**The effectiveness of social prescribing in the management of long-term conditions in community-based adults: a systematic review and meta-analysis**

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**Abstract**

**Objective:** The objective of this systematic review and meta-analysis was to evaluate the effectiveness of social prescribing interventions in the management of long-term conditions in adults.

**Data Sources:** Eleven electronic databases were searched for randomized and quasi-randomized controlled trials.

**Review Methods:** Outcomes of interest were quality of life, physical activity, psychological well-being and disease-specific measures. Bias was assessed with the Cochrane Risk of Bias 2 tool. A narrative synthesis and meta-analysis were performed.

**Results:** Twelve studies (n=3566) were included in this review. Social prescribing interventions were heterogeneous and the most common risks of bias were poor blinding and high attrition. Social prescribing interventions designed to target specific long-term conditions i.e. cancer and diabetes demonstrated significant improvements in quality of life (n=2 studies) and disease specific psychological outcomes respectively (n=3 studies). There was some evidence for improvement in physical activity (n=2 studies) but most changes were within group only (n=4 studies). Social prescribing interventions did not demonstrate any significant changes in general psychological well-being.

**Conclusion:** Social prescribing interventions demonstrated some improvements across a range of outcomes although the quality of evidence remains poor.

**Keywords:** Social Prescribing, Long-term conditions, Community link-worker, Community health worker, Self-management.

**Introduction**

Long-term conditions are lifelong health problems, which tend to be managed through medication and other therapies 1, 2. Though long-term conditions lack a universal definition 3 it is acknowledged that long-term conditions may present as individual or multiple diseases co-existing simultaneously 4 significantly impacting on both physical 5, 6 and mental wellbeing 7, 8 and are associated with increasing age, female gender, lower income class and poor social network 9. Patients with long-term conditions have poor quality of life 10, 11, reduced ability to work 12, greater dependence on hospital services 13 and experience premature death 14. Healthcare providers are encouraged to adopt patient-centred models of care for individuals with complex multimorbidity 15 to prevent treatment burden that accompanies fragmented delivery of poorly coordinated single disease models of care16.

Social prescribing is an innovative person-centred approach17 to help individuals from socioeconomically deprived areas address the biopsychosocial factors associated with long-term conditions 18 and improve their quality of life 19 20, 21 by linking patients in primary care with existing tertiary support services in the community 22, 23. Social prescribing may complement existing medical management by incorporating both horizontal and person-centred integration models of care 24. A social prescription involves the referral of individuals by medical and allied health practitioners to non-clinical laypersons called “Community link-workers” or “Community health workers”, who collaborate with these individuals to identify purposeful goals and co-design a social prescribing pathway involving relevant community based support schemes 19, 25-28. For the purpose of this review, non-clinical laypersons, recruited from the local community (that do not have existing health care qualifications) will be referred to as community link-workers. Social prescribing pathways vary from light touch signposting for housing and financial needs 29 and community groups referral for art therapy or exercise therapy30, 31 to more intensive pathways offering increased community link-worker support to address the complex needs of individuals with long-term conditions19.

Participants of social prescribing initiatives have reported improvements in numerous health domains, for example: increased self-esteem 32; increased sense of control and empowerment 32, 33; improvements in psychological well-being 34; reduction in anxiety and/or depression 35; and improved physical health and lifestyle 36. Previous systematic reviews exploring the effectiveness of social prescribing have highlighted the heterogeneity of the methodological approaches across the research. Uncontrolled before and after studies; lack of comparative controls; patients lost to follow up and inappropriate outcome measures for the population of interest are reported as limiting factors influencing the strength of the findings19, 25. Furthermore previous systematic reviews were limited to specific countries19, 25, 37 or had a singular focus on particular outcomes of interest38 and population 39. This current systematic review will bridge this gap in the evidence by including only randomised/quasi-randomised controls, from different geographical regions, focusing on outcomes that reflect the multifactorial nature of long-term conditions. Given the limitations of the literature to date, the aim of this systematic review and meta-analysis was to determine the effectiveness of social prescribing in the management of long-term conditions in community-based adults.

**Methods**

A systematic review of the literature was conducted in accordance with the Preferred Reporting Items for Systematic Reviews and Meta-Analysis (PRISMA) statement 40. The protocol for this review is registered with Open Science Framework <https://osf.io/p5vf9/>.

