing in patient records as well as the Patient Activation Measure and the ONS Wellbeing Measure to capture outcomes being delivered to patients.

Aim

This feasibility study will enable us to test approaches to understand the use and impact of social prescriptions.

Objectives

Our objectives encompass the exploration of the development of measurement tools, measuring use and impacts as well as feeding back on variation between practices which may be the result of data quality as well as variation in care.

- To identify the characteristics of the individuals who are provided, or decline social prescriptions and the patient and health service outcomes related to their social prescription, the latter of which will be done on a subgroup of individuals recorded as being homeless
- To develop a taxonomy and ontology to capture social prescribing referrals and interventions made in primary care
- To report inter practice variation and to explore opportunities to improve data quality and the quality of social prescribing in primary care.
- To explore the feasibility and willingness of primary care practitioners, including general practitioners and link workers, to routinely collect data (e.g. uptake, service use, health/wellbeing measures) and to use it to evaluate impact of the social prescribing link worker model.

Methods and Analysis

Study design

This feasibility study will enable us to test approaches to understand the use and impact of social prescriptions. Our study follows the Good Reporting of a Mixed Methods Study (GRAMMS) checklist.[19] The study protocol combines qualitative and quantitative methods and will explore how the RCGP RSC can be used to establish the baseline of existing data, understand outcomes delivered and to explore approaches that can be used to understand and influence how link-worker based models are being implemented in English general practices.

The quantitative methods (WP1) will utilise the RCGP RSC database to test approaches to identify the use and impact of social prescribing.[12, 13] The qualitative methods (WP2) comprise advisory group meetings that will be carried out with individuals with experience of primary care, which will be used to inform the design of a survey that will be disseminated to a wider group of primary care practitioners within the RCGP RSC. WP2 will help us explore approaches to understand the contextual factors that will have influenced our quantitative findings with the goal of identifying mechanisms to encourage adoption of social prescribing in primary care while improving data quality.

Study setting and sample

For WP1, we will use the sample of over 1000 nationally representative GP practices contained within the RCGP RSC.[12,13] For WP2, we will approach and recruit people in person and through existing departmental contacts within the University of Oxford and University of Surrey Departments of Primary Care as well as through our contacts within primary care networks in Oxfordshire and Surrey, where members of our study team work. Individuals will be recruited if they have any experience working within primary care (which will include general practitioners, practice nurses, allied health professionals and link workers) and are within travelling distance of the University of

Oxford or the University of Surrey to attend advisory group meetings on our premises or via a virtual platform if circumstances do not permit face to face meetings (e.g. because of COVID-19).

Data Collection and Data Management

Data collection from volunteer RCGP RSC practices

For this project we propose to use the RCGP RSC sentinel network. The RCGP RSC was established in 1967 and comprises Computerized Medical Records (CMRs) of pseudonymised data received from over 1000 primary care practices across England, covering a population of over 4,000,000 currently registered patients. [12, 13]

RCGP RSC data is registration based, so that every patient is registered with only one practice at a time with each patient having a unique patient identifier, the National Health Service (NHS) number. The NHS number enables the transition of a patient's medical record to another practice when he/she moves to a different location and for the patient's data to link with secondary care and other datasets.[9] Although within this study we will used pseudonymised NHS number throughout following RCGP RSC processes.

CMR data in UK primary care are captured primarily within two Electronic Health Record (EHR) systems which utilise Read and CTV3 codes; both systems, however, will be transitioning to SNOMED CT. Read, CTV3 and SNOMED CT codes are used to collate data for primary care including diagnoses, processes of care, prescriptions, and results from laboratory-based data.

We will extract and analyse coded data from primary care practices for five years up to 31 January 2020. The data extract will include all instances of use of the codes highlighted in Table 1, which were derived from the NHS Outcomes Framework for social prescribing.[18]

Table 1: NHS Common Outcomes Framework (COF) for Social Prescribing codes. *(NB: codes in italics are not in the COF but will be included in the data extract)*

Readv2	**CTV3**	**SNOMED CT**	**Term description**
9NSE.	9NSE. XaaEA	871691000000100	Social prescribing offered (finding)
8IEp.	8IEp. XaaEB	871711000000103	Social prescribing declined (situation)
8T09.	8T09. XaaEC	871731000000106	Referral to social prescribing service (procedure)
	XagOR	*1084281000000109*	*Signposting to social prescribing service (procedure)*
8BAf.	*8BAf. XaQvz*	*515721000000104*	*Social prescribing for mental health (regime/therapy)*

We will also explore other ways of capturing information on the use of social prescribing through the use of a social prescribing ontology. Ontologies are frequently used in health care for modelling the semantics of medical concepts and to facilitate exchange of medical data between different health care service providers.[20] The social prescribing ontology will be underpinned by a taxonomy based on concepts associated with social prescribing practices and the wellbeing of social prescribing recipients.

