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Evidence synthesis

Outcomes and instruments used in social prescribing: a modified umbrella review

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Abstract

Introduction: Previous social prescribing work highlights a range in the types and number of outcomes used in published studies. We aimed to describe social prescribing outcome core areas and instruments to build capacity for future research and program evaluation.

Methods: This was a modified umbrella review following standard guidelines. We registered the study and searched multiple databases (all languages and years); inclusion criteria were peer-reviewed publications containing outcomes for self-described social prescribing for adults aged 18 years and older. The last search date was 9 July 2023. From the included systematic reviews, we identified primary studies using the same inclusion criteria. For primary studies, we sorted extracted outcomes and instruments into six core areas using a published taxonomy. We located information on instruments' description and measurement properties and conducted two rating rounds for (1) the quality of systematic reviews and (2) reporting of instruments in primary studies. We conducted a narrative synthesis of reviews, primary studies and outcomes (PROSPERO 2023 CRD42023434061).

Results: We identified 10 systematic reviews and 33 primary studies for inclusion in our review. Outcomes covered most core taxonomy areas, with an emphasis on psychosocial factors (e.g. well-being) and less emphasis on cognition, physical activity, and caregivers and volunteers. We noted few studies provided detailed information on demographic data of participants or measurement properties of instruments.

Conclusion: This synthesis provides an overview and identifies knowledge gaps for outcomes and instruments used in social prescribing interventions. This work forms the basis of our next step of identifying social prescribing–related outcomes that matter most across interested parties, such as individuals providers and decision makers.

Keywords: *determinants of health, healthy aging, outcomes research, social prescribing*

Highlights

- We synthesized and categorized outcomes and instruments identified in 10 reviews and 33 primary studies for social prescribing.
- We highlight a range in the types and number of outcomes used in published studies.
- Many studies focussed on well-being and mental health outcomes.
- We noted less emphasis on use of outcomes for cognition, physical activity, and caregivers and volunteers.
- The field would benefit from comprehensive reporting of participants' demographic information.

Introduction

Social prescribing is a health and social model of care with origins in the United Kingdom (UK) and is quickly spreading to many other locations around the globe, including Canada. It has been well described elsewhere,[1,2] but a key feature of social prescribing is the addressing of people's unmet nonmedical social needs by connecting them to resources within the community. The most current comprehensive pathway for social prescribing[2] involves health and social providers, or community organizations working with people to identify social needs and making a nonmedical referral to a community navigator, sometimes called a "community link worker." Together, within a strengths-based approach, the person and link worker identify "what matters most" and the link worker will connect, or even in some cases accompany, people to community assets such as a service, greenspace or network (depending on needs).[2,3]

Social prescribing is informed by other evidence-based work, for example, community referrals, navigator systems,[4] and the benefits associated with engaging in activities such as physical activity[5] and

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arts-[6] or museum-based programs.[7] However, we[8,9] and others[10] have noted definitive evidence is lacking on the effectiveness of social prescribing. One challenge to synthesizing evidence may be due to the previous lack of an accepted definition of social prescribing; however, a new definition is available, co-created through an international modified-Delphi approach.[3] In Canada, social prescribing is in the early stages of development, but is well supported by clinicians' use of community referrals in practice and the large community-based sector of nonprofit, volunteer and other organizations that support people. The "new" definition and pathways of social prescribing are complemented by the integration of the health and social sectors and the strengths-based and person-centred approaches.[2]

Developing an evidence base for a complex intervention such as social prescribing requires considering many factors. One area we identified from our previous reviews,[8,9] which may be useful in advancing the science and practice of social prescribing, is related to the outcomes measured within research and program evaluations. Inconsistencies in using and reporting outcomes within trials and programs present challenges when determining the effectiveness of an intervention (such as social prescribing), ensuring person-centred, meaningful and important outcomes are included, and, later, when combining data for evidence syntheses.

Two previous studies used mapping review methods to identify and categorize outcomes in social prescribing.[11,12] While both reviews provide important knowledge and perspectives, we proposed to go further and identify outcomes used in social prescribing studies and compare them against a recently published taxonomy of outcomes for health and social interventions from Dodd and colleagues.[13] Reviewing currently used outcomes provides the opportunity to determine if any core areas or domains are missing from data collection and to describe current reporting practices.

Therefore, in this modified umbrella review, we aimed to describe outcomes, domains and instruments used in previous social prescribing studies for adults and older adults. The United Kingdom (UK) National Health Service (NHS) developed a Social Prescribing Common Outcomes Framework,[14] but to our knowledge there is not a core outcome set for social prescribing research. We proposed to address this knowledge gap,[15] and describe outcomes used in previous social prescribing research in advance of developing a core set.[16] Taken together, we approached this work to provide practical guidance for choosing outcome measures, with the overall aim of contributing to the science that underpins social prescribing.

Methods

We conducted a modified umbrella review following the guidelines outlined by the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) statement[17] and the Joanna Briggs Institute (JBI) standards for conducting an umbrella review, or review of reviews.[18] We modified the review process by screening (via two authors, independently) each primary study within included reviews to confirm it met our inclusion criteria. We made the changes for two main reasons: (1) there was a wide age range and grey literature within the identified systematic reviews, and some of the primary studies did not meet our inclusion criteria; and (2) there was an overlap of primary studies across included reviews.

We registered the protocol with the international Prospective Register of Systematic Reviews (PROSPERO; 2023 CRD42023434061)[19] before conducting searches with our final strategy. Our two exploratory research questions were: (1) What outcomes have been used in social prescribing research for community-dwelling adults aged 18 years and older? and (2) How do the identified instruments map onto the taxonomy of outcome core areas and domains?

Eligibility criteria

We included peer-reviewed systematic reviews and primary studies from all languages and all years that synthesized quantitative data for self-described social prescribing interventions for adults aged 18 years and older, and across the continuum of settings, such as hospitals primary care, community settings, etc. We included programs that have been described as "social prescribing," such as arts-based or museum-based programs (known as "arts-on-prescription" or "museum-on-prescription"). We included evidence for adults and older adults for this synthesis, as this was our focus for developing a core set of outcomes. Further, younger and older populations have distinct needs and services, and therefore we did not include outcomes from younger age groups in this synthesis.

We excluded publications that did not provide any outcome measures. We made the decision to include only peer-reviewed literature, because we wanted to compare reporting in the primary studies, which may be more likely to follow research reporting guidelines.

The following were our criteria based on the population, intervention, comparator and outcome (PICO) framework. Population: we focussed on peer-reviewed evidence that included adults aged 18 years and older receiving social prescribing. Intervention: we included reviews and primary studies that self-identified as social prescribing. Comparator: studies included in the reviews could have any or no comparator. Outcomes*:* as our aim was to identify all possible outcomes, we did not place any limits on this component.

Information sources and search strategy

We searched the databases listed below; the date of our last search was 9 July 2023. One author (MCA) ran all of the searches and uploaded identified citations into Covidence systematic review software (Veritas Health Innovation, Melbourne, AU). We also conducted a forward and backward (reference list) search for peer-reviewed publications from all included reviews based on citations downloaded from Web of Science or Google Scholar. The databases, along with keywords, were:

- Ovid MEDLINE® and Epub Ahead of Print, In-Process, In-Data-Review & Other Non-Indexed Citations, Daily and Versions and Embase. Keywords: ("social prescribing" or "social prescription"). ab,ti. AND "systematic review". ab,ti.
- EBM Reviews - Cochrane Database of Systematic Reviews. Keywords: "social prescribing" OR "social prescription" AND "systematic review"
- EBSCO (APA PsycArticles, APA PsycInfo, CINAHL Complete, Social Work Abstracts, SPORTDiscus) social prescribing or

social prescription (title) AND systematic review

- Epistemonikos "social prescribing" OR "social prescription" AND "systematic review" title and abstract
- Google Scholar "social prescribing" OR "social prescription" AND "systematic review" title

Selection process

All systematic reviews identified through search strategies were independently screened at Level 1 (titles and abstracts) and Level 2 (full text) by two authors (IKS, MCA) based on the inclusion criteria described above. We reviewed the primary studies from each included review and categorized them as peer-reviewed or unpublished studies/evaluations. We then reviewed the primary studies (e.g. a separate round of Level 1 and 2 screening) to decide if they met our inclusion criteria.

Data collection process

We extracted the following information for each review: author, publication year, systematic review question(s) and aims, population, setting, demographic information, summary of findings, and outcome measures or instruments. We also compared across reviews to look for overlap of primary studies to better understand data contributing to findings. For each included peer-reviewed primary study, we extracted the following information: author, publication year, population, setting, social prescribing intervention, and descriptive and outcome data collected. For this phase, one author (IKS or MCA) extracted information from studies in Covidence and Excel, and two other authors (EE and HA) reviewed and confirmed extracted findings. In the case of discrepancies between reviewers, a third review author (AC) made the final decision.

Sorting process

For each primary study, we extracted data on quantitative outcomes and sorted them based on a published taxonomy;[13] we chose this taxonomy because it was developed to use in determining core outcome sets. The original taxonomy has five core areas: death, physiological and clinical, life impact, resource use, and adverse events. Within the core areas there are 38 categories or domains. Two authors (IKS, MCA) independently sorted outcomes into core areas and domains following the guidelines provided by the taxonomy,[13] with two modifications: (1) we changed the domain “psychiatric outcomes” to “mental health” in the physiological/clinical core area; and (2) we moved the domain “delivery of care” to its own core area.