**Study Design**

A systematic literature review of randomised and quasi-randomised controlled studies assessing the effectiveness of a social prescribing intervention on community-based adults with long-term conditions, utilising a “Community link-worker” or “Community health worker” was performed. A narrative synthesis was conducted on the identified studies and a meta-analysis performed on those studies that reported HbA1c levels in diabetes.

**Data Sources and Search Strategy**

A comprehensive literature search (Supplementary Material #1) of electronic databases was conducted from inception until November 2022 and updated in December 2023. Databases searched were: MEDLINE and MEDLINE in Process (via Ovid), EMBASE, Cochrane Central Register of Controlled Trials (CENTRAL), Cumulative Index to Nursing and Allied Health Literature (CINAHL), EU Clinical Trials Register, LILACS (Latin American and Caribbean Health Sciences Information Database), Scopus and AgeINFO. Trial registries including Clinicaltrials.gov, WHO trials search (ICTRP) and TRoPHI (Trials Register of Promoting Health Interventions) were also searched. The search was supplemented by hand searching relevant journals and citation tracking. The Grey literature was searched using Irish Health Service Executive (HSE) Lenus, RIAN, Open Grey and WHOLIS (World Health Organization Library Information System).

**Inclusion and exclusion criteria**

To be included studies had to be randomised or quasi-randomised controlled trials incorporating a social prescribing model with a non-clinical community-based link-worker, recruited from the community, without a previous qualification in medical or health sciences or already working in a professional clinical role. The social prescribing interventions had to be community-based using a health promotion approach defined by the Social Prescribing Network Conference Report for Long-term Conditions in Community Dwelling Adults35. Any long-term conditions appropriate for a social prescribing intervention could be included in this review (for example, diabetes mellitus, stroke, asthma, depression, chronic obstructive pulmonary disease, chronic kidney disease, hypertension, inflammatory arthropathies, irritable bowel syndrome, obesity, cardiovascular disease, low back pain, progressive neurological disorders, and cancer). Interventions could be face-to-face or remote. Outcome measures of interest were quality of life, physical activity, psychological well-being, and disease-specific measures. Only studies published in English were included and participants had to be at least 18 years.

All studies identified from the search strategy were exported to Covidence software 41. After study duplicates were removed an initial screening of titles and abstracts was conducted independently by two authors (DJOS and JGMcV). Full text of suitable studies was obtained and independently screened against the inclusion criteria. Studies meeting the inclusion criteria were independently reviewed with any disagreements between the two reviewers arbitrated by a third reviewer (JH).

**Data extraction**

A data extraction template was developed a priori and trialled with one study. Study characteristics captured included author, year of publication, patient demographics (age, gender) and background, intervention, control, duration of the intervention, primary and secondary outcome measures, results. A further characteristic of the intervention table was also made. Both original tables may be found in the supplementary materials file.

**Methodological quality evaluation and Risk of Bias**

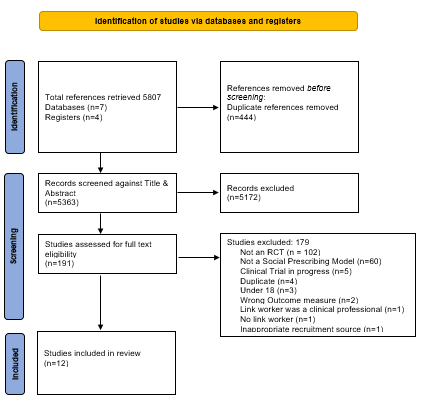
The methodological quality and reporting standards of this review was constructed using the Cochrane Collaboration’s tool for assessing risk of bias in randomised and quasi-randomised trials (RoB2) 42. The Rob2 tool is structured into five domains 38 including; bias arising from the randomisation process; bias due to deviations from intended interventions; bias due to missing outcome data; bias in measurement outcome; bias in selection of the reported outcome. Risk of bias was assessed independently by two reviewers (DJOS, JGMcV) and differences resolved by discussion with a third researcher (JH). A judgement was made on each study as being low, high, or unclear risk of bias.

**Data Synthesis**

Summary data on the study characteristics and the study interventions (Table 1) were extracted and presented in tabular form, (primary study characteristics table and primary intervention table is available in supplementary materials). A narrative synthesis was conducted, and the data was explored to interpret the relationships in the data within and between studies. Data was analysed to determine the impact of variability in study designs, populations and outcome measures. A meta-analysis, was performed on four of the 12 included studies using the Hartung-Knapp-Sidik-Jonkman 43 random-effects method and illustrated graphically (Figure 2). The standardized mean difference (SMD) and 95 % confidence interval (95 % CI) was used to analyse the effect of the community link-worker intervention on haemoglobin A1C (HbA1c) in diabetes, when comparing community link-worker interventions to the control group. Where necessary, authors were contacted to solve possible uncertainty of effect size and RoB2 interpretations. To assess between-study variance we used tau-squared (the variance of true effects). The I² statistic was then used to determine any inconsistencies within the data. These statistical analyses were performed using IBM SPSS Statistics (Version 29) 44. Statistical significance was set at 5 %. Sensitivity analyses were performed by removing the study with the highest “weight” for each cluster.

