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Title: The Social Cure of Social Prescribing: A mixed-methods study on the benefits of social connectedness on quality and effectiveness of care provision

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Keywords: Social prescribing, social cure, primary care, social determinants of health, community, loneliness

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Author contribution:

BK: Designed, conducted the research, analysed the data and drafted of this paper

JHRW: Designed, conducted the research, analysed the data and co-drafted this paper

CS: Obtained the funding, designed, conducted the research, and contributed to the drafting of this paper

NM: Designed, conducted the research, analysed the data and contributed to the drafting of this paper

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BK, JRHW, CS,NM, MB, IW accept full responsibility for the work and/or the conduct of the study, had access to the data, and controlled the decision to publish.

Transparency declaration

The lead author affirms that the manuscript is an honest, accurate, and transparent account of the study being reported; that no important aspects of the study have been omitted; and that any discrepancies from the study as planned and registered have been explained.

The study received ethical approval from the Author’s institution and West Midlands NHS REC committee 17/WM/0398.

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The researchers conducted the research independently from funders.

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None of the research team members report a conflict of interest.

Patient and Public Involvement (PPI)

PPI were not involved in the design, analysis and dissemination of this research.

Data sharing

There will be no additional data available.

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Abstract

Objectives: To assess the degree to which the ‘Social Cure’ model of psycho-social health captures the understandings and experiences of healthcare staff and patients in a Social Prescribing (SP) pathway and the degree to which these social psycho-social processes predict the effect of the pathway on healthcare usage.

Design: Mixed-method: study 1: semi-structured interviews, study 2: longitudinal survey.

Setting: An English SP pathway delivered between 2017-2019.

Participants: Study 1: GPs ($n=7$), healthcare providers ($n=9$) and service users ($n=19$). Study 2: 630 patients engaging with SP pathway at a four-month follow-up after initial referral assessment.

Intervention: Chronically ill patients experiencing loneliness referred onto SP pathway and meet with a Health Coach and/or Link Worker, with possible further referral to relevant third-sector groups.

Main Outcome Measure: Study 1: Health providers and users’ qualitative perspectives on social determinants of health. Study 2: Patients’ primary care usage.

Results: Healthcare providers recognised the importance of social factors in determining patient well-being, reason for presentation at primary care. They viewed SP as a potentially effective solution to such problems. Patients valued the different social relationships they created through the SP pathway, including those with link workers, groups, and community. Group memberships quantitatively predicted primary care used, and this was mediated by increased community belonging, and reduced loneliness

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Conclusions: Methodological triangulation offers robust conclusions that ‘Social Cure’ processes explain the efficacy of SP, which can reduce primary care usage through increasing social connectedness and reducing loneliness. Recommendations for integrating Social Cure processes into SP initiatives are discussed.

Strengths and limitations of this study

The strengths of this study

- a. It identifies mechanisms that enable Social Prescribing interventions to work.
- b. It identifies mechanisms that enable more effective use of primary care services.
- c. It reports the most comprehensive multi-perspective evaluation of an NHS model of Social Prescribing to date, with accounts from General Practitioners, Link Workers, Health Coaches and Patients.

The limitations of this study

- a. The results observed in our longitudinal analysis are short-term and are likely to develop further over longer time-periods, though observing benefits after such a short time is promising.
- b. The specific characteristics of this sample (adults with complex health needs from across the socio-economic spectrum, living in a relatively affluent area) need to be borne in mind when considering the applicability of SP to other populations.

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Introduction

The Burden of Loneliness

Aging populations and increasing demand for health services are just two of the challenges currently facing the UK's National Health Service (NHS), all of which impede medical professionals' ability to provide high-quality healthcare [1-2]. These challenges are exacerbated by increasing loneliness experiences [e.g., 3]. Loneliness has been linked to reductions in perceived physical health [4]) and cognitive health [5], and increased risk of multimorbidity [6], difficulties performing daily tasks [7], depression [8], and mortality [9].

Loneliness has also been linked to increased contact with primary care services especially among the elderly [10-11], with loneliness [12] and associated mental-health concerns [13] being increasingly common reasons for General Practitioner (GP) visits. Multicountry surveys, including the UK, show that around one third of patients with depression/anxiety contact primary care [14], but fewer than one third of these receive treatment [15]. There is thus an urgent need to adopt more patient-centred holistic care provision that considers psycho-social factors alongside physical health needs [16-18]. Any meaningful plan to address these challenges must therefore consider the issue of loneliness as well as physical/mental-health [19-21].

An additional challenge is the need to engage primary care services in the recognition and treatment of psycho-social needs (e.g., loneliness). Although GPs are the primary point of contact [22], they struggle to address mental-health/loneliness for several reasons: limitations in psychological training [23]; the additional length of time required for discussing mental-health compared to physical health [24], and limited mental-health referral options [25]. A key challenge is therefore to provide a clear and evidence-based approach to

understanding and identifying the effects of loneliness, as well as the services necessary to alleviate this healthcare burden.

Social Prescribing as a Cure for Loneliness

Healthcare commissioners/providers have recently begun implementing novel initiatives that could reduce the economic burden of loneliness. One such initiative is Social Prescribing (SP, e.g., [26]), which represents a departure from traditional medical models of healthcare. Rather than focussing on medication provision, SP involves addressing patients’ needs holistically. GPs initially profile potential patients, especially those suffering from chronic conditions exacerbated by loneliness (e.g., depression, obesity). In some SP pathways, Health Coaches (HCs) receive these referrals and provide patients with practical and emotional support, as well as opportunities to better manage their own health. The ‘social’ aspect comes from SP’s links to the community: patients are supported to join third-sector groups (e.g., voluntary, social enterprise) to enhance social connection and reduce loneliness. Patients are supported by Link Workers (LWs), who connect them to relevant groups and support their attendance. Ultimately, SP is designed to improve well-being and illness self-management whilst addressing social needs and reducing primary health-service use.

Although there has been a proliferation of different models of SP, each conceptualising and addressing loneliness differently, there is growing evidence regarding their general efficacy. SP initiatives have been shown to enhance service-users’ well-being, quality of life, patient activation, health-related confidence, community involvement, and experience of services [27-29], as well as to reduce anxiety, emotional problems, loneliness, and healthcare use [30-32]. Provision of group activities is also a highly effective way to address loneliness [33-34] and improve health [35]. Economic return on investment has also

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3 been evidenced [36-38, 28], with some reports showing better return from services delivered
4 by voluntary/community organisations [37]. These positive outcomes have led to an increase
5 in GPs advocating for SP [39].
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11 While this suggests that SP holds a great deal of potential, a major limitation of the
12 existing evaluated interventions is that they lack an underpinning theoretical framework [40].
13 This impedes the identification of SP's 'active ingredients', and the specific processes
14 through which initiatives can alleviate loneliness, improve health, and reduce healthcare
15 burdens. Specifically, the proliferation of different SP models has created confusion as to
16 how to understand loneliness, operationalise its treatment, and measure its outcomes [41].
17 This means that the profiling of potential patients, the identification of their needs, and the
18 delivery of treatment is often ad hoc and piecemeal. Furthermore, lack of clarity among those
19 referring/treating patients, as well as between staff and patients, fosters poor levels of uptake,
20 engagement, and treatment [42-43]. What is needed is a clearer theoretical understanding of
21 the relationships between loneliness, health, and treatment and, from this, greater consistency
22 in the messages delivered regarding SP.
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39 The 'Social Cure' as a Theoretical Framework for SP

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42 The pathway evaluation reported here is underpinned by an appropriate psycho-social
43 framework: the social identity approach to health and well-being, aptly named 'The Social
44 Cure' (SC; [44-45]). This approach posits that our social group memberships (e.g., family,
45 community, volunteering group) are consequential for our social life, health, and well-being,
46 but only if we identify with them (i.e., feel a subjective sense of group belonging, [46]. Group
47 identification is believed to enhance social life and well-being through numerous benefits,
48 such as reduced loneliness, enhanced self-esteem, and the belief that social support will be
49 available during crisis (e.g., [47-48]).
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Case Study: SC in Action in an SP Pathway

This study is part of a larger programme of research which uses a multi-method, longitudinal approach to explore these social processes in the context of an ongoing SP pathway (see the protocol for details, [49]). Our research has two aims. First, we determine which social factors are central to the understanding of SP among: a) GPs currently referring to this SP pathway; b) HCs/LWs delivering the pathway; c) patients participating in the pathway. From this we aim to provide an evidence base for the relevance and explanatory power of the SC framework in capturing the ‘active ingredients’ in SP delivery. Second, using a longitudinal survey, we seek to provide evidence for whether the SP pathway does have its effects through these SC processes, and the consequences of this for patients’ health-service use. We now briefly summarise the key details of the specific SP pathway. No Patient Participants were involved in this research and findings will not be distributed back to the participants.

Overview of the SP Pathway

The SP pathway began in the English East Midlands in 2017. The pathway is supplemental to any healthcare the patient is already receiving, and is designed for patients with chronic illness who are experiencing loneliness. The aims are to increase patients’ illness self-management, address their psycho-social and health needs, and through this to reduce primary healthcare usage. Once recruited onto the pathway, patients have an initial meeting and needs assessment with an HC, who either prescribes self-care management or refers to a LW, who in turn connects the patient with relevant third-sector groups. HC/LWs regularly check on patients’ progress.

Study 1

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Study 1's aim was to gain a deeper insight into perceptions/understandings of the social factors impacting on health and presentation to primary care. Specifically, we intended to investigate the degree to which staff referring patients (GPs), those delivering the pathway (HCs/LWs), and patients themselves, recognise experiences of social (dis)connection, and appreciate the effects of these experiences, as well as SP's potential to remedy these issues.

Method

Participants and Procedure

In-depth, semi-structured interviews were conducted with 7 GPs (referring into the pathway), 3 HCs, 6 LWs (involved in pathway delivery), and 19 patients (full characteristics and recruitment details can be found in table 1). All participants contacted the researcher following invitation to participate. The interviews included a range of general topics: participants' understanding of SP; their experience of the pathway; the process of referrals through the pathway; and perceptions of the pathway's success (or otherwise). There were also role-specific questions, such as the needs of patients (GPs); experiences of facilitating patient support/engagement (HCs); and involvement with the groups to which they had been linked (patients).