One author (MCA) created the first table of sorted outcomes from the previous step, and then all other authors (IKS, EE, HA, AC) reviewed the table. We also reviewed and compared the extracted outcomes with the NHS Social Prescribing Common Outcomes Framework,[14] which has four main areas: impact on the person (control and well-being, physical activity, management of daily life activities, connection); impact on community groups (confidence, impact of taking referrals, impact of social prescribing, changes in number of volunteers, capacity of the volunteer sector, and support needed); impact on the health and social care system (provider visits, medications, “morale of staff in general practice and other referral agencies”[14,p.30]); and other data collection (referrals, “equality monitoring,”[14,p.31] contacts with link workers, satisfaction).[14] Finally, for extracted instruments, we located information on measurement properties for a similar population (community-dwelling adults), when possible.

Assessment of systematic reviews and primary studies

We used the JBI critical appraisal tool[18] to analyze systematic reviews included in this synthesis. For each primary study, we compared the outcome reporting against one criterion proposed by the Consolidated Standards of Reporting Trials (CONSORT) 2020 Extension for Outcomes:[20] “Item 6a.8. Provide a description of the study instruments used to assess the outcome (e.g. questionnaires, laboratory tests) along with reliability, validity and responsiveness in a population similar to the study sample.”[20,p.2254] We reviewed each study to locate the term within the publication; this could include either stating an instrument was valid, reliable and/or responsive, or providing a reference or measurement statistic. We also compared extracted demographic information for each primary study with the criteria proposed by PROGRESS-Plus[21]: age, gender/sex, ethnicity/culture/language/race, education, occupation, place of residence, religion, social capital and socioeconomic status.

Synthesis methods

We conducted a narrative synthesis, including compiling and sorting a list of outcomes and instruments contained within reviews and primary studies.

Potential review biases

We considered bias throughout our review process. A priori, we tried to address potential bias by following standard procedures and registering and updating our protocol. We planned for conflicts of interest, such as if an author on this synthesis were also to be an author on an included review or primary study. In this case, another author, not in conflict of interest, would provide a rating of the review.

Team membership consisted of trainees and researchers, and two of the co-authors had clinical training. Our team also spanned the age range from young adult to older adult; team members had experience with multiple research methods, and authors with experience in systematic reviews mentored less experienced team members. However, none of the authors had direct, lived experience with social prescribing as defined in this work.

We acknowledge that we only included peer-reviewed studies, and that this may create a publication bias, but this was intentional in order to identify and evaluate the reporting for outcome measures for studies that usually follow standard reporting guidelines (e.g. CONSORT 2020, or similar statements based on different study designs). However, by not including unpublished literature, we may have missed some outcomes, in particular as they may relate to implementation of a program (e.g. via a process evaluation).

Results

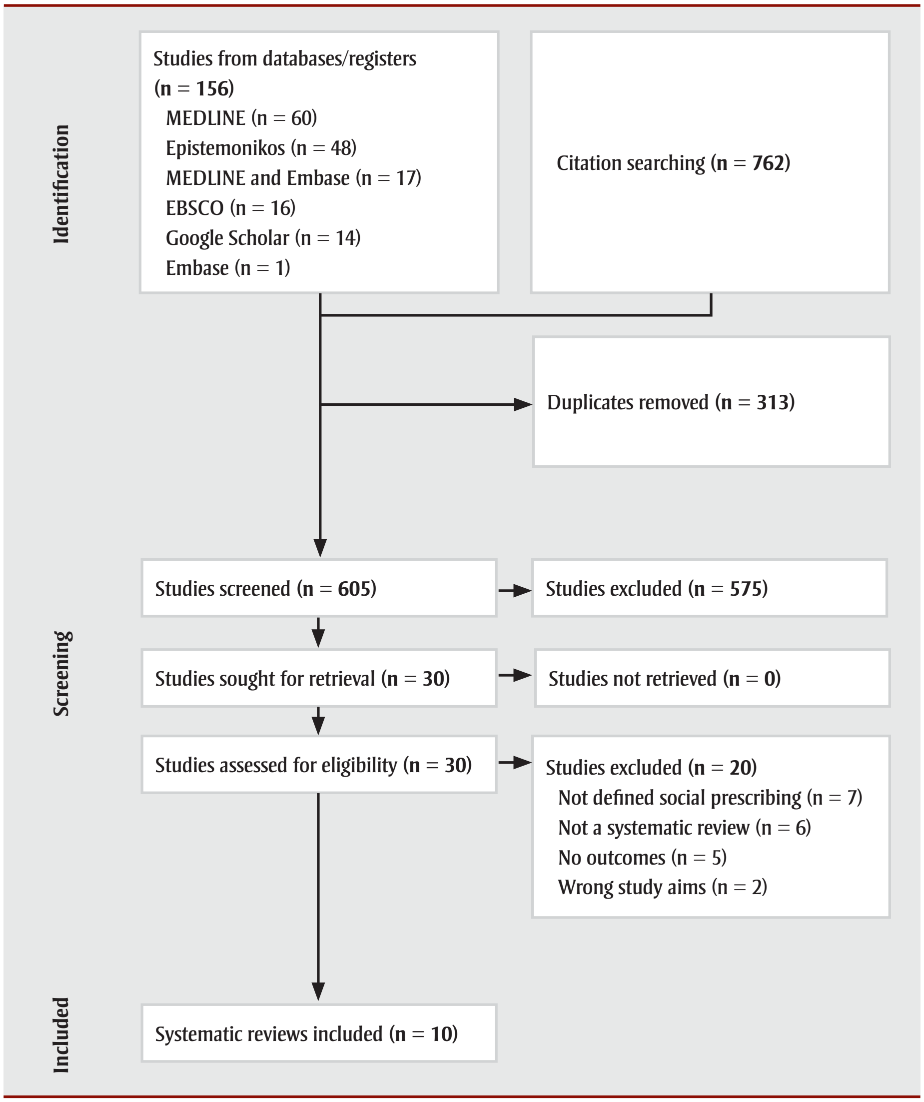
Study selection

After two rounds of Level 1 and 2 screening, we included 10 systematic reviews (Figure 1A) and 33 primary studies (Figure 1B).

Systematic review characteristics (n = 10)

There were six systematic reviews with authors located in the UK,[10,22-26] and one study each from Canada,[8] Germany,[27] Ireland[28] and Portugal.[29] Table 1 provides a summary of the systematic reviews,

FIGURE 1
PRISMA flow diagram for umbrella review (A) and individual studies (B)


A. Umbrella review

Continued on the following page

including the study aims and the number of included primary studies. Overall, participants' descriptive information was missing from several systematic reviews;[10,25,26] however, this may be because the information was missing from some of the primary studies.

Almost all of the reviews aimed to look at the general effect or impact of social prescribing, with some reviews reporting more specific criteria such as social prescribing from one location (UK),[10,23] or focussed on loneliness,[24,26] mental health,[23] primary care[8,22,29] or older adults.[8] One review focussed on social prescribing interventions that used a co-design or co-production approach.[25] The review by Vidovic and colleagues[26] provides an overview of outcomes used in social prescribing for four key measures: loneliness, social isolation, well-being and connectedness. Systematic reviews consistently noted positive outcomes but with limited evidence due to small sample sizes and methodological challenges with primary studies (Table 1). Most systematic reviews commented on the variability in the outcome measures.[10,22,23,25,26,28,29]

Primary study characteristics (n = 33)

Table 2 provides an overview of the 33 primary studies. Overall, 29 (88%) studies were conducted in the UK; three studies were from Australia,[30-32] and one was from South Korea.[33] Studies were published between 2008 and 2022, with 19 (58%) studies published from 2019 onwards, but before the publication of the social prescribing definition by Muhl and colleagues in 2023.[3] Four studies[34-37] were based on arts-on-prescription, "… part of mainstream social prescribing provision in primary health care."[37,p.1] Two studies were based on museums-on-prescription.[7,38] Two studies[39,40] were based on the social cure approach, which "suggests that social identities can enhance health/well-being through psychological resource provision."[40,p.387] We noted overlap for studies included in the 10 systematic reviews. Over half of the primary studies 19 (58%) appeared in more than one review, with a range in the number of times they were included: two;[7,30,35,36,40-43] three;[7,44-47] four;[48-50] five;[39,51] and six.[52]

Assessment of systematic review methods and instrument reporting

Most systematic reviews were in agreement with the JBI critical appraisal criteria,[18] with all but two reviews[24,26] scoring eight or higher (out of 11 possible points). The question (from the JBI tool) rated with the most "no" or "unclear" responses was related to reporting the research question based on PICO format. Of primary studies, most publications did not provide detailed information on instruments' basic measurement properties. Validity was most often mentioned or referenced,[7,30-34,36,37,41-44,47,48,50,51,53-59] followed by reliability[33,36,38,42,43,48,53,54,57] and responsiveness.[37,42,45,60] Few studies provided specific information, such as a measurement statistic (e.g. Cronbach alpha or kappa).