**Results**

Electronic searches identified 5807 potential studies. After duplicates were removed (n=444), 5363 studies were screened for title and abstract content of which 191 studies were eligible for full text screening (n=3566). Two reviewers (DJOS, JGMcV) independently assessed the eligibility of these studies and 12 studies were selected for this review. An updated search of the literature was conducted in December 2023 but did not identify any further studies. Figure 1 outlines the PRISMA flow chart.



**Figure.1** PRISMA flow diagram

**Study Characteristics**

The selected studies were conducted in the United States of America (n=9)45-53, United Kingdom (n=1)54 , Belgium (n=1)55 and Australia (n=1)56 and were heterogeneous in design. Cancer (n=1)45 and diabetes (n=7)46-50, 52, 56 were the main long-term conditions identified. Comparison groups included waiting list 56 usual care 46, 47, 50, 53-55, enhanced care 45, 48, 49or delayed access to the intervention 51, 52. Study duration ranged from 8 weeks 55 to 18 months 48, 56. The total number of participants included in the 12 studies was n=3566, (female n=2179, male n=1387) with a mean age of 48 years.

**Risk of Bias**

Overall, nine studies were judged to have a high risk of bias 45, 48, 50-56 and three studies were judged to have low risk of bias 46, 47, 49. The ‘measurement of the outcome’ presented as the greatest risk of bias in eight studies and the ‘missing outcome data’ domain had the lowest risk of bias in all 12 studies, Figure 3. There was moderate level of agreement between the two independent reviewers’ risk of bias judgements using the Kappa coefficient (K=0.488).

Risk of Bias summary judgements and judgements on outcome domains are available in supplementary materials.

**Intervention Characteristics**

Community link-workers led the intervention in all included studies and were recruited from the community of interest. The duration of community link-worker training ranged from 4 55 to 160 48 hours. The social prescribing interventions utilised in the included studies were grounded in behavioural change theoretical frameworks and behavioural models such as social cognitive theory 45, 53 self-regulation theory 53; stress and coping theory and health behaviour change theory 45. The attrition rate across all studies was generally high and ranged from 9% to 29%. The characteristics of each study and the social prescribing intervention are summarised in Table 1.

**Outcome measures used in the social prescribing intervention**

Forty-one different outcome measures (self-reported, n= 33) were used to determine the effects of a social prescribing intervention on primary and secondary outcomes. The duration of social prescribing interventions ranged from eight weeks 55 to 18 months 48, 56. Outcomes of interest were categorised as quality of life (n=12), physical activity (n= 2), psychological wellbeing (n=8), disease specific outcomes (n=17) and uncategorised (n=2).

**Effect of the social prescribing intervention on quality of life outcomes**

There are short to long-term improvements in quality of life for those receiving social prescribing interventions 45, particularly for those attending more frequently (>3 visits) 54. Mercer et al 54 (high Risk of Bias) found significant improvements in quality of life with three or more face-to-face engagements with the community link-worker intervention as measured by the EQ-5D-5L questionnaire 0.071 (95%CI, 0.016, 0.126); P<0.011). Male and female participants with similar cancer presentations responded differently after an enhanced community link-worker led intervention 45. Female colo-rectal cancer survivors in remission derived up to 15 months health related quality of life improvements when measured by the Functional Assessment of Cancer Therapy- General Scale (FACT –G Scale): 0.171; (95% CI, 0.025-0.317; P =0.021) compared to males who had only short term improvement in health related quality of life (3 months): 10.074 (95%CI, 2.030-18.119; P= 0.014).