(TABLE 1)

The analysis was separate for each group of participants. This paper focuses on data sections where participants reflect on relationships between psycho-social needs and service use, and the need for/value of SP, guided by the Social Cure framework. All interviews were audio-recorded, transcribed verbatim, and analysed with a realist approach using the six thematic analysis steps [50-51]. The purpose was to provide a detailed account of participants' views with regards to the specific research questions, using a deductive approach. Two authors conducted the interviews, then data familiarisation began, with repeated listening to interviews, transcript reading, and note-taking. Two authors completed

initial coding, which was inclusive: the whole corpus was coded, and the resultant list of codes was collated. Three authors then discussed the relationships between codes, and considered how they fitted into potential themes/sub-themes. Candidate themes were reviewed to ensure the presence of meaningful/coherent data within themes, and distinctiveness across themes. Finally, themes were defined, named, and reported. Quotes illustrate the analyses, completed with participant number, indicating omitted lines with (...).

Patient and Public Involvement (PPI).

There was no PPI involvement in this research.

Results

GP Perspective: Social Factors and the need for a Holistic Service

GPs recognised that a change is required in terms of how health, well-being, and social concerns are understood/addressed by health-services and society. They described how the NHS traditionally does not address social isolation. Achieving this would require a broader approach addressing mental, physical, and social health:

Traditionally as well this used to be very much an extended family village where most people related to each other (...) With the new families coming in they often don't know anybody, so they've lost that ability to support themselves. (...) So, we have many isolated people in the village, lots of single people who, you know, have become lonely and worried about their health just because they've got all the time in the world to sit and think about it. (...) So to have a more sustainable programme I think it will be excellent, I can see it growing, just because of the number of people with diabetes for instance who need encouragement, it's going through the roof, you know, we can't keep pace with them all and we certainly individually cannot fund the

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education programmes that are needed, so it needs to be done in a CCG wide fashion.
(GP-4).

This GP describes how GPs are overwhelmed and cannot provide support for social determinants of health such as social isolation, leading to patients being overlooked. Alongside recognising the link between physical and social health determinants, GPs perceived a shift from a traditional medical model towards recognising the need to provide support for lonely patients:

Well, most of a population's health and well-being is determined by environmental factors, and things that are not to do with healthcare. And, you know, sometimes the traditional medical model (...), our role is to just do the medicine and that's it. But we work in a system. (...) All these things are interdependent, and if we want to, we might not be the experts on it, but if we want to help our patients more and help the population, then we need to access these sort of broader things. (GP-5).

There is recognition of the limitations of the 'traditional medical model', concerns over how GPs can support patients with different needs, and frustration at the limitations within the current model. However, while GPs were perceived to be well-placed to identify those in need of healthcare, Participant 5 recognised the limitations of GPs' own expertise in terms of addressing issues related to patients' social environments, and the need for a system that provides additional pathways necessary to address such issues. Across participants, SP was viewed as a means to support GPs in providing the best care for patients by addressing loneliness and reducing its negative health impacts:

People become more isolated and often present [at primary care services]. I had a lady who used to come and see me whose depression used to peak, and her mood deteriorated when her art classes stopped. Then, she used to come to the doctor a lot. When the art classes started up, we didn't see her. (GP-2)

By referring to frequent presentation, the participant highlights one of the challenges that primary care faces at a time of limited resources and increasing demand, whilst also reflecting on the cost this has to patients whose mental health is affected by isolation. Inherent in this account is a suggestion that community activities can alleviate mental health issues, as well as reduce primary care demands, which operates within a limited timeframe (average UK GP appointments last 9 minutes; [52]). Experiences of isolation and a lack of social connection were thus recognised by GPs as a contributor to ill-health, as well as a key reason for accessing services. This recognition guided their SP pathway referrals.

LW/HC Perspectives: Social Needs and Community

SP providers highlighted the importance of reconnecting patients with the community through SP initiatives. They articulated how SP can help combat loneliness/isolation through patients receiving social support from others undergoing the same experiences. It was also hoped that patients' increased knowledge of what is available in the community would improve their social confidence:

I think it is important, I think people can maybe lose their way a bit because of certain things that's happening in life and I think if, they can get locked away in their home, become isolated and anxious and I think if people know what's around them I think it might or it does help with getting them out, giving them a bit more motivation, talking

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3 *to people in their area and understanding that it's not just them going through things*
4 *their selves, you know, people are going through similar things. Yeah, so it's just*
5 *something that they know they can go to, it might be a group that they know they can*
6 *go to every week and feel comfortable with going to that. (LW-1)*
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16 Social support provision makes patients feel comforted, understood, motivated, less
17 anxious and less isolated, but it can also involve patients sharing information about
18 difficulties they are experiencing. SP providers argued that groups benefitted the whole
19 community, as well as individual patients:
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29 *I think as we work with individuals to get them engaged more with the community, the*
30 *community itself then benefits by having more people engaged with it, so it becomes*
31 *almost organic and it can grow and develop itself, just to help to meet the needs of its*
32 *members, I guess. (HC-5)*
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42 In this way, SP was understood to have the potential to make an impact in addressing
43 social, physical, and mental-health concerns, and to develop a holistic health service.
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46 **Patients' Perspective: Relationship with LW/HC and Building Social Connections**

47 **Relationship with LW/HC**

48 Typically, patients described their interactions with pathway staff as positive. They
49 liked having time to discuss challenges thoroughly, and receiving tailored support. Patients
50 felt that staff were empathetic to their needs, and they believed that SP was qualitatively
51 different to their experiences with other health professionals:
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I think when you go to the doctor, you're used to having this ten-minute slot and you have to like quickly get everything in. And then when you go and see a counsellor, or you go and see your support worker, you have that full hour, and I wasn't really used to that at the time, that expanse of time where you can just relax and talk. (Patient-3)

An important aspect of the support patients received was having someone listen to them. Patient 7 describes how she was supported in a way that allowed self-reflection on her challenges:

I felt as though they gave me the chance to reason out that I was getting better. I listened to them. I knew what was going on in my head, but I couldn't always, I didn't always want to tell anyone. I seemed, with the link-worker, I seemed as though I could get over that more quickly. He wasn't demanding. He was very quiet and very gentle with it, and that is the way that I needed somebody to be, to maybe listen to me, really listen to me, and hear what I was saying, if you can understand that. (Patient-7)

Patient 7 highlights an important aspect of the therapeutic relationship (which was echoed across accounts) when she notes that the LW “wasn’t demanding”. Participants saw this as a goal achievement facilitator. When discussing the progress of their goals with staff, beneficiaries experienced support as encouraging rather than punitive (contrary to their expectations).

Building Social Connections

For patients who were socially isolated and coping with complex health issues, joining community groups was challenging. Some expressed fear of going outside the home,

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or anxiety about meeting new people. LW support was vital for becoming more socially connected, specifically being accompanied by the LW to the first group meeting:

[The LW] said that both of us could go to [the group] the first time, so that she could help me make sure I was comfortable and that I had what I needed to do the class. She spoke to [the instructor] and introduced me to her. I felt a lot happier knowing I had someone I knew to go with me. [lines omitted] If someone had just told me to go, I don't think I would have gone. (Patient-8)

Many patients described increased feelings of self-confidence following their pathway participation. This was particularly evident for those with complex conditions and/or social isolation. Some credited LW support as facilitating self-confidence improvements, and their ability to make new connections.

A positive group experience was also vital. This was typically facilitated by a sense of belonging, and feeling welcomed by the group (and leader). Aside from loneliness alleviation, groups allowed Participant 4 to provide support to similar others, which he experienced as an important aspect of group membership:

You're kind of helping each other, because I think for most people [with this condition] you kind of feel that you're the only person on the whole of Plant Earth, you know. You don't seem to know how many other people [have this condition] so the fact that you can meet up with others is like, oh, there are other people that understand and know how it's difficult (...) and so, you were able to give each other encouragement or copy each other or learn from each other. (Patient-4)

Thus, for patients, positive relationships with LWs and group members were essential prerequisites for engaging in social activities and connecting with others, thus addressing social isolation/loneliness.

Sustaining meaningful connections with groups aided confidence-building. For example, Participant 3 explained how she was now confident enough to attend sessions on her own, as well as join further groups (and return to groups she had previously left due to health issues), thus building further connections:

So, I didn't know there were people out there like me, and [LW] made me realise (...), there are lots of people out there like me and we're like a little tribe. And there's little places we can go and hook up and just kind of like talk about anything you want, or not talk at all. And I just think it saved me. Honestly, I don't know what would have happened. It terrifies me to think what would have happened. I think I would have got more ill, if I'm honest, because I was desperate. (Patient-3)

The positive benefits of group engagement were thus enabled by the LW, who served as connector and confidence builder. Typically, participants did not feel positive about the SP pathway when they felt the groups they were referred to did not meet their needs.

Discussion

Our analysis reveals these GPs recognise the limits of the medical model in addressing patient well-being, especially those with complex chronic conditions. All participants recognised the potential role of SP in addressing social needs, and the unique role that LWs, groups, and communities can play in establishing these benefits. Importantly, the

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analysis also confirms that patients recognise how social factors affect their health, and report how social connectedness/belonging benefits their health.

This is preliminary evidence for the relevance of the SC perspective for the understanding of SP. Both providers and patients report the negative effects of social isolation on health/healthcare usage, as well as the positive benefits of social inclusion/belonging. Moreover, SP providers and patients specify that it is the quality of the social relations which has well-being benefits. In particular, patients report various factors, including feelings of acceptance and belonging within activity groups/communities, which are central to understanding the health benefits of group memberships, as outlined in SC. On this basis, our second study determines whether these factors do indeed impact upon loneliness and healthcare usage, as predicted by SC.

Study 2

Aim

Study 2 involved asking patients a survey of questions at the point of referral onto the SP pathway (T0), and at two subsequent time-points (T1) to evaluate the overall efficacy of the pathway (Authors, 2018). These data allow an analysis of the social factors predicting patients' health service use at T1, as well as the psycho-social factors that mediate these relationships.

Method

Predictions

Based on SC, we hypothesise that possessing group memberships will positively predict a psychological sense of community belonging, which will in turn be associated with lower levels of loneliness. In turn, we propose that this serial mediation pathway will then

predict service use which, if supported, would constitute a particularly strict test of our SC model.