The primary purpose of the taxonomy and ontology is to harmonise data sources containing measures and indicators of social prescribing across various parts of the health system (Figure 1).

The taxonomy will cover several key concepts derived from the five ways to wellbeing model proposed by the New Economics Foundation[21] as well as Wilkinson and Marmot's[2] work on social factors related to health. The concepts will include: social gradient, stress, early life, social exclusion, work/unemployment, social support, addiction, food, transport, ethnic inequalities, health inequalities at older ages, neighbourhood housing and health, sexual behaviours). The ontology will describe these key concepts used within social prescribing. The social prescribing recipient will have one of more characteristics that would qualify them as a social prescribing recipient. In the ontology, these characteristics will be organised according to the biopsychosocial model.[22] The health care provider will consider these characteristics and decide if a social prescription will be beneficial. The social prescription will enable the social prescribing recipient to access one or more social prescription services. In addition to the services relevant to these concepts, we have also included an additional category, "information/advice service" which includes a range of services that do not fit directly within the scope of original conceptual model of wellbeing or social factors related to health, but have an indirect effect on wellbeing.

The social prescribing ontology has been implemented according to the web ontology language (OWL) within the Protégé ontology development environment and hosted on the BioPortal ontology repository.[23]

Advisory groups and surveys

Advisory groups

The advisory groups will comprise up to eight participants and will adopt methods and best practice normally used for focus groups[24] and will last between 90-120 minutes. The moderator will introduce the discussion topics, monitor the group dynamics to ensure views from all participants are adequately represented and to ensure all discussion topics are covered. A second moderator will take detailed notes of the discussion and help the moderator to keep to time. The advisory groups will be recorded and transcribed verbatim.[25]

The discussion topics were agreed in consultation with the NHS England personalised care team working on social prescribing. The key topics will include:

(i) Understanding if and how social prescribing schemes are being utilised by primary care and how social prescribing activity is currently being recorded.

(ii) Understanding link worker-based models of social prescribing (including: estimation of investment in social prescribing schemes; estimation of number of link workers; referral process and pathways – e.g. who refers into the scheme; estimation of average amount of time link workers spend with patients; estimation of community groups referred to and numbers of volunteers; nature of community groups referred to; estimation of number of personalised support plans co-produced with people receiving support)

(iii) Understanding if there a change in morale of primary care staff

(iv) Exploring views on the impact of these different models on patients (e.g. through measures like the Patient Activation Measure (PAM) and ONS wellbeing measure) and primary care (e.g. number of GP appointments, prescriptions for patients, number of secondary referrals).

(v) Exploring approaches that could be used to support primary care to improve data quality and recording of data related to social prescribing, including outcome and output metrics outlined in the NHS England Social Prescriptions COF.

Surveys

We will use the findings from the advisory groups to develop an online survey to capture the degree of consensus with our advisory group findings. The surveys will be sent to primary care practitioners within the RCGP RSC and include statements for respondents to agree or disagree with. There will also be an opportunity for the respondents to explain why they agree or disagree with a statement.

Data management

Where available, the following output and outcome information derived from the social prescribing COF[18] will be analysed for the study:

Output metrics

- characteristics of people referred: age, disability, gender reassignment, marriage or civil partnership, pregnancy and maternity, race, religion or belief, sex, sexual orientation
- referral criteria such as Long Term Conditions or receipt of social care packages

Outcome metrics – Impact on patients and health and care system

- Patient Activation Measures (PAMs)
- ONS wellbeing measures
- GP consultations
- A&E attendance
- Hospital bed days

- Number of medication prescriptions

Data analysis

Statistical and modelling analysis

Descriptive statistics will be used to report the findings and will focus on two key domains:

Social prescription use: Use of social prescribing will be identified using the codes listed in Table 1 as well as through the use of a social prescribing ontology. We will explore the use of both approaches individually and in combination to identify the method that works best.