**Effect of social prescribing intervention on physical activity**

Seven studies used physical activity 46, 47, 49, 50, 52-54 as a primary (n=4) 46, 50, 53, 54 or secondary outcome (n=3)47, 49, 52. Two high Risk of Bias studies50, 53 reported significant increments in the frequency50 of physical activity (3 times per week) from baseline n=21(28%) to six-month follow up n=47(63%) P<0.05) and the duration of physical activity53 (mins/week) by 141mins (95% CI 46.4, 236.4) (p<0.004) in the community link-worker intervention group (baseline: 12 months: 271.3(mins) (421.6) to 344.2 (mins) (455.6) (+72.8) compared to controls (baseline: 12months; 240.1 (mins) (364.1) to 199.9 (mins) (350.0) (−40.2)) who regressed during the 12 month intervention.. The remaining three low Risk of Bias studies 46, 47, 49 and two high Risk of Bias studies 52, 54 reported significant within group improvements only in physical activity levels. There is some evidence from a subgroup analyses conducted in one high Risk of Bias study 54 that participants attending the ‘Glasgow Deep End’ community link-worker intervention more frequently (> 3 in person visits) showed small but significant within group improvements only in self-reported exercise levels over time 0.339 (95%CI, 0.071 -0.607); P<0.013).

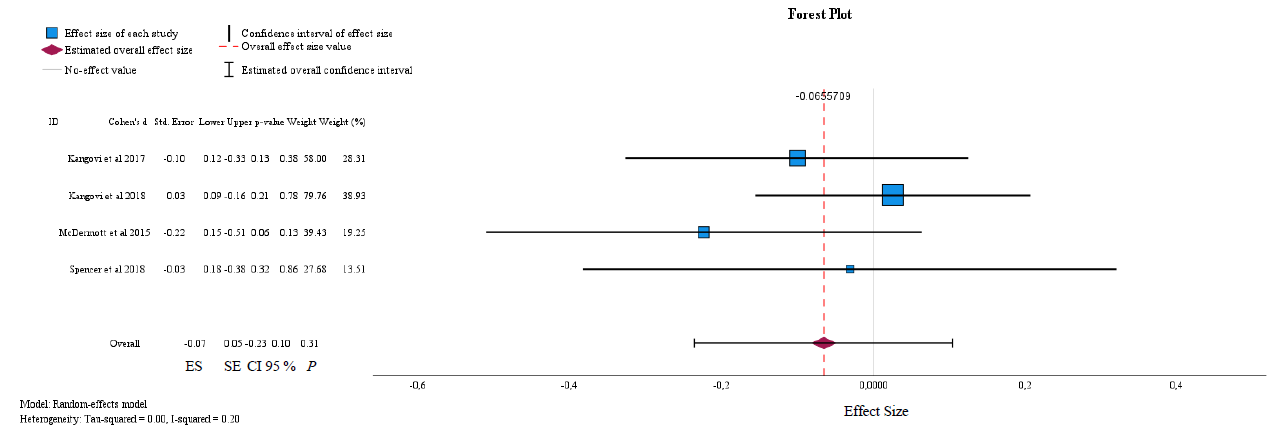
**Effect of the social prescribing intervention on psychological wellbeing outcomes**

Three studies 46, 54, 55 two high Risk of Bias54, 55 and one low Risk of Bias46 used indicators of psychological wellbeing as either primary55 (emotional support, social isolation, anxiety measured by the PROMIS score) or secondary outcomes46, 54 (Short Form 12-Mental57 and Hospital Anxiety Depression Scale (HADS-Anxiety / HADS-Depression)58)). Two studies46, 55 did not demonstrate any significant between group improvements in psychological wellbeing for participants of a community link-worker intervention. However, participants from Mercer et al 54 study that met face-to-face with the community link-worker more than three times did show significant between group improvement in their HADS-Anxiety score (–1.380)(95%CI,–2.339, -0.421); P<0.005) and HADS -Depression score (-1.280)(95%CI, –2.209, –0.352); P<0.007) but overall, did not demonstrate any significant effects on this outcome at the end of the trial.

**Effect of the social prescribing intervention on disease-specific measures**

Haemoglobin A1C (HbA1c) test measures the percentage of haemoglobin proteins in the blood that are saturated with glucose (normal: <42mmol/mol (6%)). The HbA1c test is a direct indicator of long-term glycaemic control that correlates well with complications arising from diabetes59. Seven studies 46-50, 52, 56 explored the effect of a community link-worker intervention on HbA1c blood levels in patients with diabetes as a primary outcome (n=6) 47-50, 52, 56 or as a secondary outcome (n=1) 46. Four studies 48, 49, 52, 56 reported significant between group improvements in HbA1c levels at six months 48, 52; 12 months 48, 49 and 18 months 48, 56.