Results of synthesis

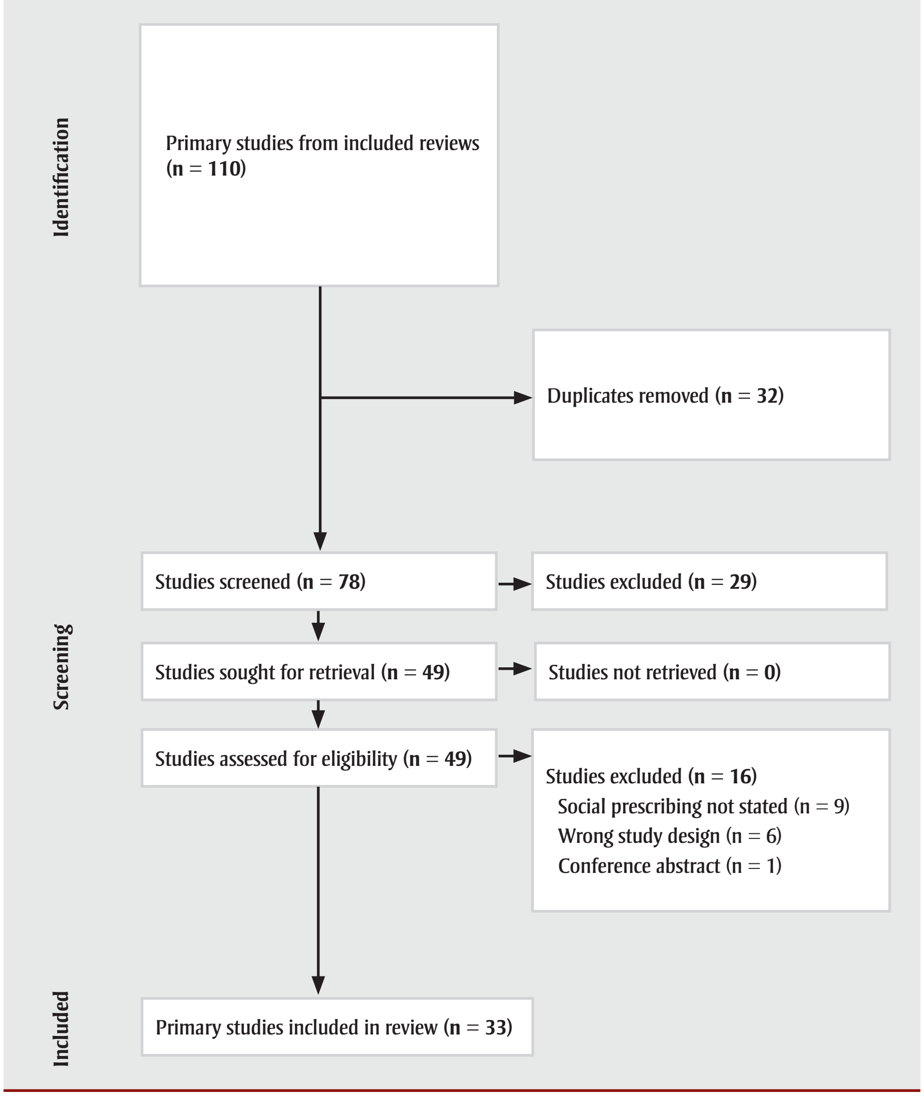
Categorization of outcomes

Many extracted instruments were patient-reported outcomes measures (PROM) focussed on well-being, with variability in the number and types of outcomes used; there were some patient-reported experience measures (PREM; e.g. satisfaction). Figure 2 and Table 3 provide an overview of outcomes and information from primary studies. Overall, almost all taxonomy core areas were represented, except death, but most domains contained instruments from only a few studies (e.g. physical functioning such as physical activity), with some exceptions.

Specifically, over half of primary studies used at least one of six different well-being

FIGURE 1 (continued)
PRISMA flow diagram for umbrella review (A) and individual studies (B)

B. Individual studies



Note: PRISMA template from Page MJ, McKenzie JE, Bossuyt PM, et al. The PRISMA 2020 statement: an updated guideline for reporting systematic reviews. Int J Surgery. 2021;88:105906. https://doi.org/10.1016/j.ijsu.2021.105906

instruments, although most studies used one of two outcome instruments: Warwick-Edinburgh Mental Well-being Scale (WEMWBS)[32,34-37,42-45,47,51,53] and Short Warwick-Edinburgh Mental Well-being Scale.[41,54,55,60,61] Many studies had a specific level of cognition as an inclusion criterion, but only two studies[56,62] reported a related instrument; however, the WEMWBS aims to “capture a wide conception of well-being, including … cognitive-evaluative dimensions.”[63,p.2] Only one study reported on adverse events (unintended outcomes).[56] Table 4 lists identified instruments within primary studies, alongside a description and some measurement properties.

When comparing extracted outcomes (Table 3) with the NHS Social Prescribing Common Outcomes Framework,[14] most categories were included by one or more primary studies. We observed that family caregivers, volunteers and voluntary groups were mentioned in many primary studies.[32,33,38,41,52,54,56,57,61] Two primary studies[54,56] included family caregivers within data collection, but we did not locate specific measures to evaluate volunteers’ experience or information related to societal or cost outcomes, despite the inclusion in the NHS framework. It is notable only six primary studies[46,50,52,53,57,58] reported on physical activity (also mentioned in the NHS framework), and these studies were all published before 2020. However, the NHS Social Prescribing Common Outcomes Framework[14] was dated June 2020 and pertains to the health and social care system in the UK. Therefore, not all included primary studies may have followed the framework (as a guideline) because of where the study was located (e.g. outside of the UK) and when it was published, as only 13 (39%) studies were published in 2020 or later.

Demographic information

Reporting varied for information provided in primary studies (n = 33). All primary studies but two[59,61] reported participants’ age and gender/sex. Thirteen primary studies collected information on ethnicity/culture/language/race;[7,30,39,41-43,47,48,52-54,57,58] 12 primary studies reported on occupation/employment;[30,35-37,39,42,46,48,50,52,58,60] seven primary studies reported on socioeconomic status (based on place of residence);[34-37,50,53,54] four primary studies reported on education;[33,40,52,58] and four primary studies mentioned disability.[30,51,57,58]

Discussion

We provide an overview of the outcomes and instruments used in peer-reviewed literature for social prescribing with adults aged 18 years and older, and highlight variability in the type and number of instruments used within studies. Our findings support and extend previous work[11,12] by comparing identified outcomes with a published taxonomy.[13] Many instruments were PROMs, alongside some PREMs, with less emphasis on physical activity, cognition or people providing unpaid care, such as family members and volunteers; only one study reported on unintended outcomes (e.g. harms). We further identified, similar to the recent mapping review,[12] missing information related to equity: most studies only provided basic participant descriptive information, yet these data inform the development of equity within program development and delivery. Further, this evidence synthesis is a reminder for more comprehensive reporting of outcomes, given the recent development of reporting guidelines.[20] Overall, this synthesis could be used to guide future research studies and program evaluations. It will be used to support our next phase—to conduct a modified Delphi study to determine outcomes important for people who impact or are impacted by social prescribing.[15]

General interpretation

Almost all taxonomy core areas and domains were included across social prescribing

TABLE 1
Summary of information for the 10 included systematic reviews

First author Location Year	Number of information sources	Number of peer-reviewed studies *Total and included in outcome synthesis*	What systematic review aimed to determine	Findings
Bickerdike[10] UK 2016	16 reports 15 studies	5 *2*[48,59]	"… effectiveness of social prescribing **programs relevant to the UK NHS setting**" (p. 2)	- Most studies had positive findings - Included studies had methodological limitations including possible confounding factors - "[A] lack of standardized and validated measuring tools" (p. 15)
Cooper[23] UK 2022	17 reports 13 studies	13 *14*[7,34-41,43,45,46,52,57]	"… effectiveness, and active ingredients of UK-based **social prescribing interventions targeting mental health**" (p. 2)	- Positive outcomes in 12/13 studies - Methodological limitations with high attrition rates - "[S]ubstantial variability in outcome measures" (p. 11)
Costa[29] Portugal 2021	13 studies	13 *11*[36,39,43,45-52]	"[T]o locate and summarize evidence regarding the **effectiveness of SP targeting the adult population assisted in primary health-care** settings." (p. 3)	- 8/10 studies reported positive physical or psychological well-being outcomes - Evidence regarding the effectiveness of SP continues to be unclear - "More studies are needed to establish the adequate and more standardized outcome measurement tools" (p.14)
Kiely[28] Ireland 2022	9 reports 8 studies	9 *2*[50,52]	"… effects on health outcomes and costs of social prescribing link workers … for people in community settings **focussing on people experiencing multimorbidity and social deprivation**" (p. 1)	- Only identified social prescribing may improve self-rated health - "[O]verall certainty of the evidence for our selected outcomes, which was low or very low for most outcomes." (p. 11) - "… there was a lot of variation in outcomes included and how they were measured ..." (p. 11)
Napierala[27] Germany 2022	68 reports 53 studies	33 *18*[30,31,35,38,39,41,42,44,45,47-52,55,58,60]	"… **effectiveness of SP for facilitating psychosocial support** with an international focus" (p. 2)	- Uncontrolled trials had positive findings - Limitations of evidence due to confounding and other possible sources of bias - "Most frequently studied outcomes represent the domains of mental health and well-being, loneliness, quality of life, general health, self-efficacy, and health care utilization." (p. 8)
Percival[8] Canada 2022	7 studies	7 *7*[7,33,44,49,51,54,56]	"… effect **of social prescribing for older adults within primary care**" (p. 2)	- "There were some positive effects of social prescribing on physical and psychosocial outcomes (e.g. social participation, well-being)" (p. 1) - Limitations noted in methodology (study design, small sample sizes, missing data) - Outcome measures reported included: physical and psychosocial outcomes and health resource use
Pescheny[46] UK 2019	16 studies	7 *4*[48,49,51,52]	"… outcomes of social prescribing programs based **on primary care and involving navigators**" (p. 664)	- "The existing evidence for improvements in health and well-being, health-related behaviours, self-concepts and daily functioning is mixed." (p. 670) - "… the quality of the majority of included studies was poor … sparse data on numbers of participants and loss of follow-up, a non-comprehensive sampling strategy, and a lack of information on data collection and analysis methods." (p. 670) - "Although we found that studies are interested in similar outcome areas, the tools to measure these outcomes varied between studies." (p. 670)

