

Digitally enabled social prescriptions: adaptive interventions to promote health in children and young people

Short title: Social prescriptions for children and young people

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Declaration of conflicting interests: The Author(s) declare(s) that there are no conflicts of interest.

Funding: This research received no specific grant from any funding agency in the public, commercial, or not-for-profit sectors.

Guarantor: Anant Jani is the Guarantor for the article.

Contributorship Statement: Richard Harrington, Muir Gray and Anant Jani were involved in designing the outline of the manuscript; Richard Harrington and Anant Jani were involved in writing the manuscript.

Health is determined by the interaction of genetic, lifestyle and environmental factors(1).

The combination of these factors creates an enormous number and variety of contexts that need to be taken into account when designing interventions to promote health and/or prevent disease. The London borough of Tower Hamlets has one of the highest rates of child obesity in the country, where more than one in four children are obese when they leave primary school. In a 2014 article describing the environment around his GP practice in Tower Hamlets, Sir Sam Everington noted “This, of course, is not helped by the 42 chicken shops per secondary school - Mile End Road running through the heart of Tower Hamlets is known as “chicken shop mile””(2). For the young people in Tower Hamlets, even if they were not genetically predisposed to obesity, their environment puts them at greater risk of becoming overweight/obese.

For children and adolescents, health promotion and disease prevention face several additional layers of complexity. As a starting point, growth and development in children and adolescents mean that they are rapidly changing, which has a significant impact on their physical and mental health. They also have less agency and autonomy in decision making because they are not free to make all the choices they would like to regarding their lives, although this lack of autonomy is often due to the roles of parents, school and other support structures.

While the aforementioned layers of complexity have existed for millennia, an emerging and important layer of complexity for younger people is the changing and unpredictable set of external influences and expectations that young people face, manifested in emerging trends

such as the use of social media. A recent study utilising the UK Millennium Cohort study showed an association between lengthy social media use and depressive symptoms in young people(3) – a problem that could not have existed 15 years ago. Due to the rapid evolution of technology, with young people often being a target audience, this layer of complexity can lead to rapidly changing and unpredictable effects on the physical and mental health of young people.

The interaction of all of these variables creates a complex ecosystem with unpredictable contexts that traditional and static biomedically-oriented interventions are having difficulty coping with, which is having a significant and negative impact on the health of younger people – in the UK, 20% of children have a long-term health condition, 30% of children leave primary school either overweight or obese, and the prevalence of mental health illness is increasing(4). Health inequality and poverty driven by social, environmental and economic differences also plays a significant role in these age groups and can have a large impact on the health of children and young people. To promote health and prevent disease for younger people in the context of the complex ecosystem they face requires interventions that can adapt to their needs as well as the context in which they are growing and developing. In this manuscript we outline how social prescriptions, supported by technology, could provide much needed adaptive interventions to improve the health of younger people.

Social prescribing, which is supported by several bodies in the UK including NHS England through their Universal Personalised Care Plan(5) and the Royal College of GPs(6), attempts to address the physical, mental and/or social health needs of individuals through referrals to

non-clinical services such as exercise and dance classes, arts communities, peer support networks, and legal and financial services, provided by charities, volunteer communities, and other third sector organisations. These referrals are often facilitated by a link worker, who takes into account the needs of the individual and knowledge of local services. The link worker, and social prescribing as a whole, aims to give the individual more control over their health by finding ways to manage their needs in ways that suit them. While there is a general approach through which social prescriptions are prescribed and delivered, the exact interventions can be adapted for individual circumstances – they are not static chemical formulations that one would find in a pharmaceutical prescription. This adaptability of social prescriptions comes with drawbacks because of a lack of standardisation but if the ultimate goal is to deliver on specific health outcomes, these drawbacks may be a small trade-off for the larger benefits they could provide because of their ability to adapt the individual's specific circumstances, environment, and needs – an important asset that can also help health and care systems address context-sensitive health inequalities.

A number of initiatives have started to use social prescribing for children and young people. The Young People's Health Partnership currently works with a number of charities who fulfil social prescriptions for children and young people, working across six Voluntary Community and Social Enterprise (VCSE) Health and Wellbeing Alliance networks through the NHS England Health and Wellbeing Programme. For example, StreetGames(7), currently runs a programme in Brighton, Southampton, Luton and Sheffield for the 5-25 age group that uses sport to get young people physically active, while also teaching teamwork, leadership, social interaction and self-discipline. The Healthy London Partnership, a London-wide initiative to make London the world's healthiest city, have also started to engage with children, young

people, parents and carers to identify how social prescribing can be used by local populations to improve health(8). End users were also involved in designing services and facilities in the Rochdale implementation of the i-Thrive project(9) (now running in ten locations across England), aimed to support the mental health and wellbeing of under-19s. The Rochdale project includes a physical hub with café and events located in the town centre, a dedicated phone line, booklet and online information and support, and comprises services for parents, carers and schools in addition to young people themselves, and aims to engage people as early as possible in order to reduce the risk of longer term mental ill-health.

