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Improvement in quality of life and loneliness after the community connections program: a community-based pilot intervention in South Australia

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Abstract

Background Reducing loneliness and enhancing quality of life (QoL) are key public health priorities. However, limited empirical research examines the impact of community-based interventions on both loneliness and QoL. This study employed a single-group pre-post design to evaluate the South Australian pilot intervention, the Community Connections Program (CCP), assessing its effects on participants' self-reported QoL and loneliness.

Methods Individuals referred to the CCP pilot completed an interviewer-led survey at both intervention intake and completion. QoL was assessed with the Assessment of Quality of Life – 6 dimensions tool (AQoL-6D). Loneliness was assessed with the Campaign to End Loneliness Tool – 3-item measure (CtELT). Data were analyzed using descriptive statistics and paired sample *t*-tests.

Results Data from 195 adults who completed both data collection points were evaluated. AQoL-6D improved from intervention intake ($M=57$; $SD=16$) to completion ($M=66$; $SD=13$) ($t(194) = -9.73$, $p<.05$; $d=0.62$). All six dimensions of AQoL improved, with the greatest increase in scores occurring for *mental health*, *relationships* and *coping* (results were statistically significant at $p<.05$). The largest within-group effect size was found for the dimension of *mental health* ($d=0.8$). Participants' overall feelings of loneliness significantly decreased between pre- ($M=6.7$; $SD=2.99$) and post- ($M=4.4$; $SD=2.00$) intervention measurement ($t(186)=10.50$, $p<.05$; $d=0.90$).

Conclusions Participants of the CCP pilot intervention reported significantly improved QoL and reduced loneliness at program completion. The CCP shows promise for the ability of community-based interventions to reduce loneliness and improve QoL for individuals disconnected from their communities and local health and support care services. These findings have implications for the development of programs that facilitate place-based, person-centered connections as important drivers of public health and wellbeing.

Keywords Quality of life, AQoL, Loneliness, Community, Psychosocial, Participant-reported outcomes.

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Introduction

Disconnection from community and social support cuts across and underpins a range of psychosocial and physical health related issues [1, 2, 3]. Participation in social activities, connection to community groups, and building meaningful social relationships beyond the home play critical roles in improving health outcomes [2, 3, 4, 5]. Higher levels of social support and community involvement are associated with increased levels of resilience and psychological wellbeing [6, 7, 8]. Therefore, public health and social care systems are increasingly prioritizing holistic frameworks that strengthen community and social connections to enhance wellbeing and quality of life (QoL) [1]. Increasing QoL and reducing loneliness and social disconnection are now recognized as key public health priorities [1, 9, 10]. Interventions that foster social connection, reduce loneliness, and enhance QoL have the potential to improve physical health, psychological wellbeing, and life-expectancy [2, 3, 4, 5, 11].

An emerging public health strategy for improving loneliness and QoL involves strengthening individual's connections to their communities and social care networks [1, 9]. This approach may also generate beneficial flow-on effects across public health and social care systems [11, 12]. However, limited empirical research has examined the effectiveness of community-based interventions aimed at improving either QoL or loneliness [13, 14, 15, 16], and even fewer address both [1]. Therefore, the aim of this study was to evaluate the effectiveness of the pilot phase of the Community Connections Program (CCP), a South Australian community-based intervention. This pilot study used a pre-post design to evaluate the intervention's effects on participant level outcomes, which included loneliness and QoL.

Loneliness can be defined as "a distressing feeling that accompanies the perception that one's social needs are not being met by the quantity or especially the quality of one's social relationships" [17]. Loneliness is a significant public health risk [18] pervasive social phenomenon [19] epidemic [9, 20] and a recognized public health problem [10]. Research that seeks to understand the drivers and impacts of loneliness on individuals, communities and health care systems is a rapidly growing field [14, 21, 22, 23]. Holt-Lunstad and colleagues' [2, 9, 21, 24] seminal work and ongoing research examines the relationship between loneliness, social isolation and health, and calls for social connection to be a public health priority in the USA. O'Sullivan et al., [14] performed a cross-sectional online survey in 101 countries to investigate the prevalence and risk factors of loneliness and social isolation. Their multi-country study showed the prevalence of severe loneliness was 21% during COVID-19 [14]. Furthermore, Surkalim et al.'s [23] systematic review and meta-analysis showed that the prevalence of loneliness for European adults ranged from 2.9 to 24%.

A range of interventions have been developed to address loneliness, many of which target older populations [15, 25, 26]. Gardiner et al., [25] conducted a review of 39 interventions aimed at reducing loneliness and/or social isolation among older people. Six categories of interventions were identified – social facilitation, psychological therapies, health and social care provision, befriending, leisure/skill development, and animal interventions [25]. The interventions varied considerably in design and implementation though most reported a reduction in loneliness and/or social isolation [25]. Successful interventions included adaptability, productive engagement and a community development approach [25]. More recently, a community-based group health intervention was found to decrease loneliness and social isolation among older adults at 6-month follow-up [26]. In addition, significant reductions in pre- post loneliness scores were observed for a 6-week face-to-face group health intervention with adults living with chronic conditions [15]. Therefore, despite the variability in previous studies, results suggest that community-based interventions can have positive impacts on loneliness [15, 25, 26].