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TABLE 1 (continued)
Summary of information for the 10 included systematic reviews

First author **Location** **Year**	**Number of information sources**	**Number of peer-reviewed studies** *Total and included in outcome synthesis*	**What systematic review aimed to determine**	**Findings**
Reinhardt[24] UK 2021	9 studies	2 *1*[39]	"… impact of social prescribing (SP) programs on **loneliness among participants and the population**" (p. 204)	• "[S]ocial prescribing models designed to address loneliness have been largely viewed as helpful by both participants and service providers" (p. 211) • "[V]ariability and paucity of evidence and lack of control group comparisons make it difficult to draw conclusions" (p. 211) • "We demonstrate a gap between social prescribing design and social prescribing evaluation and illuminate a lack of impact assessment in relation to social care. We also note a lack of consensus on what the impact of a person-centred approach such as social prescribing should be." (p. 12)
Thomas[25] UK 2021	8 studies	8 *1*[61]	"… SP that **engage communities in co-design and co-production leading to improvements** in well-being as well as examine barriers and facilitators to SP intervention development" (p. 3)	• "Well-being outcomes across the included studies were reported to have been an increase in confidence, empowerment, and self-sufficiency as well as reduction in social isolation." (p. 10) • "[A]ll included studies were of a low-quality standard." (p. 11) • Missing data (e.g. study duration and participant numbers) • "[V]arious data collecting methods were used within each study" (p. 11)
Vidovic[26] UK 2021	51 studies	33 *13*[30,32,38-40,42,44,46,47,50-53]	"…**impact of SP on addressing loneliness, social isolation, well-being, and connectedness**… at the individual, system, and community levels." p. 1	• "[A] majority of studies in this report find change following a social prescribing intervention, but not necessarily change due to a social prescribing intervention." (p. 14) • "Given this small number of studies that establish causality, conclusions regarding the impact of social prescribing are tentative, at best." (p. 14) • "[V]ariability in the types of measures used in regard to the four outcomes …" (p. 11). "[W]e recommend standardizing measurement and data collection to help deliver stronger, more reliable, and more rigorous evidence." (p. 14)

Abbreviations: NHS, National Health Service; SP, social prescribing; UK, United Kingdom.

TABLE 2
Summary of information for the 33 primary studies

First author Location Year	Study characteristics	Target population Age	N	Program description
Aggar[30] Australia 2020	Retrospective analysis of pre- and post-intervention design	Adults and older adults 18–65 years	175	• 12-week social prescribing program with link workers • Social services; enrolment in social and therapeutic activities included arts and crafts, yoga and relaxation, equine therapy and social groups
Aggar[31] Australia 2021	Exploratory, quantitative, longitudinal design	Adults and older adults 18–65 years	13	• 10-week; facilitated by mental health social worker • Arts and crafts group led by practising artist/instructor
Bird[53] UK 2019	Mixed methods design	Adults with long-term conditions [type 2 diabetes, pre-diabetes and/or hypertension] and who were inactive 18–70 years or older	602	• 12-week program that included a GP, activity program manager and exercise specialists who delivered the program • Physical activity intervention
Carnes[52] UK 2017	Mixed methods design with a matched control group	People from general practices who were frequent attenders and/or socially isolated	486	• Up to 6 sessions • GP referral to social prescribing coordinator who co-created an action plan with well-being goals • Sometimes community referrals were initiated • Support via social prescribing volunteers
Crone[34] UK 2013	Prospective longitudinal follow-up design (observational)	Adults Mean (SD) age: 54 (16) years	157	• 10-week art program (e.g. poetry, ceramics, drawing, mosaic, painting) • GP or provider referral • Within a GP clinic or community location
Crone[35] UK 2018	Prospective longitudinal follow-up design (observational)	Adults Mean (SD) age: 51.2 (15.9) years	818	• 10-week art program (e.g. poetry, ceramics, drawing, mosaic, painting) • GP or provider referral • Within a GP clinic or community location
Elston[44] UK 2019	Pre- and post-intervention design	Adults and older adults with two or more long-term conditions > 50 years	Pre-intervention: 1046 Post-intervention: 82	• 12-week, strengths-based, with coordinators (link workers) • GP or other people/services who make the referral • Coaching, advocacy and navigation of and access to local health, social and economic services
Foster[41] UK 2021	Concurrent mixed methods design	People who were experiencing, or at risk of, loneliness Mean (SD) age: 65.5 (19.3) years	2250	• 12-week social prescribing service with referrals from any source and link worker support • Navigated access to community activities and resources
Giebel[54] UK 2021	Pre- and post-intervention design	People with a diagnosis of dementia (any subtype and age) and their family carer Mean (SD) age: 74.0 (8.0) years	25	• Referred by psychiatrist or GP • Collaboration with local NHS Trust, clinics, council, clinical commissioning group, other organizations, unpaid dementia carers and dementia care navigators • Classes were ongoing, 60-minute sessions at local community centres • Variety of activities such as low-impact exercises, local walks, tai chi, relaxation techniques, mindfulness and games, etc. • Assessment at 3 and 6 months

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TABLE 2 (continued)
Summary of information for the 33 primary studies

First author Location Year	Study characteristics	Target population Age	N	Program description
Grayer[48] UK 2008	Pre- and post-intervention design	Adults with a psychosocial problem Mean (SD) age: 43.1 (14.6) years	75	• Referrals from primary health care team • Graduate primary care mental health workers met with people to identify needs and make referrals to community resources • Assessment at 3 months
Holt[42] UK 2020	Multi-level, repeated measures design	Adults with anxiety and depression Mean age: 47 years	66	• 12-week arts-on-prescription workshops • Led by artist and health provider
Howarth[55] UK 2020	Case study	Adults and older adults Between 30 and 85 years Age range: most people above 60 years	9	• 12-week, nature-based social prescription • Referrals to gardening • Provides a space to grow, reflect, and meet
Jones[57] UK 2013	Pre- and post-intervention design	Adults and older adults with low-level mental, long-term health conditions, low levels of physical activity, diet-related health, low income and/or social isolation Age range: 18–70 years or older	687	• Group of 10 (out of 15) community organizations delivering activities such as leisure, exercise, cooking, befriending, arts and crafts activities • Group activities in 10-week blocks of 2-hour sessions • Self-referral, health care agency or another agency • Baseline assessment occurred months 1–3, with follow-up between months 4–6
Jones[56] UK 2020	Pre- and post-intervention design	Participants aged 55+, their families, staff, the NHS and local government Mean (SD) age: 73.8 (8.9) years	66	• Health Precinct, a partnership with a health board and public health • 16 weeks in duration, with a focus on exercise goals, with allied health or nursing • Common referral path via an exercise referral scheme or cardiac rehab • Activities to encourage social participation and physical activity
Kellezi[39] UK 2019	Mixed methods approach with longitudinal survey	GPs, health care providers, service users > 29 years	630	• Used a “social cure” approach, e.g. group membership’s effect on social life, health and well-being • Referrals from GP practices and person meets with health coach; link workers connect people to social groups • Assessments completed 4 months apart
Kim[33] South Korea 2021	Pre- and post-intervention design	Older adults aged > 65 years Mean (SD) age: 82.0 (5.9) years	10	• Once weekly for 10-week program: music storytelling, a self-help group and gardening • Review by public health doctor • Two program coordinators attended sessions
Kimberlee[58] UK 2016	Pre- and post-intervention design	Adults 36–40 years	70	• People referred from local GPs • Person collaborates with staff to co-produce goals • Can also access community resources • Program was ongoing, but assessments occurred at baseline and at least 3 months later
Loftus[49] UK 2017	Quality improvement design	Older adults (65 years+) with a chronic condition with frequent GP visits or multiple medications Mean (SD) age: 72.1 (6.8) years	28	• 12-week program • Referrals from GP to social prescribing coordinator • Variety of activities such as social clubs, counselling, arts program, falls prevention, exercises classes, etc.