Participants and Procedure

All data were gathered during the first 18 months of pathway operation (November 2017-February 2019)¹. T0 survey data (n=630) were gathered by HCs delivering the survey face-to-face in the first meeting at participants’ GP surgeries (285 males, 340 females, 5 unknown; $M_{age} = 52.74$ years, $SD = 14.79$). T1 data were collected via phone/face-to-face on average 4 months after T0, during a routine follow-up with HCs for 178 participants (86 males, 91 females, 1 unknown; $M_{age} = 55.75$ years, $SD = 13.80$). Bonferroni-corrected between-groups *t*-tests revealed that T1 responders had significantly more group memberships ($M = 1.89$, $SD = 1.59$) than T1 non-responders ($M = 1.51$, $SD = 1.37$), $t(628) = -2.94$, $p = .003$, and were significantly older ($M = 55.75$, $SD = 13.80$) than non-responders ($M = 51.56$, $SD = 15.01$), $t(625) = -3.22$, $p = .001$. All other *p*-values were $> .05$.

Survey Measures

Participants were given a list of ten social groups (“family; sports clubs, gyms, or exercise class; tenant group/resident group/neighbourhood watch; political party/trade union/environmental group; church or other religious group; education/art/music group, or

¹ In the published protocol it is specified that there will be additional follow-ups but due to delays in setting up the intervention and higher levels of referral than expected, there was no funding available to complete the additional planned follow-ups.

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evening class; social club; support group (e.g., diabetes support); any other organisations, club, or society”) and were asked to indicate to which they belong. Alternatively, patients could tick “*I am not a member of any groups*”. From this, participants’ *number of group memberships* (0-10) was calculated.

We measured *community belonging* with a single item previously used in population surveys of social attitudes [53], (“*Thinking about this local community, the kind of place it is and the kind of people who live around here, would you say that you feel a sense of belonging to this local community?*”). Participants rated their agreement on a 1 (*definitely not*) to 4 (*yes definitely*) scale.

We measured *loneliness* with the eight-item ULS-8 [54]. Participants rated their agreement with each item (e.g., “*I lack companionship*”) on a 1 (*not at all*) to 5 (*completely*) scale. The mean score of the items was found, with higher values indicating greater loneliness.

Health service use was measured by asking participants to indicate the number of times they have used primary care (e.g., GP in-person appointments, GP phone appointments) in the previous three months, using an adapted measure from [55].

Finally, participants were asked to specify their *age*, *gender*, whether they were in a *relationship*, and their highest level of *education*.

Results

Does this SP Pathway Reduce Healthcare Use?

Table 2 presents the descriptive statistics and correlations for each T0/T1 variable, and change from T0-T1.

(TABLE 2)

Patients used primary care services less at T1 ($n=797$) than T0 ($n=1063$), with a 25% ($n=266$) reduction in appointments. We conducted a repeated-measures ANOVA to compare

T0/T1 service use: participants' primary care use decreased significantly between T0 ($M = 5.9, SD = 8.2$) and T1 ($M = 4.5, SD = 8.4$), $F(1,176) = 9.14, p = .003$.

Does this SP Pathway Reduce Healthcare Use via SC Processes?

Based on the SC perspective, we predicted that participants' increase in number of group memberships between T0 and T1 was driving reductions in primary healthcare usage at T1, and we predicted this was due to participants' social worlds being enhanced through their increased number of group memberships (specifically, increased community belonging, and decreased loneliness). We used model six in version 3.0 of [56] PROCESS macro to test our hypothesised serial mediation model: that T1 community belonging and T1 loneliness will mediate the relationship between the change in participants' number of group memberships (T1-T0), and T1 primary care usage, so that a possessing more group memberships at T1 than T0 will predict higher community belonging, which in turn will predict lower loneliness, which in turn will predict primary care usage. The analyses involved 5,000 bootstrapping samples with 95% confidence intervals (LLCI/ULCI), using the percentile method. Values were mean centred for the construction of products. Participants' gender, age, relationship status, employment status, and highest level of education were controlled for, as were the T0 versions of the mediator and predictor variables (i.e., community identification, loneliness, and primary care usage T0).

Supporting predictions, we found a significant relationship between change in number of group memberships between T0 and T1 and primary healthcare usage T1 through community belonging T1 and loneliness T1, $Effect = -.04, Boot SE = .02, Boot LLCI = -.09, Boot ULCI = -.005$. Change in number of group memberships was a positive predictor of community identification T1, $Coeff = .09, SE = .04, t = 2.61, p = .01, LLCI = .02, ULCI = .16$, while community belonging T1 was a negative predictor of loneliness T1, $Coeff = -.31, SE = .07, t = -4.15, p = .0001, LLCI = -.45, ULCI = -.16$, which was a positive predictor of

primary healthcare usage T1, $Coeff = 1.41$, $SE = .45$, $t = 3.13$, $p = .002$, $LLCI = .52$, $ULCI = 2.31$. The total effect of change in number of group memberships on primary healthcare usage T1 was non-significant, $Effect = -.07$, $SE = .18$, $t = -.39$, $p = .70$, $LLCI = -.42$, $ULCI = .28$ (it is appropriate to test for indirect effects when the total effect is non-significant; this is known as indirect-only mediation, Zhao, Lynch, & Chen, 2010), and this remained almost unchanged when community identification T1/loneliness T1 were accounted for (direct effect), $Effect = -.08$, $SE = .18$, $t = -.43$, $p = .68$, $LLCI = -.43$, $ULCI = .27$. See Figure 1 for the model.

(FIGURE 1)

Discussion

As predicted, psycho-social factors were important in reducing primary care use at 4 months following SP pathway participation. Supporting predictions, patients reported strong relationships between social variables and service use.

Our mediation analysis allows us to move beyond associative results to explore between-variable relations. From this we can determine that possessing more group memberships predicts a stronger sense of community belonging, which in turn predicts lower levels of loneliness, which in turn predicts reduced primary care use. Crucially, the serial relationship through these mediators is significant, and occurs independently of any relationships with age, gender, relationship status, or educational background. We can assert that group memberships predict these patients' reduced service use via community belonging and reductions in loneliness.

General Discussion

As we have argued above and elsewhere (e.g. [49, 40]), SP is a successful practice in need of a theoretical explanation. While there is abundant evidence that SP can (and does) work to redress the consequences of social isolation, the question of how and why it has its

effects remains unanswered. Given the disparate variety of possible SP models, and the wide variation in effectiveness measures [41], it is crucial to use methodological triangulation and advanced analyses to identify ‘active ingredients’ which will highlight this complex intervention’s benefits [57]. Doing so will foster a common understanding of the purposes/functions of SP, which should improve communication, recruitment, engagement, service delivery, and outcomes.

Our research constitutes a first step in this direction by exploring how this particular pathway is used and understood by different actors. Our qualitative analyses point to a consensus among GPs, SP staff, and patients: loneliness and social isolation-key threats to patient health-can be addressed through SP. In-line with research in the SC tradition which has demonstrated a direct link between lack of social connectedness and GP attendance [12] the absence of meaningful associative relationships is recognised by these health professionals to have detrimental health effects. Moreover, social isolation was perceived by GPs as being directly related to the frequency of inappropriate usage of primary care services by some patients and SP was recognised as a remedy for this.

Analysis of patient perspectives shows that these social factors were pivotal to their positive experience of the pathway. The supportive and encouraging role played by HCs/LWs, welcoming attitudes, acceptance from activity groups, and the more global sense of being connected to their community were crucial prerequisites for any pathway benefits. In line with the SC approach [58] the psychological and social resources flowing from rich group-based social connections were experienced as the root of SP’s positive effects.

Our patient survey allowed us to empirically examine these associations. Our results replicated previous findings showing the importance of group memberships for health service use (e.g., [12]), and we illustrate the predictive direction of this effect, with group

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memberships predicting increased community belonging, which predicts reduced loneliness. Moreover, these factors serially predict health service use, even when controlling for age, gender, relationship status, and education. In effect, our results validate the perceptions of healthcare staff and the experiences of patients in evidencing the role of SC processes in this SP pathway.

Of course, there are limitations to our research. We acknowledge that the results observed in our longitudinal analysis are short-term and are likely to develop further over longer time-periods [49], though observing benefits after such a short time is promising. Furthermore, the specific characteristics of this sample (adults with complex health needs from across the socio-economic spectrum) need to be borne in mind when considering the applicability of SP to other populations. The pathway's geographical area is a relatively affluent suburban borough of East Midlands that experiences much lower levels of crime/deprivation than nearby urban areas. The effectiveness of SP in areas with fewer community resources/lower community cohesion remains to be determined. We predict that within deprived communities/disadvantaged social groups, the benefits of social connections are likely to be more pronounced, while the opportunities to establish them are more limited..

Bearing in mind these limitations, our work has several specific implications arising from the applicability of the SC perspective. The first pertains to the determination of what elements of SP could have most effect, and through which processes. We predict that SP initiatives which reconnect isolated patients with their local community should help unlock community-based sources of social/emotional support, thereby enabling them to better cope with loneliness. Conversely, those pathways which deliver one-to-one treatment without recognition of patients' social needs may fail to unlock these support sources.

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The second recommendation comes from an appreciation of the role of community identification in reducing loneliness. While initiatives such as SP are often geared towards utilising community groups/resources, they rarely consider local communities themselves as a source of well-being. This is at odds with increasing evidence attesting to the social and psychological impacts of neighbourhoods upon health, well-being, and resilience [59, 60]. The SC model predicts that greater sense of identification with community can unlock a wide range of psychological, social, and practical supports, including increased trust, reciprocal helping, and collective enterprise. Our work suggests that SP initiatives which focus on the locatedness of their patients within their local communities, and which serve to enhance this sense of connectedness/belonging among the broader population will reach more individuals, create more sustainable community environments, and be a more effective (and ‘social’) cure.

