RESEARCH

Assessing the implementation and impact of a social prescribing protocol in primary care

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Abstract

Background Social prescribing allows clinicians to refer people to resources or activities in their community to improve their abilities and health. Implementation of social prescribing is growing. However, there is not enough evidence on several related issues. The aim of study was to analyse the implementation of the asset-based model in the primary care teams in Aragón and to describe the profile of people who benefit most and are most satisfied with social prescribing.

Methods It is an analytical observational study in the 123 primary healthcare teams of Aragon from September2018 to December2022. The data were obtained from Electronical Health Record, checked and cleaned. A descriptive analysis was performed for qualitative and mean and standard deviation for quantitative variables. To analyse the associations between attendance, satisfaction, and improvement with all variables, several analyses were conducted using different methods. Finally, a cluster analysis was developed with the most benefited and satisfied people.

Results During the study period, 2,735 asset recommendations were made to 2,578 different people and 1,050 follow-ups to 552. There was an increase in the use of the protocol over time, except during the COVID pandemic. Most recommendations were made to women (73.3%–2,006). The average age was 65. There were more referrals in the smallest places (3.11 referrals/1000inhabitants). The most frequent linked health issues were psychological problems (572 – 20.9%). Physical skills were the abilities that professionals most tried to promote (28.4–1,709). In the follow-ups, the 81.4% (373) reported attending to the asset regularly. There were differences according to age and health problems. The average of improvement was 3.87/5 with differences by age, municipality size and health problems. For satisfaction, the average was 4.57/5 with differences by age and health problems. The lowest level of improvement and satisfaction was found for social problems. The cluster analysis highlighted several groups. Three profiles were distinguished in terms of high improvement and four of high satisfaction. In both cases, the variables related to areas for enhancement primarily defined the profiles.

Conclusions It is necessary to continue research with strong methodological and complementary approaches. This manuscript is optimistic about the use and impact of the social prescription in primary health care.

Keywords Health promotion, Primary health care, Social prescribing, Community health services, Empowerment for health, Intersectoral collaboration, Community networks, Effectiveness, Patient satisfaction

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Background

Health promotion is fundamental in primary care because it allows people to increase their control and improve their health [1].

The development of health promotion has been greatly influenced by the theory of salutogenesis. According to Lindstrom and Eriksson, this salutogenic model is a good basis for health promotion [2].

The salutogenic theory focuses on the origins of wellbeing and promotes control over the health of individuals, families, and groups. In this model, the sense of coherence (SOC) is a key concept supported by generalised resistance resources, which allow people's vital experiences to be understood, managed, and made meaningful [3, 4].

Closely related to this theory is the asset-based model [5, 6, 7, 8].

The asset model focusses on identifying and promoting salutogenic resources that enhace the self-esteem and capabilities of individuals, groups and communities [8].

Within this model, an important tool is the social prescribing or health assets recommendation, which allows clinicians to refer people to a resource or activity in their community to improve their capabilities, sense of coherence and health [6, 7, 9, 10, 11].

These prescribed resources or activities are called health asset. In 2007, Morgan y Ziglio defined "Health asset" as any factor or resource which can enhace the capacity of people, groups, communities, social systems and institutions to maintain and sustain health and wellbeing and contribute to reducing health inequities [8].

These prescribed resources or activities must have been previously identified as healthy by the community itself [12].

There are many types of assets related to institutions and services, associations, culture, physical spaces, and others. Some examples are a library, a neighbourhood association, a museum, a swimming pool or a youth centre [13].

There are different models and levels of social prescribing. The main difference between them is the degree of coordination among clinicians, health assets providers and patients [12]. In 2015, Kimberlee established four levels of social prescription [7], which have since been adapted to take into account the diversity of realities [12]. Social prescribing processes are complex, and sometimes their goals are different, which makes their evaluation challenging [9, 10, 12, 14]. There is currently an institutional and professional interest in integrating social prescription as a formal clinical practice and improving its assessment [15, 16], but this integration must be done with quality and safety. Otherwise, there are some risks, such as the potential for medicalising social problems [17, 18]. Internationally, the implementation of social prescribing programmes has been designed and it is being implemented in many countries in Europe, Asia, Australia or North America [19]. The implementation of social prescribing is growing globally [9, 12, 19]. As a result, different proposals, methodologies and registry systems might be found [12].