Continued on the following page

TABLE 2 (continued)
Summary of information for the 33 primary studies

First author Location Year	Study characteristics	Target population Age	N	Program description
Maughan[59] UK 2016	Observational study	Adults with a mental health condition	55	• Aimed to connect primary care and community services • Program duration between 6 and 18 months (maximum 20 times) • Asset map exercise to identify resources with a focus on mental health awareness and lifestyle change
Mercer[50] UK 2019	Quasi-experimental cluster-randomized controlled trial	Adults aged > 18 years Mean (SD) age: 49.0 (16.0) years 56.0 (15.0) years	214	• Community link worker/coordinator connected practices (referring GPs and nurses) and local community organizations • Intervention was needs-dependent • Baseline and follow-up questionnaire 9 months later
Morton[45] UK 2015	Pre- and post-intervention design	Adults Mean (SD) age: 52.0 (11.0) years	136	• Most people referred by health providers, but some referrals from charitable organizations or others • Provided series of free activities such as meditation, arts and crafts, etc.
Pescheny[46] UK 2019	Pre- and post-intervention design	Adults from primary care Mean (SD) age: 51.2 (15.7) years	56	• 12 sessions to free programs usually organized by third sector organizations • GP referral to navigator • Services include advice, physical activity, gardening, social activities, stress management and creative activities
Pescheny[60] UK 2021	Pre- and post-intervention design	Adults from primary care Mean (SD) age: 50.3 (16.8) years	68	• 12 sessions to free programs usually organized by third sector organizations • GP referral to navigator • Services include advice, physical activity, gardening, social activities, stress management and creative activities
Poulos[32] Australia 2019	Pre- and post-intervention design	Older adults (65 years+) Mean (SD) age: 78.1 (8.0) years	127	• Arts-on-prescription classes (6–8 participants per class) were held weekly for 8–10 weeks • Health provider referral • Community care worker or volunteer was available during each class to assist participants and artists • Courses available: visual arts, photography, dance and movement, drama, singing and music
Sumner[36] UK 2020	Cohort study	Adults Mean (SD) age: 51.1 (15.9) years	1297	• 8–10-week arts-on-prescription intervention • Referrals from GPs and other providers • Courses available: creative arts such as painting, ceramics, playwriting and mosaics
Sumner[37] UK 2021	Cohort study	Adults Mean (SD) age: 50.5 (15.7) years	245	• Two 8-week arts-on-prescription interventions • Referrals from GPs and other providers • Courses available: creative arts such as painting, ceramics, playwriting and mosaics
Swift[61] UK 2017	Case study	Primary care patients	> 5000	• Community Wellbeing Practices program • GP referrals • Community navigators with up to 12 months of contact • Provides access to educational courses, hobby and interest groups and volunteering opportunities

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TABLE 2 (continued)
Summary of information for the 33 primary studies

First author Location Year	Study characteristics	Target population Age	N	Program description
Thomson[7] UK 2018	Repeated measures design	Older adults at risk of loneliness and social isolation 65–94 years	115	• 10 weekly sessions of museum-based programs • Referrals from health and social care, and third sector organizations
Thomson[38] UK 2020	Exploratory sequential mixed methods design	Adult mental health service users 44–70 years Mean age: 53 years	46	• 10 weekly sessions • Referred via community partners (mental health nurse) • Outdoor horticultural activities and indoor nature-based creative activities • Delivered by a horticultural specialist, an arts tutor and a museum volunteer
van de Venter[43] UK 2015	Pre- and post-intervention mixed methods design	People with mild-to-moderate mental health problems 27–73 years Mean age: 43 years	44	• 20-week arts-on-referral program • 4 artist-facilitated groups, held at GP practices or community centres • Included: painting, textiles, music, photography and film
Vogelpoel[51] UK 2014	Mixed methods design	Older people with sensory impairments 61–95 years Average age: over 80 years	12	• 12-week program for people with sensory impairments • GP referral • Practical arts workshop program • Visual and tactile arts facilitator • Travel support via transport options including community transport, taxis, buses and service transport
Wakefield[40] UK 2022	Multimethod longitudinal design	Adults with long-term health conditions or who reported being isolated/lonely/anxious 17–85 years Mean (SD) age: 52.7 (14.8) years	63	• Used a “social cure” approach, e.g. group membership’s effect on social life, health and well-being • Referrals from GP practices and person meets with health coach; link workers connect people to social groups • Baseline and follow-up assessment at 6–9 months
Woodall[47] UK 2018	Mixed methods design	Adults and older adults 16–94 years Mean age (SD): 53.1 (18.0) years	342	• 6-session program, although most people completed it at 16 weeks (mean: 10 weeks) • Self-referral or via referrals from GPs, health, social care and other relevant providers • Coordinators provided information on local groups and services

Abbreviations: GP, general practitioner; NHS, National Health Service; SD, standard deviation; UK, United Kingdom.

FIGURE 2
Overview of outcomes and information from primary studies based on the published taxonomy

Physiological/ Clinical

General Outcomes
- General health
- Number and impact of chronic conditions
- Pain

Mental Health
- Anxiety
- Depression
- Distress
- General mental health
- Mood

Metabolism and Nutrition
- Body composition
- Energy expenditure

Musculoskeletal and Connective Tissue
- Muscle strength

Life Impact

Physical Functioning
- Frailty
- Physical activity

Social Functioning
- Belonging
- Friendship
- Social groups
- Social participation

Role Functioning
- Work

Emotional Functioning/ Well-being
- Loneliness
- Self-efficacy
- Self-esteem
- Self-perception
- Well-being

Cognitive functioning
- Cognitive screening

Global Quality of Life
- Quality of life

Perceived Health Status
- Health status
- Capability

Personal Circumstances
- Needs
- Socioeconomic status

Delivery of Care

Adherence
- Adherence
- Completion

Patient/Carer satisfaction
- Expectations
- Perceived benefits
- Satisfaction

Process, implementation and service outcomes
- Implementation factors
- Referrals

Resources Use

Economic
- Environmental impact
- GP visits
    - home
    - in-person
    - phone call
- Social Return on Investment

Hospital
- ED visits
- Hospitalizations

Need for further Investigation
- Community referrals
- Health and social care services
- Medications

Societal
Carer Burden
- Social support

Adverse Events

- Unintended outcomes

Source of published taxonomy: Dodd S, Clarke M, Becker L, Mavergames C, Fish R, Williamson PR. A taxonomy has been developed for outcomes in medical research to help improve knowledge discovery. J Clin Epidemiol. 2018;96:84-92. https://doi.org/10.1016/j.jclinepi.2017.12.020

Abbreviations: ED, emergency department; GP, general practitioner.

TABLE 3

Outcomes extracted from primary studies, categorized using the published taxonomy, by core area and domain, showing instrument and citing primary study

Core	Domains			
Physiological/clinical	**General outcomes (n = 4)**	**Mental health (n = 9)**	**Metabolism and nutrition (n = 2)**	**Musculoskeletal and connective tissue (n = 1)**
	• Burden of multimorbidity[50] • General health[52] • Number/presence of chronic conditions[33,35,37,52] • Pain scale[30]	• Center for Epidemiological Studies Depression scale (CES-D-7)[57] • General Anxiety Disorder-7 (GAD-7)[37,58] • Geriatric Depression Scale Korean Version (GDS-K)[33] • General Health Questionnaire-12 (GHQ-12)[48] • Hospital Anxiety and Depression Scale (HADS)[45,50,52] • Kessler Psychological Distress Scale (K10)[30,31] • Patient Health Questionnaire-9 items (PHQ-9)[58,61] • Patient Health Questionnaire-8 items (PHQ-8)[37] • Short Mood Scale[42]	• BMI[53,57] • Energy expenditure[46]	• Muscle strength[53]
Life impact	**Physical functioning (n = 6)**	**Social functioning (n = 4)**	**Role functioning (n = 3)**	**Emotional functioning/well-being (n = 18)**
	• Frailty[32] • General Practitioner Physical Activity Questionnaire (GPPAC)[57] • International Physical Activity Questionnaire (IPAQ)[46,53,58] • Number of creative, lifestyle or regular activities[32,50,52] • Participation in sport[53] • Rockwood Clinical Frailty Scale (RCFS)[44]	• Community belonging[39,40] • Friendship Scale[58] • Number of social groups[39,40] • Social Participation Scale[33]	• Capacity to work[30] • Paid employment[31] • Work and Social Adjustment Scale (WSAS)[48,50]	• Campaign to End Loneliness Measurement Tool[47,56] • Clinical Outcomes in Routine Evaluation-Outcome Measure (CORE-OM)[48] • General Self-Efficacy Scale (GSE)[45] • General Self-Efficacy Scale (GSE) Korean Version[33] • Life satisfaction[57] • Museum Well-being Measure for Older Adults (MWM-OA)[7,38] • ONS Well-being[58] • Patient Activation Measure (PAM)[44] • Perceived creativity[32] • Rosenberg Self-Esteem Scale[56] • Rosenberg Self-Esteem Scale Korean Version[33] • Self-efficacy[31] • Southwest Well-being Questionnaire[57] • UCLA Loneliness Scale[30,31,33,41] • Short-form UCLA Loneliness Scale (ULS-8)[39,40] • Warwick–Edinburgh Mental Well-being Scale (WEMWBS)[32,34-37,42-45,47,51,53] • Short Warwick–Edinburgh Mental Well-being Scale (SWEMWBS)[41,54,55,60,61] • Well-being Star[44]

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TABLE 3 (continued)
Outcomes extracted from primary studies, categorized using the published taxonomy, by core area and domain, showing instrument and citing primary study