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Table 1

Participant characteristics

Characteristic	Patients	GPs	LWs/HCs
<i>N</i>	19	7	3 HCs, and 6 LWs.
Age	29 to 85 years (average age: 60.4 years).	33 to 53 years; 3 unknown (average age 43 years).	HC: 47 to 50 years (average age 48.43 years). LW: 22 to 52 years, 1 unknown (average age 30.80 years).
Gender	12 female, 6 male, 1 prefer not to say	2 female 5 male	HC: 1 female; 2 male LW: 2 female; 4 male
Interview location	University campus, in patient' homes, private spaces at the community library	GPs' workplace; university campus	HC: university campus LW: LWs' workplace; university campus
Interview length	Ranged 20 to 111 minutes ($M_{\text{duration}}=55$ minutes).	Ranged 21 minutes and 3 seconds to 51 minutes and 31 seconds ($M_{\text{duration}}=34$ minutes and 83 seconds).	HC: ranged 40 minutes and 9 seconds to 76 minutes and 30 seconds ($M_{\text{duration}}=62$ minutes). LW: ranged 30 minutes and 26 seconds to 70 minutes and 45 seconds ($M_{\text{duration}}=48$ minutes and 45 seconds).
Ethnicity	84% ($n=16$) White and/or British	71.43% ($n=5$) White British and ($n=2$) Caucasian	HC: White British ($n=3$); LW: White British ($n=4$) and White ($n=2$)
Recruitment	All first 456 recruited patients	Organisational contact points	Organisational contact points

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	were invited once at least 3 months after recruitment. Invitations were sent in 4 waves to achieve a total of 19.		
Employment	53% (<i>n</i> =10) retired 47% (<i>n</i> =9) in work	N/A	N/A
Living with	42% (<i>n</i> =8) lived alone	N/A	N/A
Referred by	58%, (<i>n</i> =11) GP 26%, (<i>n</i> =5) self 16%, (<i>n</i> =3) practice nurse	N/A	N/A
Referral reason	53%, (<i>n</i> =10) weight loss followed by support for 37%, (<i>n</i> =7) multiple/complex needs including loneliness	N/A	N/A

Table 2

T0/T1 (n = 178): Descriptive statistics and inter-correlations for key variables

Variable	1	2	3	4	5	6	7	8	9	10	11	12	13
1. Change in No. of Groups (T0-T1, $M = 0.33$, $SD = 2.15$)	-												
2. No. of Groups T0 (1-10, $M = 1.89$, $SD = 1.59$)	-.53***	-											
3. No. of Groups T1 (1-10, $M = 2.21$, $SD = 1.87$)	.69***	.23**	-										
4. Community Belonging T0 (1-4, $M = 2.72$, $SD = 1.12$)	-.16*	.31***	.08	-									
5. Community Belonging T1 (1-4, $M = 2.75$, $SD = 1.08$)	.10	.14	.24**	.44***	-								
6. Primary Care Use T0 ($M = 5.97$, $SD = 8.11$)	.04	-.04	.01	.01	-.11	-							
7. Primary Care Use T1 ($M = 4.48$, $SD = 8.32$)	.01	.01	.01	-.06	-.14†	.69***	-						
8. Loneliness T0 (1-5, $M = 2.42$, $SD = 1.13$, $\alpha = .88$)	.15	-.20**	-.001	-.38***	-.29***	.08	.21**	-					
9. Loneliness T1 (1-5, $M = 2.35$, $SD = 1.00$, $\alpha = .87$)	.06	-.15*	-.06	-.25**	-.40***	.20**	.32***	.44***	-				
10. Age ($M = 55.75$, $SD = 13.80$)	-.09	.19*	.07	.19*	.08	-.02	-.02	-.26**	-.22**	-			
11. Gender (1 = male, 2 = female)	.01	.14†	.13†	-.03	-.04	.02	-.02	-.02	-.11	.10	-		
12. Relationship (0 = no, 1 = yes)	-.03	.07	.02	.06	.23**	-.04	-.03	-.36***	-.22***	.07	.08	-	
13. Education (1 = none, 2 = sch/coll, 3 = uni/wrk)	-.06	.23**	.13†	.10	.03	-.04	.07	-.08	-.11	.15†	.09	.04	-

*** $p < .001$, ** $p < .01$, * $p < .05$, † $p < .10$.

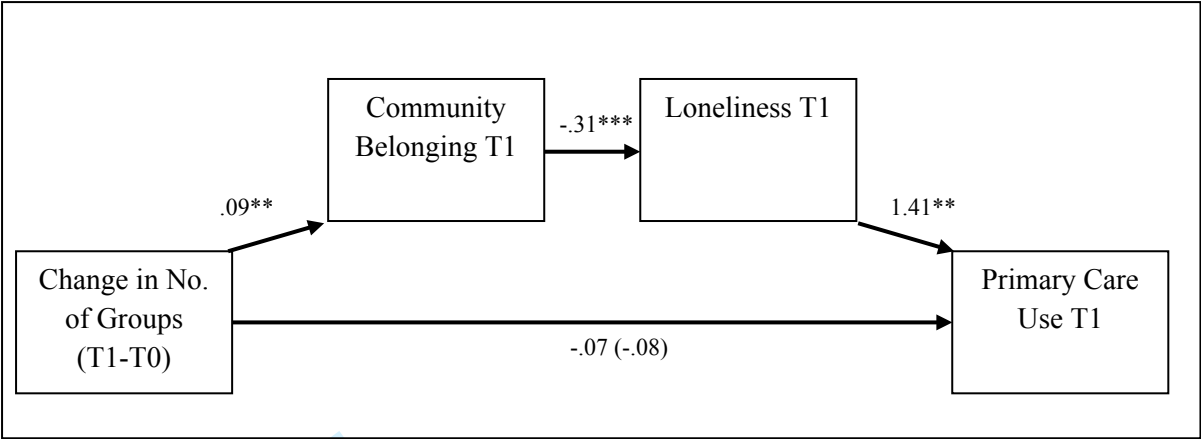


Figure 1. Model depicting the significant indirect effect of change in number of group memberships between T0 and T1 on primary healthcare usage T1 via community identification T1 and loneliness T1. Community identification T0, loneliness T0, primary healthcare usage T0, gender, age, relationship status, employment status, and education were controlled for in the analysis. Bracketed coefficient is the direct effect. Note: *** $p < .001$, ** $p \leq .01$.

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Data sharing

There is no permission to share the qualitative data from the research participants. Quantitative data can be shared upon request.

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The Social Cure of Social Prescribing: A mixed-methods study on the benefits of social connectedness on quality and effectiveness of care provision

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Author contribution:

BK: Designed, conducted the research, analysed the data and drafted and revision of this paper

JHRW: Designed, conducted the research, analysed the data and co-drafted and revised this paper

CS: Obtained the funding, designed, conducted the research, and contributed to the drafting and revision of this paper

NM: Designed, conducted the research, analysed the data and contributed to the drafting and revision of this paper

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MH: Conducted the research, and contributed to the drafting of this paper

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Name of guarantor

BK, JRHW, CS,NM, MB, IW accept full responsibility for the work and/or the conduct of the study, had access to the data, and controlled the decision to publish.

Transparency declaration

The lead author affirms that the manuscript is an honest, accurate, and transparent account of the study being reported; that no important aspects of the study have been omitted; and that any discrepancies from the study as planned and registered have been explained.

The study received ethical approval from the Author’s institution and West Midlands NHS REC committee 17/WM/0398.

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Statement of independence

The researchers conducted the research independently from funders.

Conflicting Interests

None of the research team members report a conflict of interest.

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Abstract

Objectives: To assess the degree to which the ‘Social Cure’ model of psycho-social health captures the understandings and experiences of healthcare staff and patients in a Social Prescribing (SP) pathway and the degree to which these psycho-social processes predict the effect of the pathway on healthcare usage.

Design: Mixed-method: Study 1: semi-structured interviews, Study 2: longitudinal survey.

Setting: An English SP pathway delivered between 2017 and 2019.

Participants: Study 1: GPs ($n=7$), healthcare providers ($n=9$) and service users ($n=19$). Study 2: 630 patients engaging with SP pathway at a four-month follow-up after initial referral assessment.

Intervention: Chronically ill patients experiencing loneliness referred onto SP pathway and meeting with a Health Coach and/or Link Worker, with possible further referral to existing or newly-created relevant third-sector groups.

Main Outcome Measure: Study 1: Health providers and users’ qualitative perspectives on the experience of the pathway and social determinants of health. Study 2: Patients’ primary care usage.

Results: Healthcare providers recognised the importance of social factors in determining patient well-being, and reason for presentation at primary care. They viewed SP as a potentially effective solution to such problems. Patients valued the different social relationships they created through the SP pathway, including those with link workers, groups, and community. Group memberships quantitatively predicted primary care usage, and this was mediated by increases in community belonging, and reduced loneliness.

Conclusions: Methodological triangulation offers robust conclusions that ‘Social Cure’ processes explain the efficacy of SP, which can reduce primary care usage through increasing social connectedness (group membership and community belonging) and reducing loneliness. Recommendations for integrating Social Cure processes into SP initiatives are discussed.

Strengths and limitations of this study

The strengths of this study:

- a. It identifies mechanisms that underlie effective Social Prescribing interventions.
- b. It identifies mechanisms that enable more appropriate use of primary care services.
- c. It reports the most comprehensive multi-perspective evaluation of an NHS model of Social Prescribing to date, with accounts from General Practitioners, Link Workers, Health Coaches and Patients.

The limitations of this study:

- a. The results observed in our longitudinal analysis are short-term and are likely to develop further over longer time-periods, though observing benefits after such a short time is promising.
- b. The specific characteristics of this sample (adults with complex health needs from across the socio-economic spectrum, living in a relatively affluent area) need to be borne in mind when considering the applicability of SP to other populations.

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Introduction

The Burden of Loneliness

Aging populations and increasing demand for health services are just two of the challenges currently facing the UK's National Health Service (NHS), all of which impede medical professionals' ability to provide high-quality healthcare[1-2]. These challenges are exacerbated by increasing loneliness experiences [e.g.,3]. Loneliness has been linked to reductions in perceived physical health[4]) and cognitive health[5], and increased risk of multimorbidity[6], difficulties performing daily tasks[7], depression[8], and mortality[9].