In Spain, several regions are working on this issue [20, 21, 22, 23]. In Aragón, a region in the northeast, a community care framework for primary care has been in development since 2016 [24, 25]. It is framed in the Health Department and the Aragon 2030 Health Plan [26].

Several key actions are proposed to develop this care framework, such as the creation of a community group within the primary care team, the acquisition of knowledge of the surroundings (some tools are associated with this – the *«Agenda Comunitaria»*) [27], the development of community projects, and the integration of the asset approach into the daily practice of the primary care teams. This last action includes the use of social prescribing schemes with a high level of coordination and structure among all involved parties [20].

The social prescription model used in Aragon is implemented by primary care professionals. There are no intermediary professionals (link workers, community connectors or others). The beneficiary population is selected based on their pathologies, risk factors or social determinants and the health assets are existing resources or activities at the community level [20]. A guide is available for the development of social prescribing programmes, the *«Guía de recomendación de activos para la salud en atención primaria»* [20]. This guide groups the Kimberlee levels into non-formal recommendations (Kimberlee Level 1) and formals (Levels 2, 3 y 4) [10, 7] and it is focused on the last [20].

Different phases are established to develop formal recommendations [20] Table 1.

There are several tools for developing social prescribing programmes. The first is a protocol of recommendation integrated into Electronic Health Record (EHR), the *«Recomendación Activos-AP»*. It includes the initial register and the follow-up of the social prescribing programme. All the recommendations are linked to a health problem included in the *International Classification of Primary Care (ICPC)* [28]. In the protocol, there is a register of information about the enhancing aspects of the person, the reason for the recommendation, the asset recommended, and whether or not the derivation to a social worker is needed [20].

In the follow-up, information about assistance, patient satisfaction and improvement perceived is collected. Validated scales on different topics are also available to test the patients' improvements [20].

The second tool is the asset worksheet, the «Hoja de recomendación de activos para la salud». This worksheet contains information about the protocol. This is delivered by the beneficiary in the recommended asset [20].

The final tool is an asset browser, the «Buscador de Activos para la Salud» [29]. It aims to provide information on the assets available in the area and to help choose the most suitable one. In Aragon, all the assets registered in the browser are reviewed and validated by public health professionals in the Health Department.

There is institutional support for the implementation of social prescription programs [24].

Given the current situation described above at the global level of social prescribing and the current challenges and unknowns of social prescribing, the aim of the study was to analyse the implementation of the assetbased model in the primary care teams in Aragón and to describe the profile of people who benefit most and are most satisfied with social prescribing.

Methods

This is an analytical observational study of formal social prescribing programmes in the primary health teams in Aragon (a Spanish region). The study period dates from September 2018 (when the use of the protocol started) to December 2022.

The study was conducted in the 123 primary health teams in Aragon. All patients who received a recommendation during the study period were included.

In 2021, Aragon had a population of 1,331,938, distributed in urban, semi-urban, and rural areas [30]. The ageing index was high, almost 25% of its population was over 65 years [31].

In Aragon, the public health system covers almost the entire population. Everyone is assigned to a health centre in their area. Primary care is structured into 123 basic health zones [32].

The primary care teams are comprised of different professionals profiles [32]. All professionals with access to EHR can apply social prescription schemes (social workers, family and community nurses, family and community doctors, paediatricians, physiotherapists, midwives among others). To do it, all of them follow the procedure established in the region [20].

The data were obtained from the «Recomendación Activos-AP» protocol on the EHR. The General Directorate of Health of the Health Department provided them. The database was checked, and errors and duplicates were eliminated.

All variables were obtained from EHR. Some categories related to them were defined directly from the EHR (sex, ICPC, promoting skills, satisfaction and improvement). Others were classified according to territorial characteristics (population) and vital stages (main age groups). Some variables were available in the initial recommendation. Other variables were only collected at the follow-up Table 2.

Due to the large number of follow-ups lost, initial recommendations and follow-ups were analysed separately Figure 1.

The Kolmogorov-Smirnov test was used to assess the normality. All quantitative variables had a normal distribution. A descriptive analysis (frequencies (N) and percentages (%)) for qualitative variables and mean and standard deviation (SD) for quantitative variables was used to describe initial recommendations and follow-ups.