Social prescription impact: We will explore methods to determine the impact of social prescribing by focusing on individuals recorded as being homeless, which is a subgroup that the RCGP RSC team is working with for other projects:

- We will first identify individuals who have received a social prescription and who are recorded as being homeless. We will then explore methods to determine the details of the social prescription(s) they have received from the existing RCGP RSC data (e.g. frequency, adherence, type of social prescription)
    - Where available, we will attempt identify any additional clinical conditions of the individuals referred
    - Where available, we will attempt to identify the characteristics of people referred (see output metrics above)
        - We will attempt to identify matched cohorts of homeless people with similar characteristics but who did not receive a social prescription

- Where available, identify the outcomes (see outcome metrics above) for both cohorts of homeless people

The goal of these analyses will be to explore if the RCGP RSC can be used to accurately capture the use and impact of social prescribing.

Analysis of advisory groups

QSR NVivo 11 and Microsoft Excel will be used to organise and analyse advisory group meeting outputs.[26] We will use Framework Analysis, a well-established approach to observe similarities, discrepancies and interrelationships among the data.[27] Framework Analysis consists of a five-step process including:[28]

(1) familiarisation: reading the transcripts, reflecting on the research question, and keeping notes of potential ideas and recurring concepts.

(2) identifying a thematic framework: using a priori knowledge of the literature as well as the concepts from the first step to create a framework/index to sort the new material into a descriptive list of concepts that will be refined to represent the diversity, centrality, and dynamics of participants' attitudes.

(3) indexing: systematically applying the framework to the data, using a numerical system that will link them directly to the index. A second analyst will also use the framework to test the transparency of the method and compare his/her assumptions with the first analyst's.

(4) charting: the indexes will be used to create thematic charts, which will include a refined summary of major subjects that will have emerged in order to provide a more abstract view of the data.

(5) mapping and interpretation: interpreting the data as a whole.

For the survey, summary statistics will be used to describe the results based on key themes interrogated in the survey. The outputs of the survey will be used to identify opportunities and barriers at multiple levels:

- Individual stakeholder level
- GP practice level
- Regional level

Survey results will be used to inform the survey design for a larger and subsequent study.

Patient and public involvement

No patients or public were involved in the development of the research question or design of this study. For the advisory group meetings, the GP practices we engage with for this study will be asked to invite patients who would be willing to serve on our advisory group and/or anonymously comment on the advisory group themes, as per INVOLVE guidelines.[29]

Project management

The feasibility study will be a collaborative project led by Dr Anant Jani and Professor Simon de Lusignan, with Professor de Lusignan serving as the Principal Investigator. RCGP and NHS England will be collaborators and will oversee the project in collaboration with the principal investigator. The research and information governance framework for RCGP RSC sits within the University of Surrey's formal frameworks for information and research governance. The project team is supported by IT services dedicated to the Faculty and to the Department of Clinical and Experimental Medicine. Our secure analysis servers are optimised for routine healthcare data processing, to provide faster deliveries for our projects.

Ethics and Dissemination

Ethics

For WP1, consent will not be required for these data and we will not process data for people where opt-out codes are present, which is currently 2.74%.[30] The data will be pseudonymized and encrypted before uploading to the Clinical Informatics Research Group secure server. Personal data will not be identifiable. This study is considered to be an ''Audit of current practice'' when tested against the Health Research Authority (HRA)/Medical Research Council (MRC) ''Is my study research'' tool and therefore does not require specific ethical approval.[31] Approval for use of the data was acquired from the RCGP RSC Study Approval Committee.

Data extractions will be conducted in accordance with the Clinical Informatics and Health Outcomes Research Group's standard operating procedures for data extraction, pseudonymisation, and transfer described previously.[32]

Pseudonymisation, the standard approach for protecting patient's privacy defined by the European Data Protection Supervisor (EDPS),[33] involves the removal of all personal identifiers from data – such as name, date of birth, etc. To minimise the risk of re-identification, all strong identifiers (in this study, NHS number) are removed and data is kept encrypted during transfer and is stored on a secure network that meets NHS Information Governance standards.[33] For this study we need, for example, to be able to link outcome and output metrics (see below) associated with the patient before and after receiving a social prescription. Pseudonymisation allows us to do this without knowing any of the strong personal identifiers of that individual. All data processing and analysis in the present proposed study will be conducted within the secure IT environment of the Clinical Informatics and Health Outcomes Research Group, at the University of Surrey. The information security policies and procedures of the Research Group have been approved by the NHS Digital as meeting the Data Security and Privacy (DSP) standards psuedonymising as close to sources as possible. If patients have opted out of record sharing, we will not analyse their data.

For WP2 where participants in the advisory group meetings are serving as advisors rather than research participants, University of Surrey Self-Assessment for Governance and Ethics (SAGE)[34] assessment indicated that a further ethics and governance application was not necessary for the analyses linked to this part of the feasibility study.