Core	Domains			
Life impact (continued)	**Cognitive functioning** **(n = 2)**	**Global quality of life** **(n = 1)**	**Perceived health status** **(n = 4)**	**Personal circumstances** **(n = 2)**
	• 6 Item Cognitive Impairment Test (6CIT)[56] • Korean Mini-Mental State Examination (K-MMSE)[33]	• World Health Organization Quality of Life–abbreviated 26 item (WHOQOL-BREF)[30,31]	• EuroQol-5 Dimensions (EQ-5D)[30,31,40,47,50,56,61] • General Health Score (GHS)[52] • Investigating Choice Experiments for the Preferences of Older People Capability Measure (ICE-CAP A)[50] • Measure Yourself Medical Outcome Profile 2 (MYMOP2)[52]	• Index of Multiple Deprivation (IMD)[34-37,46,50,52,54,60] • Camberwell Assessment of Need Short Appraisal Schedule (CANSAS-P)[30,31]
Delivery of care	**Adherence/compliance** **(n = 2)**	**Patient/carer satisfaction** **(n = 5)**	**Process, implementation and service outcomes** **(n = 12)**	
	• Attendance[32-36,38,43,46,53,54,56,58] • Completion[34,35,55]	• Client Satisfaction Questionnaire (CSQ)[48] • Expectations[30] • Perceived benefits[32] • Program satisfaction[30,33,35,47,52,57,61] • Satisfaction with social support[30]	• Acceptability[48] • Adoption[53] • Community link evaluation[48] • Implementation[53] • Goal achievement[44] • Program maintenance[53] • Reach[53] • Referral source (i.e. who made the referral)[30,32,34,35,39,41,44,45,52,57] • Referral reason[34-37,42,43,49,53,55,56,60] • Referral type (new or re-referral)[34,35,37] • Program engagement[34,35,50,52,57] • Uptake of referral[34,35,49,50,56]	
Resource use	**Economic** **(n = 6)**	**Hospital** **(n = 2)**	**Need for further intervention** **(n = 7)**	**Societal/carer burden** **(n = 1)**
	• Environmental impact[59] • GP consultations[39,47-49,52,58,59] • GP home visits[49] • GP phone calls[39,49] • Health care utilization[30] • Social return on investment[41,56,58]	• Emergency department visits[44,52] • Hospitalizations[31]	• Community physiotherapy, occupational therapy, nursing[44] • Community referrals[44,48] • Complex referrals[44] • GP referrals[52,59] • Health and social care services[56] • Medication prescriptions[48,49,52,59] • Mental health referral[48]	• Social support[40]
Adverse events	**Adverse events** **(n = 1)**			
	Unintended outcomes[56]			

Source of published taxonomy: Dodd S, Clarke M, Becker L, Mavergames C, Fish R, Williamson PR. A taxonomy has been developed for outcomes in medical research to help improve knowledge discovery. J Clin Epidemiol. 2018;96:84-92. https://doi.org/10.1016/j.jclinepi.2017.12.020

Abbreviations: BMI, body mass index; GP, general practitioner; ONS, Office for National Statistics (UK); UCLA, University of California, Los Angeles.

TABLE 4
List of instruments used in the primary studies with a description of the instrument and measurement properties, when available, for a general adult population

Instrument	Description	Measurement properties
6 Item Cognitive Impairment Test (6CIT)[78]	Brief cognitive screening tool	"[C]orrelates well with the [Mini-Mental State Examination] MMSE and is thus a valid measure of cognitive impairment. The 6CIT is especially useful in the identification of milder dementia; although its sensitivity is only approximately 80%, this is considerably better than that of the MMSE, whose sensitivity ranges from 50% to 65%, depending on cutoff."[78,p.938-9]
Burden of Multimorbidity[79]	Measures disease burden based on self-reported chronic conditions[79] "… respondents selected from a list of 21 common chronic diseases and additionally were allowed to add medical conditions not already on the list. They rated each condition on a five-point scale from 1 (interferes with daily activities "not at all") to 5 (interferes with daily activities "a lot"). The total score representing level of morbidity was thus the sum of conditions weighted by the level of interference assigned to each."[79,p.2-3]	"[V]alidation against medical records revealed that median sensitivity relative to a 'gold standard' of chart review was 75% (range 35%–100%) and median specificity was 92% (range 61%–100%) …"[79,p.3]
Camberwell Assessment of Need Short Appraisal Schedule Patient-rated (CANSAS-P)[80]	"[I]nstrument for the assessment of needs in people with severe mental health problems"[80,p.114]	"The CANSAS-P exhibited comparable detection of needs with its predecessor, better identification of domains that are problematic for patients to respond to, good test–retest reliability, especially for unmet needs, and generally positive evaluations by patients."[80,p.113]
Campaign to End Loneliness Measurement Tool[81]	Consists of three questions framed from a positive perspective, focussed on friendships and relationships	"A reliability analysis indicated excellent internal consistency of the scale with a Cronbach's alpha = 0.901." [81,p.3;82]
Center for Epidemiological Studies Depression Scale (CES-D-7)[83]	This 20-item instrument asks questions to rate symptoms of depression (related to sleep, appetite, loneliness) experienced in the past week[84]	"The internal consistency, test–retest reliability and validity were high for all sex and age groups…"[84,p.283]
Client Satisfaction Questionnaire[85]	An 8-item questionnaire on people's satisfaction with program/service received	"It possesses a high degree of internal consistency and correlates with therapists' estimates of client satisfaction."[85,p.204] "In that study, the scale's coefficient alpha was 90 when used with clients after their first service contact (n = 213), and 94 when used in a 90-day follow-up with the same clients (n = 113). On the other hand, the CSQ has been found to bear only moderate to low relationships with measures of outcome after a very brief or short-term follow-up interval."[85,p.205]
Clinical Outcomes in Routine Evaluation-Outcome Measure (CORE-OM)[86]	This is a 34-item instrument of subjective well-being, symptoms, function and risk[86]	"Internal and test–retest reliability were good (0.75–0.95), as was convergent validity with seven other instruments, with large differences between clinical and nonclinical samples and good sensitivity to change."[86,p.51]
EuroQol-5 Dimensions (EQ-5D)[87]	This instrument consists of two components: (1) participants are asked to rate (scale 1–5) five domains of health (mobility, self-care, usual activities, pain/discomfort and anxiety/depression); and (2) a visual analogue scale: 0 (worst)–100 (best) for self-rated health	"The EQ-5D-5L is a reliable and valid generic instrument that describes health status which can be applied to a broad range of populations and settings. The assessment of responsiveness, in particular, needs further and more rigorous exploration. Rather large ceilings persist in general population samples, reflecting the conceptualization of the EQ-5D instrument, which focusses on limitations in function and symptoms, and does not include positive aspects of health such as energy or well-being."[88,p.668]

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TABLE 4 (continued)
List of instruments used in the primary studies with a description of the instrument and measurement properties, when available, for a general adult population

Instrument	Description	Measurement properties
General Anxiety Disorder-7 (GAD-7)[89]	A 7-item self-report scale to identify general anxiety[89]	"The internal consistency of the GAD-7 was excellent (Cronbach $\alpha = .92$). Test–retest reliability was also good (intraclass correlation = 0.83)"[89,p.1094]; "There was a strong association between increasing GAD-7 severity scores and worsening function on all 6 SF-20 scales."[89,p.1094] "The GAD-7 may be particularly useful in assessing symptom severity and monitoring change across time, although its responsiveness to change remains to be tested in treatment studies."[89,p.1095]
General Health Questionnaire-12 (GHQ-12)[90]	The 12-item GHQ-12 screens for general (nonpsychotic) mental health problems among primary care patients[90]	"Reliability: The Cronbach's alpha of the GHQ-12 for bimodal scoring (0-0-1-1) was 0.76, indicating satisfactory internal consistency."[91,p.7] "Validity coefficients for the GHQ-12 … were generally high, with the mean area under the ROC curves being 0 ± 88, with a fairly narrow range …"[90,p.194]
General Practitioner Physical Activity Questionnaire (GPPAQ)[92]	Four questions about weekly physical activity completed in the previous year related to work, exercise and vigorous exercise, and number of stairs climbed	"The repeatability of the physical activity index was high (weighted kappa = 0.6, $p < 0.0001$). There were positive associations between the physical activity index from the questionnaire and the objective measures of the ratio of daytime energy expenditure to resting metabolic rate ($p = 0.003$) and cardiorespiratory fitness ($p = 0.001$)."[92,p.407]
General Self-Efficacy Scale (GSE)[93]	A 10-item scale to measure "the strength of an individual's belief in his or her own ability to respond to novel or difficult situations and to deal with any associated obstacles or setback"[93,p.35]	"High internal consistency ratings … ranged from .82 to .93"[93,p.35]; "concurrent validity … [was] found with self-esteem (.52)."[93,p.36]
General Self-Efficacy Scale–Korean Version[94]		"Cronbach's alpha for the entire GSE scale Korean version is 0.81."[94,p.844] "Significantly, the EFA revealed two factors, coping and confidence; however, Cronbach's alpha for the confidence subscale was 0.54, indicating that it was not reliable. Therefore, it is advised to use either the full GSE scale–Korean version or the subscale coping alone."[94,p.851]
Geriatric Depression Scale Korean Version (GDS-K)[62]	A 30-item screening test for depression for older people in community and clinical settings	"Cronbach's coefficient alpha for the GDS-KR was 0.90 and the test–retest reliability was 0.91 ($p < 0.01$)."[62,p.232]
Hospital Anxiety and Depression Scale (HADS)[95]	A 16-item (8 items for anxiety and 8 items for depression) self-assessment scale for medical outpatient clinics	"Cronbach's alpha for HADS-A varied from .68 to .93 (mean .83) and for HADS-D from .67 to .90 (mean .82)."[96,p.69] "Correlations between HADS and other commonly used questionnaires were in the range .49 to .83."[96,p.69]
Investigating Choice Experiments for the Preferences of Older People Capability Measure (ICE-CAP A)[97]	Measures capability that "is primarily concerned with the evaluation of individual advantage based on a person's ability to achieve 'functionings' in life that are valuable to them."[98,p.2] Measures five areas: "stability ('settled and secure'), attachment ('love, friendship and support'), autonomy ('independent'), achievement ('achieve and progress') and enjoyment ('enjoyment and pleasure')"[98,p.3]	"The reliability of the capability questions, which takes into account higher level of inherent variability, is in the range of 0.52 (autonomy) to 0.61 (stability). The reliability of the health status questions is somewhat higher, in the range of 0.60 (usual activities) to 0.79 (mobility)."[99,p.627] "We found that the reliability of a simple measure of adult capability (the ICECAP-A) was slightly lower than that for a commonly used health functioning measure (the EQ-5D-3L) but not obviously affected by age, sex or education"[99,p.628]