Due to the heterogeneity of the intervention and outcome reporting, it was only possible to conduct a meta-analysis on the pooled data from four studies (n=1329), 2 low Risk of Bias46, 47 and 2 high Risk of Bias48, 56 to compare the effects of community link worker interventions on individuals’ HbA1c levels from baseline to 18 months. The respective calculated effect sizes are displayed in Figure 2. The forest plot (red dashed line) indicates a small non-significant effect of -0.07 (95% CI -0.23, 0.10): P=0.31. The Tau-square test represented the variance of the effect size across the studies, the value of 0 means that there is no significant between-study variance beyond what would be expected by chance alone.



**Figure 2**. Meta-analysis of Social Prescribing intervention on HbA1c levels in diabetic patients

Four studies48, 50-52, three of which from the same author48, 51, 52 and all having high Risk of Bias48, 50-52 used eight separate diabetes specific patient reported outcome measures to determine the effectiveness of a community link-worker intervention on diabetes related distress, depression, self-management and self-efficacy required to control diabetes. Spencer et el48, 51, 52 examined the levels of distress experienced by people with diabetes using the Problem Areas in Diabetes Scale in two early studies51, 52 and later the Diabetes Distress Scale48. The first of these studies52 did not find any significant change between the community link-worker group and the control. However, in the later 12-month study51, after adjusting for demographic variables the authors reported significant changes in the intervention group (n=72) at baseline 23.8 (95% CI, 18.7, 29.0) and six months -6.5 (95% CI, -11.2, -0.04);P<0.05) and 6-12 months -7.8 (95% CI, -12.5, -1.4);P<0.05) compared to the delayed intervention group (n=92) at baseline 25.9 (95%CI, 21.2, 30.6) and six months (-1.7 (95 % CI,-7.0, 5.3);P>0.05) and 6-12 months -6.2 (95%CI,-11.0, 0.2);P>0.05). These findings are again supported in another later study48 using the Diabetes Distress Scale which demonstrated significant reduction in diabetes related distress of -0.4 (95%CI,-0.7,-0.1);P<0.05) for up to 18-months in the community link-worker group only. Spencer et al48, 51 also examined the effectiveness of a community link-worker intervention on diabetes related depression using the Patient Health Questionairre-960. In the latter of these two studies individuals randomised to the extended peer-led community link-worker intervention (6-18 months) demonstrated significant decrements in depressive episodes at 18 months -2.2 points (95% CI -4.1, -0.3) P<0.05) compared to the enhanced usual care group. The effectiveness of Community link-worker interventions on diabetes self-management was measured in three studies48, 50, 52 by the Diabetic Care Profile61, Summary of Diabetes Self-Care Activities Measure62 and the Diabetes Knowledge Scale63. The Diabetic Care Profile61 used by Spencer et al48 which assesses a patients’ understanding of the social and psychological factors related to the self-management of diabetes reported the extended peer led community link-worker group demonstrated a significant between group improvement of 0.3 points (95% CI, 0.1, 0.6); P<0.05) after 12 months against the enhanced usual care group but not the community link- worker only group. The Diabetes Knowledge Scale was used in one study only50. Significant between group results were reported at the 6-month follow-up for community link-worker intervention versus case management versus standard care (P<0.05). Spencer et al48, 52 were the only studies to examine the effectiveness of community link-worker interventions on diabetes related self-efficacy utilising the Perceived Competence of Diabetes Scale64 and Diabetes Social Support65 respectively. At six months’ time point diabetes self-efficacy was significantly improved 0.5 (95%CI, 0.2,0.8); P<0.01) in the community link-worker group only48.

Five studies 46, 47, 49 50, 52 investigating the effect of a community link-worker intervention on body mass index 47, 49, 50, cholesterol 46, 49, 52 and blood pressure 46, 49 did not report any significant within group or between group changes across the trial periods.