Loneliness has also been linked to increased contact with primary care services especially among the elderly[10-11], with loneliness[12] and associated mental-health concerns[13] being increasingly common reasons for General Practitioner (GP) visits. Multi-national surveys, including the UK, show that around one third of patients with depression/anxiety contact primary care[14], but fewer than one third of these receive treatment[15]. Thus, there is an urgent need to adopt more patient-centred holistic care provision that considers psycho-social factors alongside physical health needs[16-18]. Any meaningful plan to address these challenges must therefore consider the issue of loneliness as well as physical/mental-health[19-21].

An additional challenge is the need to engage primary care services in the recognition and treatment of psycho-social needs (e.g., loneliness). Although GPs are the primary point of contact[22], they struggle to address mental-health/loneliness for several reasons: limitations in psychological training[23]; the additional length of time required for discussing mental-health compared to physical health[24]; and limited mental-health referral options[25]. A key challenge is therefore to provide a clear and evidence-based approach to

understanding and identifying the effects of loneliness, as well as the services necessary to alleviate this healthcare burden.

Social Prescribing as a Cure for Loneliness

Healthcare commissioners/providers have recently begun implementing novel initiatives that could reduce the economic burden of loneliness. One such initiative is Social Prescribing (SP[26]), which represents a departure from traditional medical models of healthcare. Rather than focussing on medication provision, SP involves addressing patients’ needs holistically. GPs initially profile potential patients, especially those suffering from chronic conditions exacerbated by loneliness (e.g., depression, obesity). In some SP pathways, Health Coaches (HCs) receive these referrals and provide patients with practical and emotional support, as well as opportunities to better manage their own health. The ‘social’ aspect comes from SP’s links to the community: patients are supported to join third-sector groups (e.g., voluntary, social enterprise) to enhance social connection and reduce loneliness. Patients are supported by Link Workers (LWs), who connect them to relevant groups and support their attendance. Ultimately, SP is designed to improve well-being and illness self-management whilst addressing social needs and reducing primary health-service usage.

Although there has been a proliferation of different models of SP, each conceptualising and addressing loneliness differently, there is growing evidence regarding their general efficacy. SP initiatives have been shown to enhance service-users’ well-being, quality of life, patient activation, health-related confidence, community involvement, and experience of services[27-29], as well as to reduce anxiety, emotional problems, loneliness, and healthcare use[30-32]. Provision of group activities is also a highly effective way to address loneliness[33-34] and improve health[35]. Economic return on investment has also

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3 been evidenced[36-38, 28], with some reports showing better return from services delivered
4 by voluntary/community organisations[37]. These positive outcomes have led to an increase
5 in GPs advocating for SP[39].
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10 While this suggests that SP holds a great deal of potential, a major limitation of the
11 existing evaluated interventions is that they lack an underpinning theoretical framework[40].
12 This impedes the identification of SP's 'active ingredients', and the specific processes
13 through which initiatives can alleviate loneliness, improve health, and reduce healthcare
14 burdens. Specifically, the proliferation of different SP models has created confusion as to
15 how to understand loneliness, operationalise its treatment, and measure its outcomes[41].
16 This means the profiling of potential patients, the identification of their needs, and the
17 delivery of treatment can be ad hoc and piecemeal. Furthermore, lack of clarity among those
18 referring/treating patients, as well as between staff and patients, fosters poor levels of uptake,
19 engagement, and treatment[42-43]. A clearer theoretical understanding of the relationships
20 between loneliness, health, and treatment is needed, and from this, greater consistency in the
21 messages delivered regarding SP.
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39 **The 'Social Cure' as a Theoretical Framework for SP**

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42 The pathway evaluation reported here is underpinned by an appropriate psycho-social
43 framework: the social identity approach to health and well-being, aptly named 'The Social
44 Cure' (SC[44-45]). This approach posits that our social group memberships (e.g., family,
45 community, volunteering group) are consequential for our social life, health, and well-being,
46 but only if we identify with them (i.e., feel a subjective sense of group belonging[46]). Group
47 identification is believed to enhance social life and well-being through numerous benefits,
48 such as reduced loneliness, enhanced self-esteem, and the belief that social support will be
49 available during crisis (e.g.,[47-48]).
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Case Study: SC in Action in an SP Pathway

This study is part of a larger programme of research which uses a multi-method, longitudinal approach to explore these social processes in the context of an ongoing SP pathway (see protocol for details[49]). Our research has two aims. First, we determine which social factors are central to the understanding of SP and how SP is experienced among: a) GPs currently referring to this SP pathway; b) HCs/LWs delivering the pathway; c) patients participating in the pathway. From this we aim to provide an evidence base for the relevance and explanatory power of the SC framework in capturing the ‘active ingredients’ in SP delivery. Second, using a longitudinal survey, we seek to provide evidence for whether the SP pathway does have its effects through these SC processes, and the consequences of this for patients’ health-service use. We now briefly summarise the key details of the specific SP pathway.

Overview of the SP Pathway

The SP pathway began in the English East Midlands in 2017. The pathway is supplemental to any healthcare the patient is already receiving and is designed for patients with chronic illness who are experiencing loneliness. The GP practices in the area covered a population of over 120,000 people. They were introduced and encouraged to participate in the pathway by designated SP advocate GPs, but the level of referrals varied across the practices. The aims are to increase patients’ illness self-management, address their psycho-social and health needs, and through this to reduce primary healthcare usage. Once recruited onto the pathway, patients have an initial meeting and needs assessment with an HC, who either prescribes self-care management or refers to a LW, who in turn connects the patient with relevant third-sector groups. HC/LWs regularly check on patients’ progress. The aim of the pathway was to support each patient weekly for up to 8 weeks. The length of support depended on the

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specific paths offered. By the follow-up assessment, some participants received this number of one-to-one support meetings, while others had fewer meetings with Health Coaches and Link Workers as they had joined group activities and thereafter met with their groups. By the end of the funding, the pathway had received 1483 referrals and supported approximately 650 patients. The initial appointment lasted over one hour, and further appointments ranged in length based on the activities in which the patients were involved.

Study 1

Study 1's aim was to gain a deeper insight into perceptions/understandings of the social factors influencing health and presentation to primary care. Specifically, we intended to investigate the degree to which referrers (GPs), those delivering the pathway (HCs/LWs), and patients themselves, recognise experiences of social (dis)connection, and appreciate the effects of these experiences, as well as SP's potential to remedy these issues.

Method

Participants and Procedure

In-depth, semi-structured interviews were conducted with 7 GPs (referring into the pathway), 3 HCs, 6 LWs (involved in pathway delivery), and 19 patients (full characteristics and recruitment details can be found in table 1).

All potential participants were invited through their managers (email invitation letters were sent to all participating GPs, HCs, and LWs) or pathway staff (letters were sent to the first 80 patients recruited onto the pathway, and then the next 200 patients, due to a low response rate). All those interested were invited to contact the researcher via email/phone/post for further information and to arrange a time for the interview. Further details can be found in the published protocol[49]. The interviews included a range of general topics: participants' understanding of SP; their experience of the pathway; the process of

referrals through the pathway; and perceptions of the pathway’s success (or otherwise). There were also role-specific questions, such as the needs of patients (GPs); experiences of facilitating patient support/engagement (HCs); and involvement with the groups to which they had been linked (patients).

(TABLE 1)

The analysis was separate for each group of participants. This paper focuses on data sections where participants reflect on relationships between psycho-social needs and service use, and the need for/value of SP, guided by the Social Cure framework. All interviews were audio-recorded, transcribed verbatim, and analysed with a realist approach using the six thematic analysis steps[50-51]. The purpose was to provide a detailed account of participants’ views with regards to the specific research questions, using a deductive approach. Two authors conducted the interviews, then began data familiarisation began through repeated listening to interviews, transcript reading, and note-taking. Two authors completed initial coding, which was inclusive: the whole corpus was coded, and the resultant list of codes was collated. Three authors then discussed the relationships between codes and considered how they fitted into potential themes/sub-themes. Candidate themes were reviewed to ensure the presence of meaningful/coherent data within themes, and distinctiveness across themes. Finally, themes were defined, named, and reported. Quotes illustrate the analyses, completed with participant number, indicating omitted lines with (...).

Patient and Public Involvement (PPI).

PPI were not involved in the design, analysis and dissemination of this research.

Results

GP Perspective: Social Factors and the need for a Holistic Service

GPs recognised that a change is required in terms of how health, well-being, and social concerns are understood/addressed by health-services and society. They described how the NHS traditionally does not address social isolation. Achieving this would require a broader approach addressing mental, physical, and social health:

Traditionally as well this used to be very much an extended family village where most people related to each other (...) With the new families coming in they often don't know anybody, so they've lost that ability to support themselves. (...) So, we have many isolated people in the village, lots of single people who, you know, have become lonely and worried about their health just because they've got all the time in the world to sit and think about it. (...) So to have a more sustainable programme I think it will be excellent, I can see it growing, just because of the number of people with diabetes for instance who need encouragement, it's going through the roof, you know, we can't keep pace with them all and we certainly individually cannot fund the education programmes that are needed, so it needs to be done in a CCG wide fashion. (GP-4).

This GP describes how GPs are overwhelmed and cannot provide support for social determinants of health such as social isolation, leading to patients being overlooked. Alongside recognising the link between physical and social health determinants, GPs perceived a shift from a traditional medical model towards recognising the need to provide support for lonely patients:

Well, most of a population's health and well-being is determined by environmental factors, and things that are not to do with healthcare. And, you know, sometimes the traditional medical model (...), our role is to just do the medicine and that's it. But we work in a system. (...) All these things are interdependent, and if we want to, we might not be the experts on it, but if we want to help our patients more and help the population, then we need to access these sort of broader things. (GP-5).

There is recognition of the limitations of the ‘traditional medical model’, concerns over how GPs can support patients with different needs, and frustration at the limitations within the current model. However, while GPs were perceived to be well-placed to identify those in need of healthcare, Participant 5 recognised the limitations of GPs’ own expertise in terms of addressing issues related to patients’ social environments, and the need for a system that provides additional pathways necessary to address such issues. Across participants, SP was viewed as a means to support GPs in providing the best care for patients by addressing loneliness and reducing its negative health impacts:

People become more isolated and often present [at primary care services]. I had a lady who used to come and see me whose depression used to peak, and her mood deteriorated when her art classes stopped. Then, she used to come to the doctor a lot. When the art classes started up, we didn’t see her. (GP-2)

By referring to frequent presentation, the participant highlights one of the challenges that primary care faces at a time of limited resources and increasing demand, whilst also reflecting on the cost this has to patients whose mental health is affected by isolation.