To analyse the associations between attendance, participant satisfaction and improvement with all variables, bivariate analyses were performed using different methods (Fisher's exact test and chi-square for the relationship between two qualitative variables and Welch's t-test for two samples for quantitative variables). Bootstrapped confidence intervals estimated the correlation coefficients at 95% using the t-test to estimate the means and bootstrap for the medians. In the case of preventive activities, ANOVA tests, followed by t-tests with pooled SD were used to detect significant differences between groups.

Given the aim of the study, to analyse the formal recommendation of health assets in a real context, all calculations were performed, maintaining the original groups as much as possible. Due to this, it was difficult to calculate some associations with age, attendance, satisfaction and improvement. Therefore, age was used as a quantitative variable, and analyses were performed using

Table 1 Established stages of social prescription in the Aragon guide

Phases	Description
Preparation and contextualisation	Work on the process in the Community Care Group of the Primary Care Team.
Identification and char- acterisation of usable community activities	Phase 1: List of activities carried out in the community. Phase 2: Characterisation of possible activities. Phase 3: Selection of community activities and visibility.
Community activ- ity-health centre connection	Carry out the coordination process with the health asset, designating a responsible person, the method of contact, the welcom- ing process, follow-up, registration and evaluation.
Recommendation of assets / Social prescription	Motivational interview, formal recommenda- tion proposal of an asset for improvement. Search for shared solutions. Information about the health asset to be recommended. Linking the protocol to the corresponding Electronic Health Record (EHR) episode. Execute the EHR protocol.
Evaluation and facilitation	To evaluate proposed improvements.

Table 2 Variables included in the study

Variable	Time of collection	Categories
Sex	Initial and Follow-up	Female / Male
Age grouped (Years)	Initial and Follow-up	0-15/16-30/31-45/46-60/61-75/76-90/>90
Municipality size (Inhabitants)	Initial and Follow-up	Less than 2,000 / Between 2,000 and 10,000 / and more than 10,000
Grouped International Classification of	Initial and	A General and unspecified / K Circulatory / L Musculoskeletal / P Psychological / T En-
Primary Care (ICPC) and Preventive activities	Follow-up	docrine, metabolic and nutritional / Z Social problems / Other: B Blood, blood-forming organs, and immune mechanism / D Digestive / F Eye / H Ear / N Neurological / R Re- spiratory / S Skin / U Urinary system / W Pregnancy, childbearing, family planning / X Female genital system (including breast) / Y Male genital system / Preventive activities
Skills/Areas to enhance	Initial and Follow-up	Physical activity / Self-care/ Cognitive skills / Emotional skills / Relational and social skills / Other *In each recommendation, one or more can be enhanced.
Degree of attendance to the health asset	Follow-up	Regular attendance / Occasional attendance / Never attends
Satisfaction of the person attending the asset	Follow-up	1/2/3/4/5
Improvement perceived by the professional	Follow-up	1/2/3/4/5



Fig. 1 People involved in the different phases of the study

Spearman's rho for improvement and satisfaction and the contingency coefficient for attendance.

Finally, a cluster analysis was developed to define the profiles of people who benefitted most from and were most satisfied with the health assets recommendation.

A multiple correspondence analysis was performed for both issues, and the variables sex, age interval, and place size were considered supplementary variables. A scree test revealed the presence of six dimensions, of which the first two were selected, as they explained 71.2% (53.7% and 17.4%) and 66.9% (48.2% and 18.7%) of the variance respectively.

The relationships between the spheres to be enhanced were analysed using a cloud of correlations and another cloud of categories. Then, a factor map was obtained through agglomerative hierarchical cluster analysis. By analysing the previous results, the distinctive characteristics of each cluster were determined.

The STROBE statement http://www.equator-network .org/reporting-guidelines/strobe/ was used to check the manuscript.

Results

During the study period, 2,735 asset recommendations were made, and 2,578 people benefited from them. During this period, 1,050 follow-ups were made to 552 different people.

Recommendations were made by 103 of the 123 primary care teams in Aragon. The primary care teams that had a community health diagnosis [27] showed an average of 27.9 social prescriptions per team instead of the 8.5 shown for those that did not.

From the beginning of the protocol's implementation (September 2018), there was an increase in its use. In March 2020, the COVID pandemic arrived, and there was a decrease in the number of recommendations (March 2020 - December 2021 – average: 19.1 recommendation per month). After this, the number of prescriptions increased again throughout the year 2022, with an average of 108.4 per month Figure 2.