**Table 1**. Characteristics of the study and social prescribing intervention

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Study** | **Theoretical domains & constructs** | **Link Worker Training** | **Link worker backgrounds** | **Services provided** | **location, duration & follow ups** | **Intervention delivery& Mode** |
| 1. Gray et al 51 | Shaping knowledge, feedback and monitoring, goal setting, social support, advocacy, navigation | 40 hr of comprehensive  training, including didactic sessions, In-class exercises and field practice. Health coaching and motivational interviewing. | High school or equivalent degrees and 5–8 years of experience as CLWs, | Education, social support, informal counselling, linkages to community resources, blood glucose monitoring, healthy eating, physical activity, smoking cessation | Home based, community resource locations  Follow up: 12 months | CLWs meetings 0.5, 1.5, 3.5,7, 10-month  Total Interventions:  At least four CLW visits.  Mode: Face to Face |
| 2. Bossche et al 53 | Social support, coaching, advocacy, navigation | 2 online training modules of 2 hrs with entailed communication skills, signposting | NR | Presence to patients who were socially isolated or who felt lonely or anxious, information on social distancing, navigation to healthcare | Community sites  8 weeks duration  Follow up: 8 weeks | 8 contacts for 2 hours per over 8 weeks  Total interventions: NR  Mode: Telephone, text, e-mails, park walks |
| 3.Ramirez et al45 | Community-based participatory research methods drawing on theoretical frameworks; social cognitive theory, stress and coping theory, health behaviour change | NR | NR | Social work and psychosocial services referrals, child /elderly care, transportation, financial services; appointment follow-up, fertility education, onward referral to community | Community sites  12 months duration  Follow up: baseline, 3, 9, 15 months | PN-LCNS group 2.70 times; LCNS 2 times. PN-only survivors 2.69 times, 3 PN-only survivors accessed the LCNS services  Total Interventions: NR  Mode: Telephone |
| 4.Mercer et al54 | The Glasgow Deep End Links Worker  Programme; theory of community-oriented primary care | NR | NR | Forge relationships between general practices and community organizations, and support patients to access the nonmedical services and encourage self determination | Clinics, home, Community sites  9 months duration  Follow up:9 months | As required  Total interventions: 868  Mode: One to one, face to face, telephone |
| 5.Kangovi et al46 | Participatory action research framework within the domains of coaching, social support, and advocacy | One month-long training that covers topics such as action planning and motivational interviewing. | High school diploma | Helped patients identify long-term supports, -facilitated exercise, social services; sourcing lower cost medication; referral to mental health care/ drug addiction | NR  6 months duration  Follow up: baseline, 6, 9 months | Min 24 contacts;  Total interventions: NR  Mode: Individualised or group face to face; telephone |
| 6.Spencer et al 48 | Community-based  participatory research grounded in empowerment method to facilitate self-directed behaviour change | CLWs underwent 160 h of CLW training; 80 hrs of diabetes education; trained in empowerment-based  Approaches; motivational interviewing and goal setting. | Spanish-fluent Latinas who had completed high school or had a GED | Improve communication skills, referrals to other service systems; set goals using the five-step goal-setting model | Community site  6 months duration  Follow up: baseline, 6, 12, 18 months | 11 x 2-hr sessions every 2 weeks; 2 x 60-min home visits monthly; phone calls  Total interventions: NR  Mode: Individualised, group face to face; |
| 7.Carrasquillo et al49 | Community-level framework of chronic care model; self-management support; clinical information; healthcare organization and community resources | 75-hour training curriculum, type 2 diabetes clinical and behavioural interventions (20 hours), including motivational interviewing training; basic research methods on human participants research (20 hours); insurance navigation | Lead CLW were non-medical staff; CLW supervisor – MSc qualification | Health education, medication refills, health coaching; assisted with nonmedical services; housing, employment, legal, financial, food resources; linkages to community services, Bimonthly exercise groups. | Home; clinic; Community  12 months duration  Follow up: baseline, 12 months | 4 home visits, 12 calls during the 12 months & bimonthly exercise groups in parks  Total interventions: home visits received- 5, Telephone calls- 20; Participants (126 (84%) received 12 CLW contacts per year  Mode: Individualised, group face to face |
| 8.Kangovi et al47 | Individualized intervention to help low-income patients achieve health goals within the domains of coaching, social support, advocacy | Month-long college accredited training covering topics such as action planning and motivational interviewing. CLWs had on-the-job training with a senior CLW. | Recruited from community  Qualifications: NR | 3 stages: action planning, tailored support, and connection with long-term support, Weekly patient support group | Home; community  6 months duration  Follow up: baseline, 6, 9 months | 38.4 hrs with each patient over the 6-month intervention period. 35% had 3 meetings  Total interventions: NR  Mode: Face to face; group classes |
| 9.McDermott et al56 | Diabetes case management approach by local community-based health workers supported by indigenous teams | Intensive 3-week training in diabetes and self-management skills, advice on medications, routine foot care, nutrition, smoking cessation | Recruited from community  NR | Keep appointments, medications adherence effects of smoking; work with the family to support the patient in self-management. | Home; clinic  18 months duration  Follow up:18 month | Delivery: NR  Total Interventions: NR  Mode: Individualised face to face |
| 10.Spencer et al51 | Using a socioecological model, family, health system, and community-level interventions were developed to address sources of diabetes disparities at each level | CLW were underwent more than 80 h of training in  empowerment-based approaches; self-determination and autonomy motivation theory and interviewing | Ethnically matched with their assigned participants  Qualifications: NR | Physical fitness activity- dance, walking); weekly community farmer’s market; self-management skills; facilitated necessary referrals to other services | Home; community sites; clinic  12 months duration  Follow up: baseline, 6, 12 months | Home visits (2 per month, 60 min); 11 culturally tailored 2-h sessions every 2 weeks; Daily calls every 2 weeks  Total interventions: NR  Mode: Individualised, group face to face |
| 11.Spencer et al52 | Using a socioecological model, family, health system, and community-level interventions were developed to address sources of diabetes disparities at each level | CLW were underwent more than 80 h of training. CLW were trained in  empowerment-based approaches including self-determination and autonomy motivation theory and interviewing | Ethnically matched with their assigned participants  Qualifications: NR | Trained CLWs, known in this study as family health advocates, promoted healthy lifestyle and diabetes self-management activities as part of the “Reach Detroit Community program” | Home; community resource locations; clinic  12 months duration  Follow up: baseline, 6 months | Home visits (2 per month, 60 min);11 culturally tailored 2-h group sessions of 8–10 participants every 2 weeks in community: Daily calls every 2 weeks  Total interventions: NR  Mode: Individualised and group face to face; telephone |
| 12.Babamoto et al50 | Cultural intervention composed of diabetes education and evaluated health behaviours | 6-week training curriculum on roles and responsibilities, diabetes standards, self-management strategies incorporating patient cultural and spiritual beliefs, health behaviour change theory | High school degree or a GED degree  Layperson recruited locally. | 10-week ADA sessions tailored to needs; knowledge, identified problems, goals, and level of progress; routine follow-up calls to monitor self-management progress, review barriers | Home; clinic  6 months duration  Follow up: baseline, 6 months | Weekly individual ADA educational sessions  Total interventions: 11.3 mean  Mode: Telephone; face to face |