Inherent in this account is a suggestion that community activities can alleviate mental health issues, as well as reduce primary care demands, which operates within a limited timeframe (average UK GP appointments last 9 minutes[52]). Experiences of isolation and a lack of social connection were thus recognised by GPs as a contributor to ill-health, as well as a key reason for accessing services. This recognition guided their SP pathway referrals.

GPs also discussed concerns about referring due to limited knowledge and understanding of the pathway and poor feedback on their referrals (all of which could influence the referrers' willingness to continue engaging with the pathway).

LW/HC Perspectives: Social Needs and Community

SP providers highlighted the importance of reconnecting patients with the community through SP initiatives. They articulated how SP can help combat loneliness/isolation through patients receiving social support from others undergoing the same experiences. It was also hoped that patients' increased knowledge of what is available in the community would improve their social confidence:

I think it is important, I think people can maybe lose their way a bit because of certain things that's happening in life and I think if, they can get locked away in their home, become isolated and anxious and I think if people know what's around them I think it might or it does help with getting them out, giving them a bit more motivation, talking to people in their area and understanding that it's not just them going through things their selves, you know, people are going through similar things. Yeah, so it's just something that they know they can go to, it might be a group that they know they can go to every week and feel comfortable with going to that. (LW-1)

Social support provision makes patients feel comforted, understood, motivated, less anxious and less isolated, but it can also involve patients sharing information about difficulties they are experiencing. SP providers argued that groups benefitted the whole community, as well as individual patients:

I think as we work with individuals to get them engaged more with the community, the community itself then benefits by having more people engaged with it, so it becomes almost organic and it can grow and develop itself, just to help to meet the needs of its members, I guess. (HC-5)

In this way, SP was understood to have the potential to make an impact in addressing social, physical, and mental-health concerns, and to develop a holistic health service. The success of the referrals and the pathway brought challenges for HCs/LWs who felt the increasing numbers could impact the quality of services provided.

Patients’ Perspective: Relationship with LW/HC and Building Social Connections

Relationship with LW/HC

Typically, patients described their interactions with pathway staff as positive. They liked having time to discuss challenges thoroughly and receiving tailored support. Patients felt that staff were empathetic to their needs, and they believed that SP was qualitatively different to their experiences with other health professionals:

I think when you go to the doctor, you're used to having this ten-minute slot and you have to like quickly get everything in. And then when you go and see a counsellor, or you go and see your support worker, you have that full hour, and I wasn't really used to that at the time, that expanse of time where you can just relax and talk. (Patient-3)

An important aspect of the support patients received was having someone listen to them. Patient 7 describes how she was supported in a way that allowed self-reflection on her challenges:

I felt as though they gave me the chance to reason out that I was getting better. I listened to them. I knew what was going on in my head, but I couldn't always, I didn't always want to tell anyone. I seemed, with the link-worker, I seemed as though I could get over that more quickly. He wasn't demanding. He was very quiet and very gentle with it, and that is the way that I needed somebody to be, to maybe listen to me, really listen to me, and hear what I was saying, if you can understand that. (Patient-7)

Patient 7 highlights an important aspect of the therapeutic relationship (which was echoed across accounts) when she notes that the LW “wasn’t demanding”. Participants saw this as a goal achievement facilitator. When discussing the progress of their goals with staff, beneficiaries experienced support as encouraging rather than punitive (contrary to their expectations). Two participants did not feel supported because the pathway staff failed to maintain contact as expected, or interacted in what was perceived as a rushed manner. This in turn made the patients feel their needs were not understood.

Building Social Connections

For patients who were socially isolated and coping with complex health issues, joining community groups was challenging. Some expressed fear of going outside the home, or anxiety about meeting new people. LW support was vital for becoming more socially connected, specifically being accompanied by the LW to the first group meeting:

[The LW] said that both of us could go to [the group] the first time, so that she could help me make sure I was comfortable and that I had what I needed to do the class. She spoke to [the instructor] and introduced me to her. I felt a lot happier knowing I had someone I knew to go with me. [lines omitted] If someone had just told me to go, I don't think I would have gone. (Patient-8)

Many patients described increased feelings of self-confidence following their pathway participation. This was particularly evident for those with complex conditions and/or social isolation. Some credited LW support as facilitating self-confidence improvements, and their ability to make new connections.

A positive group experience was also vital. This was typically facilitated by a sense of belonging, and feeling welcomed by the group (and leader). Aside from loneliness alleviation, groups allowed Participant 4 to provide support to similar others, which he experienced as an important aspect of group membership:

You're kind of helping each other, because I think for most people [with this condition] you kind of feel that you're the only person on the whole of Plant Earth, you know. You don't seem to know how many other people [have this condition] so the fact that you can meet up with others is like, oh, there are other people that understand and know how it's difficult (...) and so, you were able to give each other encouragement or copy each other or learn from each other. (Patient-4)

Thus, for patients, positive relationships with LWs and group members were essential prerequisites for engaging in social activities and connecting with others, thus addressing social isolation/loneliness.

Sustaining meaningful connections with groups aided confidence-building. For example, Participant 3 explained how she was now confident enough to attend sessions on her own, as well as join further groups (and return to groups she had previously left due to health issues), thus building further connections:

So, I didn't know there were people out there like me, and [LW] made me realise (...), there are lots of people out there like me and we're like a little tribe. And there's little places we can go and hook up and just kind of like talk about anything you want, or not talk at all. And I just think it saved me. Honestly, I don't know what would have happened. It terrifies me to think what would have happened. I think I would have got more ill, if I'm honest, because I was desperate. (Patient-3)

The positive benefits of group engagement were thus enabled by the LW, who served as connector and confidence builder. Typically, participants did not feel positive about the SP pathway when they felt the groups they were referred to did not meet their needs or they felt unwelcomed. Participant 8, who had a negative group experience, suggested that SP groups should be sensitive to the issues that patients who joined the group might be dealing with:

Whoever's running a particular class should be made aware of the programme itself and the issues and the impact it could have on the people who have eventually managed to get out of the house, and treat them a little better.

In this case, the participant highlights their disappointment in not feeling well-treated or having their needs understood, especially after a lot of effort was required to make the first step ("leave the house"). Thus, rather than fostering connection, group participation seems to add to the issues rather than address them.

Discussion

Our analysis reveals these GPs recognise the limits of the medical model in addressing patient well-being, especially those with complex chronic conditions. All participants recognised the potential role of SP in addressing social needs, and the unique role that LWs, groups, and communities can play in establishing these benefits. Importantly, the analysis also confirms that patients recognise how social factors affect their health, and report how social connectedness/belonging benefits their health.

This is preliminary evidence for the relevance of the SC perspective for the understanding of SP. Both providers and patients report the negative effects of social isolation on health/healthcare usage, as well as the positive benefits of social inclusion/belonging. Moreover, SP providers and patients specify that it is the quality of the social relations which has well-being benefits. In particular, patients report various factors, including feelings of acceptance and belonging within activity groups/communities, which are central to understanding the health benefits of group memberships, as outlined in SC. Since reducing loneliness through building social connectedness (i.e. group membership and community belonging) is central to both SP and SC, our second study determines whether these factors do indeed impact upon loneliness, as well as healthcare usage (another core aim of SP).

Study 2

Aim

Study 2 involved asking patients a survey of questions at the point of referral onto the SP pathway (T0), and at a subsequent time-point (T1) to evaluate the overall efficacy of the pathway (for study protocol, see[49]). These data allow an analysis of the psycho-social

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factors mediating the relationships between change in group memberships and health service usage.

Method

Predictions

Based on SC, we hypothesise that possessing group memberships will positively predict a psychological sense of community belonging, which will in turn be associated with lower levels of loneliness. In turn, we propose that this serial mediation pathway will then predict service usage which, if supported, would constitute a particularly strict test of our SC model.

Based on previous SP literature and the Social Identity Approach, the two variables we expected to change during the pathway were patients' service use (decrease), and participants' number of group memberships (increase). While we did not necessarily expect the other variables (e.g., community belonging, loneliness) to change during the short period between T0 and T1, we expected these (based on SC theorising) to be the 'active ingredients' through which an increase in participants' number of group memberships would predict reductions in service use.

Participants and Procedure

All data were gathered during the first 18 months of pathway operation (November 2017-February 2019)¹. T0 survey data ($n=630$) were gathered by HCs delivering the survey face-to-face in the first meeting at participants' GP surgeries (285 males, 340 females, 5 unknown; $M_{age} = 52.74$ years, $SD = 14.79$). T1 data were collected via phone/face-to-face on average 4 months after T0, during a routine follow-up with HCs for 178 participants (86 males, 91 females, 1 unknown; $M_{age} = 55.75$ years, $SD = 13.80$). Using G*Power[53], we

¹ In the published protocol[49] it is specified that there will be additional follow-ups, but due to delays in setting up the intervention and higher levels of referral than expected, there was no funding available to complete the additional planned follow-ups.

computed an a priori minimum sample size of 49 for a repeated measures ANOVA, assuming a partial η^2 of 0.147 (the value we obtained in the service use repeated measures ANOVA described below) and 0.80 power. Bonferroni-corrected between-groups *t*-tests revealed that T1 responders had significantly more group memberships ($M = 1.89$, $SD = 1.59$) than T1 non-responders ($M = 1.51$, $SD = 1.37$), $t(628) = -2.94$, $p = .003$, and were significantly older ($M = 55.75$, $SD = 13.80$) than non-responders ($M = 51.56$, $SD = 15.01$), $t(625) = -3.22$, $p = .001$. All other *p*-values were $> .05$.

Survey Measures

Patients were given a list of ten social groups (*“family; sports clubs, gyms, or exercise class; tenant group/resident group/neighbourhood watch; political party/trade union/environmental group; church or other religious group; education/art/music group, or evening class; social club; support group (e.g., diabetes support); any other organisations, club, or society”*) and were asked to indicate to which they belong to. Alternatively, patients could tick *“I am not a member of any groups”*. From this, patients’ *number of group memberships* (0-10) was calculated.