Regarding the sex of the beneficiaries, 73.3% (N=2,006) of the prescriptions were given to women and 26.6% to men (N=729). The average age was 65 years and consequently, people aged 60 to 90 received more social prescriptions. There were more recommendations in places with more than 10,000 inhabitants, 1,691 (61.8%). However, if the total population is considered, more



Fig. 2 Evolution of the number of social prescriptions

Table 3 General description of the study population

		Ν	%
Sex	Female	2,006	73.3
	Male	729	26.6
Age	0–15	93	3.4
	16–30	87	3.1
	31–45	181	6.6
	46–60	466	17.0
	61–75	971	35.5
	76–90	892	32.6
	>90	45	1.6
Municipality size	> 10,000	1,691	61.8
(Inhabitants)	> 2,000 - <10,000	387	14.1
	< 2,000	657	24.0
International Clas-	Preventive Activities	648	23.6
sification of Primary	K. Circulatory	166	6.0
Care (ICPC) and Pre-	L. Musculoskeletal	278	10.1
ventive activities	P. Psychological	572	20.9
	T. Endocrine, metabolic and nutritional	402	14.6
	Z. Social problems	450	16.4
	Others	219	7.9
Skills/Areas to	Physical	1,709	28.4
enhance	Self-care	1,048	17.4
	Cognitive	722	12.0
	Emotional	975	16.2
	Relational	965	16.0
	Others	591	9.8

recommendations were made in the smallest places, followed by medium-sized places (2.12 every 1,000 inhabitants) and finally the largest places [25, 33] Tables 3 and 4 [33]. Regarding the health problems (classified according to the International Classification of Primary Care (ICPC)) associated with a recommendation, the most used were those related to psychological problems (P) (572 - 20.9%), social problems (Z) (450 - 16.4%) and endocrine, metabolic and nutritional problems (T) (402 - 14.6%). Preventive activities were linked to 648 protocols (23.6%) Table 3.

Through social prescribing, physical abilities were the most promoted (1,709-28.4%), while cognitive skills were the least (722-12.0%) Table 3.

It was found that recommendations aimed at improving people's physical abilities mainly corresponded to problems in the locomotor system (92.8%). The enhancement of self-care was more associated with neurological problems (N) (74.1%), while the emotional and cognitive areas were particularly prominent in psychological problems (P) (69.9% and 34.6%, respectively). Social/relational skills were notably enhanced in general and unspecified issues (A) (44.5%) and social problems (Z) (42.8%).

Regarding the recommendations' follow-ups, 552 people were followed up at least once after three months from the initial recommendation. The other prescriptions were not followed up.

The information recorded in these follow-ups included the level of attendance to the asset (83%; N=458), satisfaction (71.7%; N=396), and improvement (52%; N=287). One or more items were completed at follow-ups.

In terms of attendance, 81.4% (N=373) reported attending the asset regularly, while 30 (6.5%) reported never attending. No differences in attendance were found based on sex (p-value=0.0839) or municipality size (p-value=0.7626). Differences were found by age (p-value=<0.001). Despite the small sample size in the 0–15 age group, the exceptionally high percentage of individuals in this group (83.4% - n = 5) who never attended was noteworthy. Differences in attendance were also found according to the health problems associated with the recommendation (p-value=0.0004). People with circulatory problems attended the most (91.1%), while those with social problems attended at the least (56.25%) Table 5.

Improvement was measured for 287 people, with an average score of 3.87 out of 5. The improvement score was 3.85 for women and 3.94 for men (t = -0.5261, df = 101.6, *p*-value = 0.5999). Regarding the age, the greatest improvement was found in the 31–45 age group, with a score of 4.33. It gradually decreased in the older age groups, reaching the lowest level in the >90 age group. Spearman's Rho showed a significant but weak correlation between these variables (-0.229; *p*-value = <0.001). Municipality size showed significant differences (*p*-value = 0.0004), with the most considerable improvements in the largest places (4.06). Significant differences