QoL is defined by the World Health Organization as, "an individual's perception of their position in life in the context of the culture and value systems in which they live and in relation to their goals, expectations, standards and concerns" [27]. QoL is a multidimensional construct that encompasses a variety of physical and psychosocial dimensions [13, 28]. Self-reported QoL is an individual's perception of their physical, emotional, and social wellbeing and everyday functioning across multiple dimensions including, mental health, relationships, pain, and independent living [13, 28]. QoL has been widely applied in clinical settings to evaluate QoL before and after medical intervention [29, 30, 31]. QoL instruments are typically used in clinical studies as a utility measure (to compute health state utility values), which can then be used in economic evaluations of interventions [32, 33]. In addition, several of these studies assess the impact of loneliness on QoL/health state utility. Majmudar et al., [33] conducted a systematic literature review that explored the impact of loneliness and/or social isolation on health state utility values (HSUVs). Despite finding significant variations in HSUVs among the studies (due in part to differences in methodologies), the review "reflects detriments in utility which are important indicators of the burden associated with loneliness and social isolation" (33 p1995). More recently, Lange et al., [34] investigated loneliness as a potential predictor of health-related QoL outcomes in patients receiving hematopoietic stem cell transplantation. The authors suggested that improved health-related QoL outcomes (and immunological recovery) may be achieved by addressing perceptions of loneliness prior to treatment [34].

Investigating QoL in non-clinical settings, and using QoL instruments as a psychometric measure, are of increasing interest to researchers and practitioners. Community-based interventions aimed at improving QoL demonstrate mixed results [13, 16]. Lassander et al., [13] investigated the impact of a school-based mindfulness intervention on participants' health-related QoL. Compared to the active control group, intervention participants showed a significant improvement in health-related QoL at both 9- and 26-weeks follow-up [13]. Verkleij et al., [16] examined the impact of a community-based cardiovascular disease prevention program on participants' physical and mental QoL. After 5-years of intervention, the program was reported to have no beneficial effect on QoL [16].

Few studies have addressed both QoL and loneliness, and these have typically assessed the impact of loneliness on QoL [33, 34]. One intervention that has addressed both QoL and loneliness as outcome measures, is the Windsor-Essex Compassion Care Community (WECCC) initiative in Canada [1]. The WECCC is a community-based program designed to improve QoL, loneliness, social connection, health, and wellbeing among vulnerable and traditionally underserved groups [1]. The WECCC program is an evidence-based model and set of tools and activities that include individualized goal support, resource navigation, and public education sessions on social connection and loneliness [1]. An evaluation of the developmental phases of the WECCC program reported significant positive impacts on participants' perceived loneliness, social connectedness, and QoL [1]. The results of the WECCC evaluation highlight the potential of community-based interventions to enhance both QoL and loneliness.

The intervention evaluated in the current study, the Community Connections Program (CCP), was developed to build on previous public health interventions to address the prevalence of loneliness and improve QoL within an Australian context. The CCP program provided person-centered, place-based care, along with community and connection-building support activities tailored to individual needs [35, 36, 37, 38, 39]. Place-based, person-centered interventions address the needs of the individual to strengthen social support within local communities, leverage local knowledge, and tailor activities and assets to meet specific community needs [35, 36, 37, 38].

The aim of the current study was to evaluate the effectiveness of the CCP in improving participant-level outcomes, specifically loneliness and QoL. This quantitative investigation of participant-level outcomes was part of a broader mixed-method evaluation examining the CCP's impact from a systems perspective, including program sustainability and acceptability. The evaluation is ongoing, with qualitative insights published elsewhere [40]. The findings of this quantitative evaluation offer valuable insights for designing community-based programs that leverage place-based, person-centered connections as key drivers of public health and wellbeing.

Methods

Intervention

The CCP pilot commenced on 1 July 2021, funded for developmental phases until 30 June 2023. The CCP was administered by the Department of Human Services (DHS) South Australia on behalf of the Minister for Human Services. The program operated within the context of a broader system of community and health services funded by the Australian Government, state and local governments, and community-level initiatives. Providers of social, health and support services across South Australia had continued to report to DHS significant service gaps for people who were lonely, socially isolated, and disconnected from their local health and social support services [40]. The CCP was therefore developed by DHS South Australia to support people who were experiencing or at risk of loneliness and isolation, to enhance their independence and strengthen connections with communities, social networks and services [40]. The two primary participant outcomes of the CCP were loneliness and QoL (psychosocial and physical dimensions of QoL) [40].