Dissemination

The outputs from our research will highlight and capture findings linked to our four objectives, namely:

- An analysis of social prescribing use across the RCGP RSC
- An analysis of the NHS COF social prescribing codes versus the codes from our ontology

- An overview of approaches utilised to determine how the impact of social prescribing could be estimated from different analytical approaches
- An analysis highlighting the findings from our advisory group meetings about different social prescribing models used by practitioners and their willingness to use routine data collection to improve data quality and the outcomes that could be delivered by social prescribing

The outputs from the research will be disseminated primarily through peer reviewed papers in high impact journals within the domains of primary care and health and care systems. We will also present findings at relevant seminars and conferences.

Discussion

Our feasibility study aims to enable us to test approaches to understand the use and impact of social prescriptions. We look to achieve this aim through several objectives including: reporting baseline levels of social prescription utilisation and the patients within practices who are provided social prescriptions; establishing a social prescribing taxonomy/ontology that can capture social prescribing referrals and interventions made in primary care; establishing what data can be made available to practices to highlight inter practice variation; establishing what data can be used to enable future evaluation of social prescribing; exploring approaches to understand the contextual factors that will have influenced our quantitative findings and which can inform the design and development of a more effective taxonomy/ontology for social prescribing; and ultimately helping us understand and encourage adoption of social prescribing in primary care while improving data quality. For the quantitative analyses, we will focus on the specific subgroup of those who are homeless to better understand how they can be identified through the RCGP RSC and to explore whether we can identify the interventions they received and the outcomes delivered to them.

Below we outline several strengths of our study and as well as some limitations which we hope to overcome.

Strengths

The key strength of this feasibility study is that is uses an established and nationally representative sentinel network. The practices within the sentinel network are nationally representative and they provide access to a sample of real world evidence (RWE) data to quantify current national use of social prescribing. Further to this, the large sample size of this representative dataset and the high-level data completeness of the data are particular strengths of the RCGP RSC dataset.

We think that the introduction of a standard methodology for adoption and delivery of social prescribing by GP practices could increase the chances of being able to show benefits. Furthermore, the recording of detailed information on social prescribing (including type, treatment duration, costs and outcomes) is also needed to facilitate the adoption and improvement in the use of social prescriptions. The practical and feasible approaches identified through our project could be adopted by NHS Digital and rolled out nationally across England, yielding information to improve our understanding of the current use and impact of social prescribing and also help to elucidate best practice for social prescribing. Furthermore, our findings could also serve as a source of information for other countries looking to introduce social prescribing into their health and care systems.

Limitations

Though nationally representative, because GP practices participate on a voluntary basis, there is slight underrepresentation of practices with more deprived patients,[13] which means there may be some selection bias. Furthermore, identification of patient output and outcome metrics will be restricted by primary care clinical codes (i.e. Read, CTV3), which do not always align directly with the output and outcome metrics of interest. Finally, because of the limited number of people we can recruit for the advisory group meetings and survey, the experiences of the primary care practitioners we recruit for WP2 will be limited and may not be able to capture the contextual factors experienced by the entire sentinel network.

We will report additional strengths and limitations identified while undertaking the study in the final manuscript.

Conclusion

This feasibility study will enable us to test approaches to understand the use and impact of social prescriptions. Once established, we plan on using our approaches to create a dashboard for GP practices to understand their use of social prescriptions in near real time.

Authors' contributions: AJ, HL, UH, LM, FF, IY and SdeL were involved in the design of the study protocol; AJ, HL, LM, VTB and SdeL were involved in writing and reviewing the manuscript.

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Competing interests statement: None of the authors have a competing interest.

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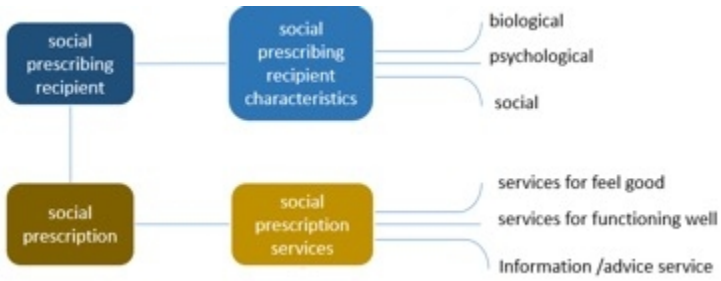
Figure Legends

Figure 1: Upper level design of the social prescribing ontology



Upper level design of the social prescribing ontology

128x48mm (72 x 72 DPI)