Tab	e 4	Comparison	of the stuc	ly popu	lation with	n the structure	of the popu	lation in /	Aragór
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		Social prescribing schemes <i>N</i> (%)	Inhabitants N (%)	Number of recommenda- tions per 1000 inhabitants
Sex	Female	2,006(73.3)	671,013(50.5)	2.98
	Male	729(26.6)	655,248(49.4)	1.11
Age	0–15	93(3.4)	195,213(14.6)	0.47
	16–30	87(3.1)	196,914(14.7)	0.44
	31–45	181(6.6)	275,208(20.6)	0.65
	46–60	466(17.0)	305,672(22.9)	1.52
	61–75	971(35.5)	219,755(16.4)	4.41
	76–90	892(32.6)	122,290(9.1)	7.29
	>90	45(1.6)	16,886(1.2)	2.66
Municipality size (Inhabitants)	>10,000	1,691(61.8)	934,067(70.4)	1.81
	>2,000 - <10,000	387(14.1)	181,911(13.7)	2.12
	< 2,000	657(24.0)	210,283(15.8)	3.12

 Table 5
 Description of the attendance of the study population

Attendance		Regular N (%)	Occasional N (%)	Never N (%)	<i>P-</i> Value
Sex	Female	266 (80.85)	45(13.67)	18 (5.47)	0.0839
	Male	107(82.94)	10 (7.75)	12(9.30)	
Age	0–15	1 (16.6)	0(0.0)	5(83.40)	< 0.001
	16–30	9(75.0)	1(8.33)	2(16.66)	
	31-45	24(92.30)	2(7.69)	0(0)	
	46–60	78(85.71)	11(12.08)	2(2.19)	
	61–75	165(83.75)	25(12.69)	7(3.55)	
	76–90	95(77.86)	16(13.11)	11(9.01)	
	>90	1(25.0)	0(0.0)	3(75.0)	
Municipality size	> 10.000	188(83.55)	24(10.66)	13(5.77)	0.7626
(Inhabitants)	> 2.000 - <10.000	101(80.80)	16(12.80)	8(6.40)	
	< 2.000	84(77.77)	15(13.88)	9(8.33)	
International Classifica-	Preventive Activities	128(88.88)	11(7.63)	5(3.47)	0.0004
tion of Primary Care (ICPC)	K. Circulatory	82(91.1)	7(7.77)	1(1.11)	
and Preventive activities	L. Musculoskeletal	15(60.0)	8(32.0)	2(8.0)	
	P. Psychological	46(71.87)	8(12.5)	10(15.62)	
	T. Endocrine, metabolic and nutritional	64(73.56)	15(17.24)	8(9.19)	
	Z. Social problems	9(56.25)	4(25.0)	3(18.75)	
	Others	29(90.62)	2(6.25)	1(3.12)	

were also found by ICPC (*p*-values = 0.0477). The lowest level of improvement was found for recommendations related to social issues (Z) (3.09). In contrast, the highest was identified in the grouped health problems (A, B, D, F, H, N, R, S, U, W, X, Y) (4.29) and circulatory system problems (K) (4.17) Table 6.

Finally, 396 people were asked about their satisfaction, with an average score of 4.57 out of 5. No sex differences were found (women 4.57, men 4.58). Significant differences were found by age group (p-value = 0.0233). The most satisfied was the 61–75 age group, with a score of 4.72, and it was noted that the extreme age groups were the least satisfied. Significant differences were also

found by ICPC (*p*-value = 0.0021). The group with circulatory problems (C) had the highest satisfaction (4.84 points), while the group with social problems (Z) had the lowest (4.06 points). Satisfaction also varied according to the size of municipality in which people lived (*p*-value = 0.0004), being higher in municipalities with more than 10,000 inhabitants (4.79 points) and lower in the smallest municipalities (4.15) Table 6.

The cluster analysis conducted with individuals with high improvement and satisfaction (scores 4 or 5) highlighted several distinct groups.

Regarding the most improved group, three clusters were distinguished. The variables related to the skills to