We measured *community belonging* with a single item previously used in population surveys of social attitudes[54], (*“Thinking about this local community, the kind of place it is and the kind of people who live around here, would you say that you feel a sense of belonging to this local community?”*). Patients rated their agreement on a 1 (*definitely not*) to 4 (*yes definitely*) scale.

We measured *loneliness* with the eight-item ULS-8[55]. Patients rated their agreement with each item (e.g., *“I lack companionship”*) on a 1 (*not at all*) to 5 (*completely*) scale. The mean score of the items was found, with higher values indicating greater loneliness.

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Health service use was measured by asking patients to indicate the number of times they have used primary care (e.g., GP in-person appointments, GP phone appointments) in the previous three months, using an adapted measure from[56]. Change in service usage was also calculated, since service use reduction is a core goal of SP.

Finally, patients were asked to specify their *age*, *gender*, whether they were in a *relationship*, and their highest level of *education*.

Statistical Analyses

We conducted a repeated-measures ANOVA to compare T0/T1 service use and T0/T1 number of group memberships. Additionally, we used model six in version 3.0 of PROCESS macro [57] to test our SC-derived prediction that possessing more group memberships at T1 than T0 will predict higher community belonging, which in turn will predict lower loneliness, which in turn will predict less primary care usage. The analyses involved 5,000 bootstrapping samples with 95% confidence intervals (LLCI/ULCI), using the percentile method. Values were mean-centred for the construction of products. Participants' gender, age, relationship status, employment status, and highest level of education were controlled for, as were the T0 versions of the mediator and predictor variables (i.e., community belonging, loneliness, and primary care usage T0).

Results

Does this SP Pathway Reduce Healthcare Usage?

Table 2 presents the descriptive statistics and correlations for each T0/T1 variable, and change in number of group memberships between T0 and T1.

(TABLE 2)

Patients used primary care services less at T1 ($n=797$) than T0 ($n=1063$), with a 25% ($n=266$) reduction in appointments. Participants' primary care use decreased significantly between T0 ($M=5.9$, $SD=8.2$) and T1 ($M=4.5$, $SD=8.4$), $F(1,176)=9.14$, $p=.003$.

Does this SP Pathway Reduce Healthcare Use via SC Processes?

Participants' number of group memberships increased significantly between T0 ($M=1.89, SD=1.59$) and T1 ($M=2.21, SD=1.87, F(1,177)=5.34, p=.022$, partial $\eta^2=.029$). Supporting predictions, we found a significant relationship between change in number of group memberships between T0 and T1 and primary healthcare usage T1 through community belonging T1 and loneliness T1, $Effect=-.04, Boot SE=.02, Boot LLCI=-.09, Boot ULCI=-.005$. Change in number of group memberships was a positive predictor of community belonging T1, $Coeff=.09, SE=.04, t=2.61, p=.01, LLCI=.02, ULCI=.16$, while community belonging T1 was a negative predictor of loneliness T1, $Coeff=-.31, SE=.07, t=-4.15, p=.0001, LLCI=-.45, ULCI=-.16$, which was a positive predictor of primary healthcare usage T1, $Coeff=1.41, SE=.45, t=3.13, p=.002, LLCI=.52, ULCI=2.31$. The total effect of change in number of group memberships on primary healthcare usage T1 was non-significant, $Effect=-.07, SE=.18, t=-.39, p=.70, LLCI=-.42, ULCI=.28$ (it is appropriate to test for indirect effects when the total effect is non-significant; this is known as indirect-only mediation [58]), and this remained almost unchanged when community belonging T1/loneliness T1 were accounted for (direct effect), $Effect=-.08, SE=.18, t=-.43, p=.68, LLCI=-.43, ULCI=.27$. See Figure 1 for the model².

(FIGURE 1)

² To test the possibility that number of group memberships could predict loneliness without first predicting community belonging, we re-ran our PROCESS model with community belonging removed (i.e., we used model 4, which only involves one mediator). The indirect effect of change in number of groups (T1-T0) on primary care use T1 via loneliness T1 was non-significant ($Effect=-.03, Boot SE=.05, Boot LLCI=-.17, Boot ULCI=.06$).

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Discussion

As predicted, psycho-social factors were important for predicting reductions in primary care usage at 4 months following SP pathway participation. While we did not expect the full benefits of group membership upon healthcare usage to be immediately apparent within this short implementation period (many previous SP evaluations have only reported benefits after 6 months, or even longer [59]), the fact that patients reported significant relationships between social psychological variables and service use is promising.

Our mediation analysis allows us to move beyond associative results to explore between-variable relations. From this we can determine that possessing more group memberships predicts a stronger sense of community belonging, which in turn predicts lower levels of loneliness, which in turn predicts reduced primary care use. Crucially, the serial relationship through these mediators is significant, and occurs independently of any relationships with age, gender, relationship status, or educational background. We can assert that group memberships predict these patients' reduced service usage via community belonging and reductions in loneliness.

General Discussion

As we have argued above and elsewhere (e.g.[49, 40]), SP is a successful practice in need of a theoretical explanation. While there is abundant evidence that SP can (and does) work to redress the consequences of social isolation, the question of how and why it has its effects remains unanswered. Given the disparate variety of possible SP models, and the wide variation in effectiveness measures[41], it is crucial to use methodological triangulation and advanced analyses to identify 'active ingredients' which will highlight this complex intervention's benefits[60]. Doing so will foster a common understanding of the purposes/functions of SP, which should improve communication, recruitment, engagement, service delivery, and outcomes.

Our research constitutes a first step in this direction by exploring how this particular pathway is used, experienced and understood by different actors. Our qualitative analyses point to a consensus among GPs, SP staff, and patients: loneliness and social isolation - key threats to patient health - can be addressed through SP. In line with research in the Social Cure tradition which has demonstrated a direct link between lack of social group connectedness and GP attendance[12] the absence of meaningful associative relationships is recognised by these health professionals to have detrimental health effects. Moreover, social isolation was perceived by GPs as being directly related to the frequency of inappropriate usage of primary care services by some patients and SP was recognised as a remedy for this.

Analysis of patient perspectives shows that these social factors were pivotal to their positive experience of the pathway. The supportive and encouraging role played by HCs/LWs, welcoming attitudes, acceptance from activity groups, and the more global sense of being connected to their community were crucial prerequisites for any pathway benefits. In line with the Social Cure approach[61] the psychological and social resources flowing from rich group-based social connections were experienced as the root of SP's positive effects.

Our patient survey allowed us to empirically examine these associations. Our results replicated previous findings showing the importance of group memberships for health service usage (e.g.,[12]), and we illustrate the predictive direction of this effect, with group memberships predicting increased community belonging, which predicts reduced loneliness. Moreover, these factors serially predict health service use, even when controlling for age, gender, relationship status, and education. In effect, our results validate the perceptions of healthcare staff and the experiences of patients in evidencing the role of SC processes in this SP pathway.

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Of course, there are limitations to our research. We acknowledge that the results from our longitudinal analyses are based on a short time period and are likely to strengthen over longer time-periods[49], though observing benefits after such a short time is promising. Furthermore, the specific characteristics of this sample (adults with complex health needs from across the socio-economic spectrum) need to be borne in mind when considering the applicability of SP to other populations. The pathway's geographical area is a relatively affluent suburban borough of East Midlands that experiences much lower levels of crime/deprivation than nearby urban areas. The effectiveness of SP in areas with fewer community resources/lower community cohesion remains to be determined. We predict that within deprived communities/disadvantaged social groups, the benefits of social connections are likely to be more pronounced, while the opportunities to establish them are more limited. Importantly, the designated GP advocates of the SP and the location of some of the LCs/HWs within these GP practices, facilitated referrals, visibility, and engagement with the pathway.

Bearing in mind these limitations, our work, among the first to quantify the effects of SP, has several specific implications arising from the applicability of the Social Cure perspective. The first pertains to the determination of what elements of SP could have most effect, and through which processes. We predict that SP initiatives which reconnect isolated patients with their local community should help unlock community-based sources of social/emotional support, thereby enabling them to better cope with loneliness. Conversely, those pathways which deliver one-to-one treatment without recognition of patients' social needs may fail to unlock these support sources. The Social Cure literature offers a manualised five-session psychological intervention (Groups4Health) aimed at developing and maintaining social group membership, which has been shown to tackle loneliness by building participants' sense of group belonging[62] as well as a psychometrically-valid 'Social Identity Mapping' tool that can be used to produce a visual representation of an individual's

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group memberships[63]. Either could be integrated into future SP initiatives and provide a strong basis for identifying and meaningfully addressing gaps in social connection. Identification of these gaps and individual needs can help avoid mismatching and increase connection with the activity groups.

The second recommendation comes from an appreciation of the role of community belonging in reducing loneliness. While initiatives such as SP are often geared towards utilising community groups/resources, they rarely consider local communities themselves as a source of well-being. This is at odds with increasing evidence attesting to the social and psychological impacts of neighbourhoods upon health, well-being, and resilience[64-66]. The SC model predicts that greater sense of community identification and belonging can unlock a wide range of psychological, social, and practical supports, including increased trust, reciprocal helping, and collective enterprise. Our work suggests that SP initiatives which focus on the locatedness of their patients within their local communities, and which serve to enhance this sense of connectedness/belonging among the broader population will reach more individuals, create more sustainable community environments, and be a more effective (and ‘social’) cure.