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TABLE 4 (continued)
List of instruments used in the primary studies with a description of the instrument and measurement properties, when available, for a general adult population

Instrument	Description	Measurement properties
International Physical Activity Questionnaire (IPAQ)[100]	Self-report measure of physical activity; "The objective was to develop a self-reported measure of physical activity suitable for assessing population levels of physical activity across countries."[100,p.1381]	"Overall, the IPAQ questionnaires produced repeatable data (Spearman's rho clustered around 0.8), with comparable data from short and long forms. Criterion validity had a median rho of about 0.30, which was comparable to most other self-report validation studies."[100,p.1381]
Kessler Psychological Distress Scale (K10)[101]	A 10-item screening instrument for nonspecific psychological distress	"There is a significant association between scores on the K10 and scores on the GHQ and SF-12, measures of symptoms and disability respectively, and between the K10 and the number of consultations for a mental problem in the previous 12 months. These findings support the validity of the K10 as a measure of psychological distress."[101,p.496-7]
Korean Mini-Mental State Examination (K-MMSE)[102]	Translation of the Mini-Mental State Examination, a 30-item screening tool for cognitive impairment	"The sensitivity of the K-MMSE was 48.7%, with a specificity of 89.9%. The incidence of false positive and negative results totalled 10.1% and 51.2%, respectively. In addition, the positive predictive value of the K-MMSE was 87.1%, while the negative predictive value was 55.6%."[102,p.177]
Measure Yourself Medical Outcome Profile 2 (MYMOP2)[103]	A short, generic, patient-specific measure of health. People are asked to state and rate one or two symptoms and "one activity of daily living, which they have come for help with, and which they consider to be the most important in affecting their lives."[103,p.28]	"The responsiveness index relating to minimal clinically important change was greater, for all MYMOP scales except well-being, than the level of 0.8 nominated as 'high' by previous work … [the] well-being scale was less responsive, but practitioners reported that it was clinically useful, especially in chronic disease.[103,p.1018] "MYMOP's validity was supported by its ability to detect different degrees of change in relation to change scores and in acute and chronic conditions, and by its correlations with SF-36 scores. Although the issue of clinical usefulness was clouded by follow-up being postal and not related to clinical follow-up, interviews provided important information on the effect of using the instrument in the consultation."[103,p.1018]
Museum Well-being Measure for Older Adults (MWM-OA)[104,105]	"[M]useum-focussed measure to evaluate the well-being benefits of museum and gallery events and activities"[104,p.44]	Internal consistency reliability was constructed for positive (α = 0.81) and negative emotion (α = 0.82). "Comparison of pretest-posttest differences showed highly significant increases in positive scores and decreases in negative scores with medium to large effect sizes."[105,p.29]
Patient Activation Measure (PAM)[106]	A 13- or 22-item measure of activation, focussed on a person's knowledge, skills and belief in their ability to self-manage health/health care	"Assessments of the 22-item PAM using national sample data show a high level of reliability with infit values ranging from .71 to 1.44. All but one of the outfit statistics are between .80 and 1.34."[106,p.1020] "The results indicate considerable evidence for the construct validity of the PAM. Those with higher activation report significantly better health as measured by the SF 8 ($r = .38$, $p < 0.001$), and have significantly lower rates of doctor office visits, emergency room visits and hospital nights ($r = -.07$, $p < 0.01$)."[106,p.1021]
Patient Health Questionnaire-9 items (PHQ-9)[107]	A 9-item depression questionnaire from the full PHQ for "making criteria-based diagnoses of depressive and other mental disorders commonly encountered in primary care"[107,p.606]	"The internal reliability of the PHQ-9 was excellent, with a Cronbach's α of 0.89 in the PHQ Primary Care Study and 0.86 in the PHQ OB-GYN Study."[107,p.608] Test–retest reliability of the PHQ-9 was also excellent. "PHQ-9 score ≥10 had a sensitivity of 88% and a specificity of 88% for major depression."[107,p.606]

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TABLE 4 (continued)
List of instruments used in the primary studies with a description of the instrument and measurement properties, when available, for a general adult population

Instrument	Description	Measurement properties
Patient Health Questionnaire-8 items (PHQ-8)[108]	This is the PHQ-9 questionnaire without the last question.	"Correlation between PHQ-9 and PHQ-8 scores was r = 0.997. Sensitivity and specificity for the PHQ-9 (54%, 90%) and PHQ-8 (50%, 91%) to detect major depression were similar."[109,p.163]
Rockwood Clinical Frailty Scale (CFS)[110]	Instrument for clinicians to observe patients (using clinical judgment) "that evaluates specific domains including comorbidity, function and cognition to generate a frailty score ranging from 1 (very fit) to 9 (terminally ill)."[110,p.1]	"Reliability of retrospective with prospective CFS scores was high (κ [kappa] = 0.89)."[111,p.1009] "Precision and interrater reliability of the comparison of retrospective CFS scores were high with narrow interquartile ranges and κ = 0.85."[111,p.1009]
Rosenberg Self-Esteem Scale (RSES)[112]	A 10-item scale to measure two facets of self-esteem, self-competence and self-liking (using both positive and negative statements).[112]	"Internal consistency reliability: Cronbach coefficient a was .91 for the overall sample and ranged from .84 (66+ age group) to .95 (unemployed working group), with an average of .90.[112,p.72]
Rosenberg Self-Esteem Scale–Korean Version[113]		"The analysis showed that item eight was a misfit, and items three, nine, and ten were challenging to answer. It was found that, as the response range, a 4-point Likert scale was appropriate, and most of the items between the old and young adults functioned differently. As a result, RSES is not suitable for use for the older Korean adults because it did not satisfy the construct validity."[113,p28984]
Short Mood Scale[114]	A 6-item scale that measures changes in mood over the day, with a specific focus on calmness, valence and energetic arousal	"The results suggest that the proposed three factors calmness, valence, and energetic arousal are appropriate to assess fluctuations within persons over time. However, calmness and valence are not distinguishable at the between-person level. Furthermore, the analyses showed that two-item scales provide measures that are reliable at the different levels and highly sensitive to change."[114,p.258]
Social Participation Scale[115]	"… eight items evaluated on a five-point scale to measure the level of older adults' social participation in a variety of interpersonal relationships"[33,p.5]	The Cronbach alpha of the instrument was 0.85.[33]
Social Support[116]	A 10-item questionnaire to assess perceived social support[116]	The Cronbach alpha of the instrument was 0.81.[116]
South West Well-being Questionnaire (SWWBQ)[57]	"Designed to be used for before-and-after evaluation, the South West Well-being Questionnaire … consisted of sets of validated and original measures that covered general health, social well-being, personal well-being, mental ill health, healthy eating and physical activity."[56,p.1952]	"Post analysis of the study data indicated acceptable internal consistency for the scales: 1. CES-D-7 baseline Cronbach's α 0.853; follow-up Cronbach's α 0.715 2. WEMWBS-7 baseline Cronbach's α 0.885; follow-up Cronbach's α 0.849 3. SWB-6 baseline Cronbach's α of 0.714; follow-up Cronbach's α of 0.708."[56,p.1953]
UCLA Loneliness Scale (ULS-20)[117]	A 20-item measure of subjective loneliness and isolation	"The measure has high internal consistency (coefficient alpha = .96) and a test–retest correlation over a two-month period of .73. Concurrent and preliminary construct validity are indicated by correlations with self-reports of current loneliness and related emotional states, and by volunteering for a 'loneliness clinic.'"[117,p.290]
ULS-8 (Short-form UCLA Loneliness Scale)[118]	An 8-item version of the UCLA Loneliness Scale	"Internal consistency reliability was high … Cronbach's (1951) alpha = 0.84"[118,p.74] "An eight-item short-form of loneliness, ULS-8, was selected on the basis of results from exploratory factor analysis, and it was found to be highly correlated with the ULS-20 (r = .91)."[118,p.77]
Warwick–Edinburgh Mental Well-being Scale (WEMWBS)[63]	A 14-item measure of well-being in the general population "capturing affective-emotional aspects, cognitive-evaluative dimensions, and psychological functioning" of well-being[63,p.2]	"A Cronbach's alpha score of 0.89 (student sample) and 0.91 (population sample) suggests some item redundancy in the scale. WEMWBS showed high correlations with other mental health and well-being scales and lower correlations with scales measuring overall health… Test–retest reliability at one week was high (0.83)."[63,p.1]