		Improvement		Satisfaction	
		Average (SD)	P-Value	Average (SD)	P-
					Value
Sex	Female	3.84(1.14)	0.5999	4.57(0.79)	0.9549
	Male	3.94(1.29)		4.58(0.89)	
Age	0–15	3.0(NA)	NA	3.0(NA)	0.0233
	16–30	3.71(1.38)		4.38(1.41)	
	31–45	4.33(1.19)		4.56(0.512)	
	46–60	4.13(1.12)		4.51(0.801)	
	61–75	4.02(1.04)		4.72(0.690)	
	76–90	3.48(1.26)		4.42(0.916)	
	>90	2.25(1.26)		3.25(1.71)	
Municipality size	> 10,000	4.06(1.08)	0.0004	4.79(0.605)	0.0004
(Inhabitants)	>2,000 - <10,000	3.86(1.10)		4.60(0647)	
	< 2,000	3.57(1.33)		4.15(1.06)	
International Classifica-	Preventive Activities	3.91(1.10)	0.0477	4.67(0.746)	0.0021
tion of Primary Care	K. Circulatory	4.17(0.892)		4.84(0.462)	
(ICPC) and Preventive	L. Musculoskeletal	3.56(1.59)		4.50(0.780)	
activities	P. Psychological	3.73(1.13)		4.32(0.959)	
	T. Endocrine, metabolic and nutritional	3.71(1.30)		4.42(0.998)	
	Z. Social problems	3.09(1.38)		4.06(1.12)	
	Others	4.29(1.19)		4.61(0.502)	

Table 6 Description of the improvement and satisfaction of the study population

be enhanced in the patients mainly defined these profiles (physical activity, relational and social skills, self-care, emotional skills, cognitive skills and other). Sociodemographic variables (age, sex, and municipality size) did not contribute to defining the characteristics of these groups. In this analysis, Cluster 1 (N=31) stood out because in none of the people included, the physical skills were promoted (0%) and an intermediate enhanced of the rest of the abilities (16.13-38.71%). Group 2 (N=102) was defined by the fostered of the physical sphere in all individuals (100%) and low to intermediate enhancement in the other domains (1.96-34.31%). Cluster 3 (N=61) was characterized by the fact that all skills were reinforced in all or almost all of the group (93.44-100%) Table 7 and Figure 3.

In those people with high satisfaction, 4 clusters were differentiated, and the variables related to the spheres to be promoted also defined the profiles (physical activity, relational and social skills, self-care, emotional skills, cognitive skills and other). In the analysis, Cluster 1 (N=115) was characterised by encourage the physical sphere in the totality of the group (100%), an intermediate enhancement of self-care and emotional skills (35.65% and 15.65%) and low or no enhancement of the spheres of cognitive skills (4.35%), other spheres (1.74%) and relational and social skills (0%). Cluster 2 (N=45) was defined by a group of patients with intermediate potentiation in all spheres (26.67-40%), except for the physical sphere with no enhancement (0%). Cluster 3 (N=107) highlighted an enhancement in all or almost all of the

group of physical skills (100%) and relational and social skills (99.07%), an intermediate improvement in the rest of the spheres (14.02 – 32.71%) and a null improvement in the spheres not included in the protocol (0%). Finally, Cluster 4 (N=95) highlighted the potentiation in all spheres of the majority of the group (89.47-100%) Table 8 and Figure 4.

Discussion

The increasing number of asset recommendations made since the integration of a protocol in EHR shows how it is becoming a tool in progressive development [15, 19]. The decrease in the number of recommendations during the COVID pandemic coincides with the months of increased restrictions. During this period, needs changed and community and professionals had to adapt accordingly [34].

This increase in its use, although practice and perceptions are different among professionals, reinforces the idea that it is a useful and accepted tool for the professionals involved [35, 36].

The higher number of recommendations made by professionals to older adults and women may relate to the original definition of "Asset for Health," highlighting that these factors or resources help to reduce inequities [8]. Professionals may use more assets for these groups because they represent two situations of lower privilege [37, 38]. The number of recommendations to people over 60 and women may also be related to the higher number

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Groups		1	2	3
TOTAL N (%)		31(15.98)	102(52.58)	61(31.44)
		N(%)	N(%)	N(%)
Sex	Female	24(77.42)	82(80.39)	38(62.30)
	Male	7(22.58)	20(19.61)	23(37.70)
Age	0–15	0(0)	0(0)	0(0)
	16–30	2(6.45)	1(0.98)	2(3.28)
	31–45	10(32.26)	0(0)	5(8.20)
	46–60	3(9.68)	25(24.51)	7(11.48)
	61–75	13(41.94)	49(48.04)	34(55–74)
	76–90	3(9.68)	27(26.47)	12(19.67)
	>90	0(0)	0(0)	1(1.64)
Municipality size (Inhabitants)	> 10,000	21(67.74)	40(39.22)	50(81.97)
	>2,000 - <10,000	3(9.68)	27(26.47)	6(9.84)
	< 2,000	7(22.58)	35(34.31)	5(8.20)
Skills/Areas to enhance	Physical	0(0)	102(100)	61(100)
	Self-care	5(16.13)	32(31.37)	61(100)
	Cognitive	8(25.81)	11(10.78)	59(96.72)
	Emotional	8(25.81)	33(32.35)	61(100)
	Relational	8(25.81)	35(34.31)	59(96.72)
	Others	12(38.71)	2(1.96)	57(93.44)