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Table 1

Participant characteristics

Characteristic	Patients	GPs	LWs/HCs
<i>N</i>	19	7	3 HCs, and 6 LWs.
Age	29 to 85 years (average age: 60.4 years).	33 to 53 years; 3 unknown (average age 43 years).	HC: 47 to 50 years (average age 48.43 years). LW: 22 to 52 years, 1 unknown (average age 30.80 years).
Gender	12 female, 6 male, 1 prefer not to say	2 female 5 male	HC: 1 female; 2 male LW: 2 female; 4 male
Interview location	University campus, in patient' homes, private spaces at the community library	GPs' workplace; university campus	HC: university campus LW: LWs' workplace; university campus
Interview length	Ranged 20 to 111 minutes ($M_{\text{duration}}=55$ minutes).	Ranged 21 minutes and 3 seconds to 51 minutes and 31 seconds ($M_{\text{duration}}=34$ minutes and 83 seconds).	HC: ranged 40 minutes and 9 seconds to 76 minutes and 30 seconds ($M_{\text{duration}}=62$ minutes). LW: ranged 30 minutes and 26 seconds to 70 minutes and 45 seconds ($M_{\text{duration}}=48$ minutes and 45 seconds).
Ethnicity	84% ($n=16$) White and/or British	71.43% ($n=5$) White British and ($n=2$) Caucasian	HC: White British ($n=3$); LW: White British ($n=4$) and White ($n=2$)
Recruitment	All first 456 recruited patients	Organisational contact points	Organisational contact points

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	were invited once at least 3 months after recruitment. Invitations were sent in 4 waves to achieve a total of 19.		
Employment	53% (<i>n</i> =10) retired 47% (<i>n</i> =9) in work	N/A	N/A
Living with	42% (<i>n</i> =8) lived alone	N/A	N/A
Referred by	58%, (<i>n</i> =11) GP 26%, (<i>n</i> =5) self 16%, (<i>n</i> =3) practice nurse	N/A	N/A
Referral reason	53%, (<i>n</i> =10) weight loss followed by support for 37%, (<i>n</i> =7) multiple/complex needs including loneliness	N/A	N/A

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Table 2

T0/T1 (n = 178): Descriptive statistics and inter-correlations for key variables

Variable	1	2	3	4	5	6	7	8	9	10	11	12	13
1. Change in No. of Groups (T0-T1, $M = 0.33$, $SD = 2.15$)	-												
2. No. of Groups T0 (1-10, $M = 1.89$, $SD = 1.59$)	-.53***	-											
3. No. of Groups T1 (1-10, $M = 2.21$, $SD = 1.87$)	.69***	.23**	-										
4. Community Belonging T0 (1-4, $M = 2.72$, $SD = 1.12$)	-.16*	.31***	.08	-									
5. Community Belonging T1 (1-4, $M = 2.75$, $SD = 1.08$)	.10	.14	.24**	.44***	-								
6. Primary Care Use T0 ($M = 5.97$, $SD = 8.11$)	.04	-.04	.01	.01	-.11	-							
7. Primary Care Use T1 ($M = 4.48$, $SD = 8.32$)	.01	.01	.01	-.06	-.14†	.69***	-						
8. Loneliness T0 (1-5, $M = 2.42$, $SD = 1.13$, $\alpha = .88$)	.15	-.20**	-.001	-.38***	-.29***	.08	.21**	-					
9. Loneliness T1 (1-5, $M = 2.35$, $SD = 1.00$, $\alpha = .87$)	.06	-.15*	-.06	-.25**	-.40***	.20**	.32***	.44***	-				
10. Age ($M = 55.75$, $SD = 13.80$)	-.09	.19*	.07	.19*	.08	-.02	-.02	-.26**	-.22**	-			
11. Gender (1 = male, 2 = female)	.01	.14†	.13†	-.03	-.04	.02	-.02	-.02	-.11	.10	-		
12. Relationship (0 = no, 1 = yes)	-.03	.07	.02	.06	.23**	-.04	-.03	-.36***	-.22***	.07	.08	-	
13. Education (1 = none, 2 = sch/coll, 3 = uni/wrk)	-.06	.23**	.13†	.10	.03	-.04	.07	-.08	-.11	.15†	.09	.04	-

*** $p < .001$, ** $p < .01$, * $p < .05$, † $p < .10$.

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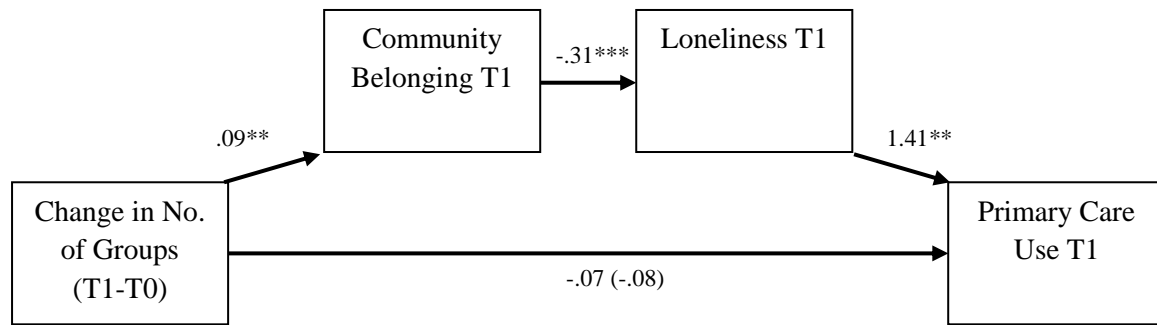
Acknowledgements

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Data sharing

There is no permission to share the qualitative data from the research participants. Quantitative data can be shared upon request.

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Title and Abstract		
	Requirements	Present study
1. Title	Indicate that the manuscript concerns an initiative to improve healthcare (broadly defined to include the quality, safety, effectiveness, patient-centeredness, timeliness, cost, efficiency, and equity of healthcare)	Reference to quality and effectiveness of care provision has been made on title Pg. 1
2. Abstract	a. Provide adequate information to aid in searching and indexing b. Summarize all key information from various sections of the text using the abstract format of the intended publication or a structured summary such as: background, local problem, methods, interventions, results, conclusions	Details are provided on Objectives, design, setting, participants, intervention, main outcomes, results and conclusion Pg 4
Introduction	<i>Why did you start?</i>	
3. Problem Description	Nature and significance of the local problem	There is thus an urgent need to adopt more patient-centred holistic care provision that considers psycho-social factors alongside physical health needs. PG6
4. Available knowledge	Summary of what is currently known about the problem, including relevant previous studies	Social determinants of health such as loneliness has been linked to poor physical and mental health and primary care attendance, but primary care provision cannot focus on social determinants of health. Social Prescribing initiatives could provide a solution to addressing social determinants of health while reducing primary care use. PG6-7.
5. Rationale	Informal or formal frameworks, models, concepts, and/or theories used to explain the problem, any reasons or assumptions that were used to develop the intervention(s), and reasons why	Social prescribing initiatives are being considered as alternative to address economic burden on loneliness. But such initiatives lack theoretical grounding. The present study introduces The Social Cure as theoretical

	the intervention(s) was expected to work	framework to understanding the impact of Social Prescribing initiatives. PG 8
Specific aims	Purpose of the project and of this report	Our research has two aims. First, we determine which social factors are central to the understanding of SP among: a) GPs currently referring to this SP pathway; b) HCs/LWs delivering the pathway; c) patients participating in the pathway. From this we aim to provide an evidence base for the relevance and explanatory power of the SC framework in capturing the 'active ingredients' in SP delivery. Second, using a longitudinal survey, we seek to provide evidence for whether the SP pathway does have its effects through these SC processes, and the consequences of this for patients' health-service use. Pg 9
Methods	<i>Why did it do it?</i>	
Context	Contextual elements considered important at the outset of introducing the intervention(s)	Primary care challenges outlined in pg 7 Context of research outlined in pg 9
Interventions	a. Description of the intervention(s) in sufficient detail that others could reproduce it b. Specifics of the team involved in the work	Intervention and team involved are described in pg 9.
Study of the intervention	a. Approach chosen for assessing the impact of the intervention(s) b. Approach used to establish whether the observed outcomes were due to the intervention(s)	A multi-method and multi-perspective approach aiming to triangulate findings outlined in pg 10-11
Measures	a. Measures chosen for studying processes and outcomes of the intervention(s), including rationale for choosing them, their	Measures for study 1 outlined in pg 10-11 Measures for study 2 outlined in pg 21-22

	operational definitions, and their validity and reliability b. Description of the approach to the ongoing assessment of contextual elements that contributed to the success, failure, efficiency, and cost c. Methods employed for assessing completeness and accuracy of data	
Analysis	a. Qualitative and quantitative methods used to draw inferences from the data b. Methods for understanding variation within the data, including the effects of time as a variable	Method for study 1 outlined in pg 10 Method for study 2 outlined in pg 22
Ethical Considerations	Ethical aspects of implementing and studying the intervention(s) and how they were addressed, including, but not limited to, formal ethics review and potential conflict(s) of interest	Ethical considerations have been outlined in detail in the published protocol attached. No additional issues were identified during delivery. The study was reviewed by two ethics committees.
Results	What did you find?	
Results	a. Initial steps of the intervention(s) and their evolution over time (e.g., time-line diagram, flow chart, or table), including modifications made to the intervention during the project b. Details of the process measures and outcome c. Contextual elements that interacted with the intervention(s) d. Observed associations between outcomes, interventions, and relevant contextual elements e. Unintended consequences such as unexpected benefits, problems, failures, or costs associated with the intervention(s). f. Details about missing data	Study 1 findings are outlined in pg 12-18 Issues identified in study 1 were follow-ed up and addressed in study 2. Study 2 findings are outlined in pg 22-23 and tables 2, 3 and figure 1.
Discussion	What does it mean?	
Summary	a. Key findings, including relevance to the rationale and specific aims	Key findings are presented at the start of the general discussion pg 23-24.

	b. Particular strengths of the project	Strength of the project are provided in pg 24.
Interpretation	a. Nature of the association between the intervention(s) and the outcomes b. Comparison of results with findings from other publications c. Impact of the project on people and systems d. Reasons for any differences between observed and anticipated outcomes, including the influence of context e. Costs and strategic trade-offs, including opportunity costs	Interpretation in relation to outcomes, previous research, impact, context and effectiveness are outlined in pg 25-26.
Limitations	a. Limits to the generalizability of the work b. Factors that might have limited internal validity such as confounding, bias, or imprecision in the design, methods, measurement, or analysis c. Efforts made to minimize and adjust for limitations	Limitations are outlined in pg 25-26.
Conclusions	a. Usefulness of the work b. Sustainability c. Potential for spread to other contexts d. Implications for practice and for further study in the field e. Suggested next steps	Conclusions of the work in terms of usefulness, sustainability, spread and implications are outlined in page 25-26.
Other information		
Funding	Sources of funding that supported this work. Role, if any, of the funding organization in the design, implementation, interpretation, and reporting	Outlined in page 3.