CLW- Community Link Worker; NR - not reported; PN-LCNS- Patient Navigation-Livestrong Cancer Navigation Services; PN - Patient Navigation; PL - Peer leader; EUC-Enhanced Usual care; ADA- American Diabetes Association; GED- General Educational Development Test.

**Discussion**

The aim of this systematic review was to determine the effectiveness of social prescribing in the management of long-term conditions in community-based adults. To our knowledge, this is the first systematic review to conduct a meta-analysis of the data on the effectiveness of social prescribing focusing on outcomes that reflect the multifactorial nature of long-term conditions. Twelve randomised controlled trials across different geographical locations, in areas of socioeconomic deprivation, were included in this review. Most studies included in this review utilised a tailored social prescribing model directed at improving diabetes self-management. This review found some evidence to support the effectiveness of social prescribing in improving quality of life and disease specific outcome measures. There is some evidence that adherence to a social prescribing intervention may result in positive outcomes for the participant. Most significant improvements were in reducing diabetes related distress; diabetes related depressive episodes and improving diabetes self-management efficacy. Given the heterogeneity of the included studies and outcome measures and like previous review conclusions19, 38, 66 it is not possible to determine the effectiveness of social prescribing in the management of long-term conditions in community-based adults.

The results of this review suggests that an enhanced social prescribing intervention with increased uptake of support services provided over a longer duration will lead to improvements in both short and long-term quality of life outcomes 54, 67. As females reported longer-term improvements (15 months) there may be other factors influencing the gender response to the social prescribing intervention. This contrasts with previous evidence that found men with poor health, anxiety and social networks had greater benefit from social prescribing interventions than women 68 and may be explained by the possible gender differences in coping strategies of cancer patients 69. It is unclear if there is a gender response to social prescribing which is a possible area for future research.

There is some evidence from this review that participating in a social prescribing intervention can significantly influence a participant’s uptake of physical activity in the short term50 and also the weekly duration of physical activity in the long-term53 helping participants with controlled diabetes meet recommended physical activity guidelines70 with minimal support53. Other studies within this review46, 47, 49, 52 also demonstrated significant improvements in physical activity but within group only. The control groups also receiving physical activity advice and access to free services e.g. dance classes, exercise classes and walking groups may explain these improvements. No study in the present review utilised external activity monitors e.g. pedometers that would provide objective measures of activity and eliminate response bias. Social prescribing interventions did not demonstrate any significant between group changes in psychological well-being in participants experiencing anxiety and depression51, 54 or in patients with limited social network55. High dropout rates and lack of reporting on intervention adherence makes it difficult to interpret these results with confidence.