Fig. 3 Factor map of the clusters differentiated in people with high improvement Figure 3. Dimension 1 contrasts the presence of the spheres relational and social skills, emotional skills, cognitive skills, self-care, others vs. the absence of such spheres. Dimension 2 contrasts the absence of the physical activity sphere vs. its presence

of primary care visits and the diagnoses that are more frequently managed in these groups [39].

It is striking that recommendations for children and young people are scarce. Some papers show that this population has been largely ignored in research, policy, and social prescribing practice [40].

Depending on the place where recommendations were made, smaller areas were the most likely use this tool. This may be influenced by the specific characteristics of rural areas, which have an important impact on community-based health promotion activities [41].

The most common health problems were related to psychological problems (P) and social problems (Z), which is consistent with the usual uses of recommendations in different studies and areas [9, 42]. Given the prevalence of these problems (P and Z), it may seem surprising that most of recommendations focused on improving the physical sphere. However, this may be

Groups		1	2	3	4
TOTAL N (%)		115 (43.07)	45 (16.85)	107(40.07)	95(35.58)
		N(%)	N(%)	N(%)	N(%)
Sex	Female	91(79.13)	30(66.67)	88(82.24)	64(67.37)
	Male	24(20.87)	15(33.33)	19(17.76)	31(32.63)
Age	0-15	0(0)	0(0)	0(0)	0(0)
	16-30	1(0.87)	2(4.44)	1(0.93)	3(3.16)
	31-45	4(3.48)	4(8.89)	2(1.87)	6(6.32)
	46-60	24(20.87)	8(17.78)	17(15.89)	13(13.68)
	61-75	61(53.04)	21(46.67)	59(55.14)	48(50.53)
	76–90	25(21.74)	10(22.22)	27(25.23)	24(25.26)
	>90	0(0)	0(0)	1(0.93)	1(1.05)
Municipality size (Inhabitants)	> 10,000	51(44.35)	24(53.33)	72(67.29)	70(73.68)
	> 2,000 - <10,000	29(25.22)	3(6.67)	11(10.28)	10(10.53)
	< 2,000	35(30.43)	18(40.0)	24(22.43)	15(15.79)
Skills/Areas to enhance	Physical	115(100)	0(0)	107(100)	95(100)
	Self-care	41(35.65)	12(26.67)	24(22.43)	95(100)
	Cognitive	5(4.35)	13(28.89)	15(14.02)	94(98.95)
	Emotional	18(15.65)	12(26.67)	35(32.71)	95(100)
	Relational	0(0)	12(26.67)	106(99.07)	90(94.74)
	Others	2(1.74)	18(40.0)	0(0)	85(89.47)



Fig. 4 Factor map of the clusters differentiated in people with high satisfaction

Figure 4. Dimension 1 contrasts the presence of the spheres relational and social skills, emotional skills, cognitive skills, self-care, others vs. the absence of such spheres. Dimension 2 contrasts the absence of the physical activity sphere vs. its presence

linked to the impact of physical activity on the improvement of many health issues beyond just physical health [43]. In Europe, assets related to physical exercise are the most used by general practitioners [36]. Among health problems, endocrine system disorders, metabolism, and nutrition were also prominent (T). This may be related to the fact that many of the situations included here are very prevalent and they are mainly managed by primary care teams (for example type 2 diabetes mellitus, obesity or overweight) [39, 44]. Given the low number of followups, it may be necessary to establish a protocol with a minimum number of follow-ups. This is already done for some chronic diseases and processes managed in primary care [45, 46].

In these follow-ups, most people regularly attended the recommended asset and showed high improvement and satisfaction. This is in line with the opinion of professionals and other studies [35, 36, 47]. These positive effects could be related to the care and quality of the recommendation process [12], Aragón has been working on it since 2016 [24].