Continued on the following page

TABLE 4 (continued)
List of instruments used in the primary studies with a description of the instrument and measurement properties, when available, for a general adult population

Instrument	Description	Measurement properties
Short Warwick–Edinburgh Mental Well-being Scale (SWEMWBS)[119]	A 7-item version of the WEMWBS, to measure mental well-being with the focus on function[119]	"In this exploratory analysis, SWEMWBS demonstrates construct validity and sensitivity to change as a clinical outcome measure for patients with common mental disorders (CMDs) in primary care, demonstrating inverse correlation and comparable sensitivity to change over a course of clinical treatment when compared to two widely used clinical outcome measures."[119,p.7]
Well-being Star[120]	A 7-domain scale, each scoring 1–10, "with a long-term health condition, to support and measure their progress in living as well as they can"[121,p.1]	"Internal consistency: internal consistency was good (Cronbach's α = .82)."[121,p.1] "Responsiveness to change: Wilcoxen Signed Rank Test revealed a statistically significant increase in all outcome areas … A large effect size was found for the Lifestyle area, medium effect sizes for Looking after yourself, Managing symptoms, Work, volunteering and other activities and Feeling positive. The effect sizes for the other three areas were small–medium."[122,p.2]
World Health Organization Quality of Life–abbreviated (WHOQOL-BREF)[123]	A quality-of-life and general health measure, contains 26 questions, designed to be used cross-culturally	"Domain scores produced by the WHOQOL-BREF correlate highly (0.89 or above) with WHOQOL-100 domain scores (calculated on a four-domain structure). WHOQOL-BREF domain scores demonstrated good discriminant validity, content validity, internal consistency and test–retest reliability."[123,p.551]
Work and Social Adjustment Scale (WSAS)[124]	A 5-item self-report scale of ability to function (work, home, etc.) related to an identified problem (like the impact of mental health).	"Cronbach's α measure of internal scale consistency ranged from 0.70 to 0.94. Test–retest correlation was 0.73. Interactive voice response administrations of the WSAS gave correlations of 0.81 and 0.86 with clinician interviews. Correlations of WSAS with severity of depression and obsessive-compulsive disorder symptoms were 0.76 and 0.61, respectively. The scores were sensitive to patient differences in disorder severity and treatment-related change."[124,p.461]

primary studies, but there was a strong emphasis on well-being and mental health. Noteworthy is the lack of studies measuring physical and daily activity to quantify any behaviour change associated with participation resulting from the prescription. However, it is possible, based on our inclusion criteria, that we excluded studies focussed on exercise and physical activity but that did not call their program "social prescribing." There were included studies that focussed on other activities (e.g. arts, museum, connection) which could result in incidental physical activity. However, the studies did not routinely capture "what" people are doing within programs (e.g. incidental physical activity). Arts- or museum-based programs are not necessarily promoted as physical activity, but they are opportunities to add movement into everyday life.

Another identified gap was the measurement or collection of information on people's cognition. Although more than 20 of the primary studies reported populations as middle-aged or older (40+ years), including nine studies of people aged over 60 years, only two studies reported using an instrument to directly evaluate the effect or impact of social prescribing on cognition.[33,56] There is an interplay between mental health (e.g. depression, anxiety), physical health and cognition. Depression in later life can increase the risk of dementia[64] or frailty.[65] Conversely, life satisfaction may prevent a decline in some measures of cognition.[66] In 2019, there were approximately 57 million people (all ages) living with dementia globally;[67] this number is projected to rise to 152.8 million people by 2050.[67] Cognitive function and unmet social needs may be related, possibly due to the consequences of negative environmental factors, such as food insecurity or fewer neighbourhood resources.[68] Further, a decline in cognition can challenge functional independence and completion of simple daily tasks.

These factors, at a minimum, should be considered when co-creating an action plan to address unmet needs. In an ideal situation, it would be beneficial to see if social participation (as an aim of social prescribing) could mitigate the risks for cognitive decline. Some social prescribing activities, such as arts- and museum-based programs, may encourage concurrent cognitive and physical activities, which when combined in other research has been effective at promoting cognitive health.[69] Taken together, better understanding a person's cognition could assist when connecting them with a link worker, introducing community resources and services, and determining the effectiveness of the social prescription.

The NHS Social Prescribing Common Outcomes Framework highlights collecting information on volunteers,[14] but there were fewer evaluations of the impact or effect of family caregivers, volunteers and volunteer organizations,[41,54,56] despite their being mentioned in many primary studies.[32,38,41,52,54,56,57,61] Despite the important contribution of volunteers personally and economically,[70] there are fewer published studies for volunteering and social prescribing; when they are available, they are focussed on volunteering as a "prescription."[71,72]

There were also few mentions of family caregivers in primary studies,[54,56] who play an essential role in providing supportive care. At a personal and societal level, the costs of family caregiving are high. There is the likelihood of caregivers experiencing high risk of physical and mental health challenges resulting in reduced quality of life.[73] Further, in 2017, a report from the Canadian Imperial Bank of Commerce (CIBC) estimated caregiving costs Canadians CAD 33 billion annually for direct and indirect costs, such as out of pocket expenses (including paying for other providers) and time away from work; most affected are women and people with lower income.[74] Given the benefits of volunteers and family caregivers at a personal and societal level, it is important to support, tailor, track and evaluate this important contribution to health and social models of care.

Social prescribing has a central theme of connection, for people with unmet social needs, family members, volunteers, providers and community organizations. The creation and sustainment of relationships between and across interested parties depends on effective communication and trust,[22] among other factors. There are relational strategies and techniques to build intra- and interpersonal trust of people, providers and implementation teams,[75] which can be used to generate effective changes in the adoption and sustainability of programs or clinical practices.[76] We did not locate outcomes on relationships, but may have missed these data because the information is available in the unpublished literature or in studies using different methods. Future research could consider measurement of the development, strength and sustainability of relationships for people receiving social prescribing, and for people who deliver, manage and make decisions for its delivery across the continuum of care and sectors.

Strengths and limitations

This work has many strengths to contribute to the science and practice of social prescribing. Despite the comprehensive approach in this synthesis, we recognize several limitations. First, we made the decision to include only peer-reviewed studies that described their program as "social prescribing." Social prescribing is a relatively new care model, but similar programs have existed for decades. However, using this criterion means we excluded studies that align with this model but do not call themselves social prescribing. Conversely, it could also mean we included studies that called their program social prescribing when it may not have been as closely aligned to the definition that is now published.[3] In the recent social prescribing mapping review, the authors noted the challenges with screening studies to determine if the intervention was social prescribing.[12] In our previous reviews[8,9] we had a similar experience, and thus decided to only include studies described as social prescribing.

Second, we only included peer-reviewed studies when searching for outcomes. We made this decision because many systematic reviews noted data were missing across studies (Table 1), and we wanted to compare reporting in the peer-reviewed primary studies, which may be more likely to follow research reporting guidelines. We acknowledge this means we may have missed other outcomes, especially as there are many social prescribing studies published in the grey literature.

Third, we only included outcomes that were captured using quantitative strategies, and we may have missed information that was obtained via interviews and focus groups. Despite the important and rich data obtained through these methods, our findings may not have changed substantially, as studies in the current review included outcomes from almost all taxonomy domains. Nonetheless, concepts such as social connectedness may be better explored through qualitative methods, to better understand the effect of a complex intervention such as social prescribing. Our work highlights what is or could be measured—it does not limit how the outcome or domain should be measured.

Fourth, our work is only descriptive and does not provide any information as to which outcomes should or should not be included in evaluating social prescribing interventions. This was intentional, because determining the scope and priorities of future evaluation should be a collaborative process based on needs, preferences and supporting information, which together with interested parties (such as people, families, providers and decision makers) can be used to advance the science and practice of social prescribing.

Conclusion

We recognize it is impossible to measure everything in one study, but a core set of outcomes would benefit the field. Although the NHS has already provided outcomes to include in social prescribing evaluations,[14] there remains the need to expand the list, standardize what and how we measure outcomes, and provide more information when describing people and processes for social prescribing. Specifically, consideration should be given to equity-considered guidelines such as PROGRESS-Plus[21] to describe communities and people receiving and delivering social prescribing. It is also important to provide more information on unintended outcomes and the rationale and instrument measurement properties (reliability, responsiveness and validity, at a minimum).[77] As there is now an international definition of social prescribing,[3] it is important to use it to guide interventions and how they align (or do not). The current work is intended to prompt interest and action in the continued development of the science and practice underpinning social prescribing.

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Conflicts of interest

The authors declare no conflicts of interest.

Authors' contributions and statement

MCA, EE—conceptualization.

MCA, IKS, HA, AC, EE—methodology, formal analysis.

MCA, IKS—writing—original draft.

MCA, IKS, HA, AC, EE—writing—review and editing.

MCA, IKS—visualization.

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