The results from individual studies47-53, 56 within this review suggest that targeted disease specific community link-worker interventions can significantly improve HbA1c levels in patients with diabetes in the short (six months) and long-term (18 months) to those recommended by the American diabetes guidelines71. However, when the data from suitable studies46-48, 56 were pooled in a meta-analysis the results showed social prescribing interventions had only a small non-significant impact on HbA1c levels at six months (P=0.31). This finding is contrasted in a recent large-scale study72 which found a small statistically significant reduction in HbA1c (-1.11 mmol/mol) (95% CI: -1.878, -0.342); P<0.05), however, the authors concluded this was not sufficient to be clinically significant, thus echoing our results. Psychological co-morbidities are common in people with physical long-term conditions73, 74 and may influence the lifelong trajectory of their illness75, 76. This review has highlighted some evidence to support the role of social prescribing in significantly improving disease related distress48, depression51, self-management knowledge50 and self-efficacy52 which play an integral role in patient empowerment77, 78. The heterogeneity and unblinding of outcome measures (n=41) used to measure the effect of the intervention on quality of life, physical activity, psychological wellbeing and disease specific parameters lessens the credibility of their findings and made evidence synthesis challenging. Outcome reporting bias and inconsistency in the measurement of outcomes could be minimised through the development79, 80 and reporting81 of standardised core outcome sets with established Minimal Clinical Important Difference values similar to other areas82. This review has identified key factors that may influence future clinical practice; targeted and enhanced social prescribing interventions improve self-management and self-efficacy of long-term conditions; the use of technology in the measurement of physical activity should support self-reported measures of physical activity in social prescribing interventions.

It should be noted that there are some limitations with this review. Firstly, only studies published in the English language were considered for inclusion, it is possible some studies published in another language were missed. Secondly, while the search strategy was comprehensive, including nine databases, three trial registries and the grey literature, it could be argued that the range of key words used could have been more extensive. It is possible that using specific conditions and outcome measures may have resulted in a more focused search and perhaps additional papers. Notwithstanding this, we are confident we have identified all relevant papers.

This comprehensive systematic review only includes quasi-randomised and randomised controlled trials whose study design matches the current definition of social prescribing23 and is the first review of social prescribing to use a meta-analysis to analyse the data. The studies included within our review were heterogeneous in terms of patient populations, interventions delivered, and outcome measures used, which substantially influences the ability to make meaningful comparisons. This review suggests that social prescribing interventions designed to target specific long-term conditions, i.e. cancer and diabetes, demonstrated significant improvements in quality of life and disease specific psychological outcomes respectively. There was some evidence for improvement in physical activity levels, but most findings were within group changes only. Social prescribing interventions did not demonstrate any significant changes in psychological well-being. The findings from this review suggest it is not possible to determine the effectiveness of social prescribing in the management of long-term conditions.

**Clinical Messages**

1. Tailored social prescribing interventions improved quality of life in cancer remission patients.
2. Social prescribing interventions improved diabetes specific psychological outcomes.
3. Social prescribing interventions may improve the frequency and duration of physical activity in people with diabetes.

**Author Contributions**

Concept/idea/research design: D.J OS., J.M H., L.M B., J.G McV.; Writing Review and Editing, D.J OS., J.M H., L.M B., J.G McV., J.R C.; Data collection: D.J OS., J.G McV.; Data analysis: D.J OS., J.G McV., J.R C.; Project management: D.J OS., J.G McV.; Providing institutional liaisons: J.G McV; Consultation (including review of manuscript before submitting): J.M H, L.M B., J.G McV., J.R C.

**Systematic Review Registration**

The protocol was registered with the Open Science Framework <https://osf.io/p5vf9/>

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**Supplementary materials:** Please find the following supplemental material visualised and available to download via Figshare in the hyperlink below. Where there are more than one item, you can scroll through each tab to see each separate item[10.6084/m9.figshare.24099798](file:///C:\Users\declanosullivan\OneDrive%20-%20University%20College%20Cork\Desktop\PhD%20Search%20Results\Combined%20Results_Discussion%20Chapters\Clinical%20rehabilitation%20Submission\Response%20to%20Rev_1%20&%20Rev_2\10.6084\m9.figshare.24099798)

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