In relation to the limited attendance from the 0-15 age group, it may be influenced by the factors discussed above as the little experience or evidence in this group [39].

Regarding the improvement and effectiveness of this tool, there is controversy and variability [10, 48, 49]. Notable improvements were seen in middle-aged groups, which may be related to the higher prevalence of chronic diseases and comorbidities in older people [50]. It would be interesting to investigate the greater improvement in the largest municipalities. This may be influenced by factors such as access, availability of assets, or similar aspects. The differences according to health issues, with social problems showing the least improvement, may be due to the complexity of these situations. It is striking that the group with the greatest improvement is the grouped health problems, reasons for consultation which are rarely addressed by recommendations. This may suggest that any issue could benefit from this tool and approach.

In many groups, the level of improvement corresponded to the level of satisfaction. The differences between age groups and the lowest satisfaction at the extremes may be related. Differences by environment could be influenced by factors already discussed, such as accessibility and the availability of assets. Since it is very difficult to control this information (complete official data has not been found), it would be interesting to explore qualitatively the reasons for these differences. Regarding health issues, as with improvements, social problems showed the lowest satisfaction levels, which maybe is conditioned by the same situation.

With regard to cluster analyses, the relevance of the variables related to the areas to be promoted was high-lighted. In contrast, sociodemographic variables had little influence on the definition that these groups.

The limited influence of sociodemographic variables in defining the clusters may suggest that these characteristics do not modify the impact of health asset recommendations in an important way. According to the original definition, one of the aims of social prescribing is to reduce inequities [8] and all these sociodemographic variables are axes of inequality that determine power hierarchies in society [37, 38]. The fact that they do not influence the definition of the groups that benefit most or are most satisfied calls for reflection. In this regard, as some studies point out, it is not possible to expect a single tool to solve complex and structural problems linked to social inequalities [12, 51]. This result can also mean that different profiles of people can benefit from this approach. However, it would be interesting to go deeper with qualitative approaches to see whether this improvement and satisfaction are truly experienced similarly by all individuals or if these methodologies reveal more complex differences [52]. Regarding the spheres to promote, the physical domain was very present in the most numerous clusters of people with high improvement and high satisfaction. This is may be related to a possible longer tradition of working on and measuring physical skills compared to other abilities. Studies have found some benefits associated with the prescription of physical activity through social prescribing [53].

Limitations of this study include some aspects related to the daily clinical practice of professionals, including issues with record-keeping and the low number of follow-ups to recommendations. In view of this finding, active work is being done to train teams in this area and to improve record-keeping and information systems. Regarding variables, some of the response categories offered could be considered too restrictive and interesting aspects such as the socio-economic level of the beneficiaries were missing. Hence, the importance to record the social determinants of health in EHRs [54]. The different realities by areas in terms of population distribution or the availability of assets could also influence the social prescribing schemes applied. In order to take these aspects into account, existing related information was available into the manuscript. In terms of analysis, the few people studied in some categories of the variables made some calculations difficult. This was addressed by adapting the analysis to the situation.

Conclusions

Despite the limitations and the need to continue conducting studies with greater methodological rigour and using complementary approaches, this study reflects the complexity of implementing and evaluating social prescribing programmes and it shows positive results about the use and the impact of social prescribing as a tool in primary health care.

Abbreviations

ICPCInternational Classification of Primary CareEHRElectronic Health Record

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Author contributions

MPG, CBBA and AGG contributed to the conception of this study and wrote the initial draft. ATL, FML and MPG did the statistical analysis. NEM and MLLA

made an initial review. All the authors iteratively reviewed and refined the manuscript.

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Data availability

Pooled data are available on the Intranet of the Aragonese Health Service. The dataset is available from the corresponding author upon reasonable request. Open information about them is offered on https://www.aragon.es/-/estadist icas-asistenciales.

Declarations

Ethics approval and consent to participate

This study was developed within the EvaLRA Project and approved by the Research Ethics Committee of the Aragon region (Pl20/606 - January 13, 2021). All methods were performed in accordance with existing laws and guidelines. Due to the type of data, completely anonymous, and according to the legislation (Disposición Adicional 17 de la ley Orgánica de Protección de Datos (LO3/2018) https://www.boe.es/eli/es/lo/2018/12/05/3/con) individual informed consent of each data subject is not required.

Consent for publication

Not applicable.

Competing interests

The authors declare no competing interests.

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