Digital technologies are also currently being used to support social prescriptions, primarily through the use of management platforms, as well as apps and digital therapeutics.

Evergreen Life, a social prescribing app currently in use in the north of England, acts as a virtual link worker, making connections between patients and non-clinical services to help users improve their health(10). By linking with the GP's medical record and a database of social prescribing services, the app can automatically recommend relevant personalised social prescriptions. Through building social prescribing components onto an already useful app, exposure to and engagement with these services are increased, as is the confidence of patients in taking greater control of their own health.

A similar programme run by EMIS Health embeds the Elemental Social Prescription Connector into their primary care computer system(11). Elemental allows GPs to quickly and automatically identify and refer patients to appropriate non-clinical services, both physical and digital. Care City and HealthUnlocked have also created an EMIS plugin,

HealthUnlocked Discover(12) to provide 11 GP practices with data on over 600 social prescriptions that GPs can use to provide information to patients on local resources available to them. A new partnership between HealthUnlocked and the social enterprise Patients Know Best (PKB) allows users to import social prescriptions generated by HealthUnlocked into their PKB Personal Health Record, with the aim of giving patients even greater control, personalising their prescription and to ensure that the right support is given in a timely and seamless way(13).

The use of digital technologies in social prescribing can facilitate the tailoring of treatments to individuals and drive care to be more person-centred because of its ability to take both the individual and local context into account(14). Whilst they introduce complexity around data integrity and data protection, they support more effective targeting of limited resources, and can adapt over time to effectively target the specific and changing needs of children and young people. Furthermore, developing such technologies with user-centred design principles, keeping the specific needs of target users at the centre of the design process, can promote engagement and usage of the tools, further increasing effectiveness. These interactions are also not intended to be replacements for face-to-face contact in the social prescribing pathway, but rather as an extra component, to help both prescriber and patient.

Digital interventions supporting social prescribing aimed at children and young people are also currently in use. NHS Go is a confidential health advice and information service for 16-24 year olds that was commissioned by Lewisham CCG in 2016(15). It is a free and confidential app, with a directory of services and health advice on targeted topics important

to young people, including sleep, smoking drugs and alcohol, healthy eating and exercise, sex and relationships, and emotional and mental health. It also contains specific targeted information at different times, such as exam stress advice and help during exam time. Whilst NHS Go facilitates a passive, self-directed model of social prescribing, a more interactive example is Cypher App, previously known as Silent Secret, one of a growing number of apps and websites that are designed to promote mental wellbeing in young people(16). Cypher has an online community of 11-19 year olds which gives young people the opportunity to talk openly about things by creating anonymous posts on the app. Unlike other social networking platforms, other members cannot post replies or comments, but rather can only interact by pressing buttons to express support, such as 'heart' or 'hug'. Further, a 'get support' button allows users to be connected with real-world support organisations.

A significant advantage of digital platforms, whether for management of social prescribing or as an intervention, is that they allow for managed collection and processing of data by users of the services, allowing link workers and other primary care professionals to monitor progress of their patients by using standard data collection, and to also collect data for evaluation of the effectiveness of social prescription providers. Real-time monitoring of engagement with services, both digital and real-world, can identify when changes are required for the specific health needs of an individual, and can also provide feedback to services in order to help them improve their offering. These data can be used by not just individuals, GP practices, and CCGs, but where part of an approved study, by researchers investigating how social prescriptions can add value to health and care systems.

The social prescribing landscape in the UK is complex, and whilst the application to children and young people is a more recent development, it is a field that is growing, with the aim of improving long term health outcomes and reducing health inequalities. Social prescribing can help to address the environmental and lifestyle related issues and technology and data can help to enhance both of these dimensions when targeted towards the needs of children and young people. Questions remain around its effectiveness, both for patients and primary care services, because there is a limited evidence base for social prescribing(17) and it is specifically lacking when considering children and young people. More research is needed to understand the theoretical framework of social prescribing, how digital tools can be used in this context, and their role in improving the health of children and young people. Utilising digital technologies to supplement, improve, and collect data on social prescribing offers the opportunity to improve the effectiveness of prescriptions for individuals, tailoring recommendations more effectively, with better outcomes for both young patients and healthcare providers; allows development of frameworks for scaling social prescribing to more people; and can help to generate the evidence needed for evaluation of both individual programmes and for social prescribing as a whole.

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