Three design aspects were central to the CCP: (a) a no-wrong-door policy, enabling any CCP partner organization to assist new participants without requiring referrals; (b) a responsive approach, ensuring support for individuals previously ineligible for other programs (preventing them from slipping through the cracks); and (c) a focus on fostering collaboration among CCP partners organizations and agencies to create a unified system (rather than each organization working independently) – which was unprecedented in the sector [40]. Collaborative relationships were vital to the CCP in achieving its system-level goal of "connecting the systems that connect people". The DHS achieved this goal by assigning specific roles and functions to partner organizations, including Regional Coordinating Partners and Care and Community Partners. Each partner type was responsible for activities that fostered cohesion, integration, and responsiveness in the system. For example, Regional Coordinating Partners facilitated regular information-sharing with community and service network contacts, identified new community organizations and innovative projects, oversaw referral and client pathways, and recommended new partners and initiatives to DHS. Additionally, all CCP partner organizations were encouraged to adopt referral practices that minimized service fragmentation, strengthening connections within the CCP and with external providers to enhance participant support.

The CCP was delivered by a range of not-for-profit community-focused organizations, incorporated community bodies, and local government councils across South Australia (approximately 40 organizations during the pilot phase). Support activities for each participant were organized and facilitated by a CCP partner organization staff member (such as a coordinator, usually with a social services background) to meet the individual's needs. Staff trained in a holistic approach developed individualized support plans that considered each person's physical needs, personal and family circumstances, background, and life experiences. Direct, in-home contact allowed staff to build rapport, gain a deeper understanding of the participant's needs, priorities, and preferences regarding health and wellbeing, and to collaboratively establish meaningful goals. Partner organization staff had the flexibility to design person-centred supports tailored to the individual's unique context, experiences, capacity, and needs. The program encompassed a wide range of care, community, and connection-building activities, ensuring participants could access the services, groups, and organizations needed to reduce perceived loneliness and enhance their QoL – both psychosocially and physically. For example, to facilitate a reduction in perceived loneliness, CCP staff connected participants to community networks by accompanying them to group social activities and events (e.g. at community centers). To address the *independent living* dimension of QoL, participants were connected to services that provided necessary in-home support and/or personalized equipment. To address the *mental health* dimension of QoL, participants were connected to services that provided mental health support. Other examples of support activities included, assisting participants with navigating public transport to attend activities/appointments, linking participants with required allied and medical health services, and connecting participants with employment services. In addition to providing support to participants via a range of tailored activities, CCP staff also provided information and advocacy [40].

DHS South Australia commissioned the research center CSI Flinders [40] to conduct an independent evaluation of the program's pilot phase – the data reported in this manuscript. The evaluation was conducted at the two levels at which the program operated – participant level, and system level. Multiple sources of quantitative and qualitative data were collected and analyzed to answer the three key evaluation questions of the CCP pilot phase: (1) How much are we doing? (2) How well are we doing it? and, (3) Is anyone better off [40]?. The first key evaluation question, "How much are we doing?", examined participant demographics along with the type and quantity of activities and services provided. The second question, "How well are we doing it?", assessed system effectiveness, participant experiences, and the program's ability to meet their needs. The purpose of the current manuscript is to report the evaluation of participant level outcomes – QoL and loneliness – the two participant reported outcomes of evaluation question three, "Is anyone better off?". Other components of the program evaluation, including qualitative findings, are available at [40].

Participants and data collection

The target population of the CCP included adults living in South Australia aged from 18 years up to 64 years, or 49 years for Aboriginal and Torres Strait Islander people, which is the cut-off age for eligibility into the Australian Government-funded My Aged Care program. Given that the CCP was developed to assist anyone within the specified age range who did not qualify for the federal programs My Aged Care and the National Disability Insurance Scheme, the inclusion criteria for the CCP were extremely broad. By design, the CCP had a 'no wrong door' policy which allowed for entry into the program by anyone in need of connection to community, social and health support services [40]. As such, the level of complexity in circumstances of those who entered the program varied greatly, from a simple case of someone needing a little assistance to re-engage with existing social networks, to very complex circumstances including severe and acute life events such as suicide attempts or palliative care [40].

The recruitment of participants into the CCP occurred via the DHS (the administering body) and CCP partner organizations across 12 regions of South Australia. The DHS promoted the CCP on their website and via other marketing materials including flyers. CCP partner organizations utilized the DHS-provided materials and engaged in networking activities within their region, such as visiting community centers, to promote the program. Some partners also advertised the program via local newspapers and Facebook pages [40]. The CCP's target audience was diverse, encompassing potential participants, their families and carers, and specialist and allied health professionals, including General Practitioners. To effectively communicate the program, CCP partner organizations tailored their messaging to each audience group. For instance, messages directed at General Practitioners highlighted the program's role in addressing loneliness and social isolation. In contrast, outreach to potential participants used a strengths-based approach, encouraging engagement in activities that leveraged their existing abilities while empowering them to take greater control over managing their needs in the future.

Ultimately, each CCP partner organization determined its promotional strategies, leveraging its deep understanding of the local community.

A single-group pre-post design was used to investigate the effect of the pilot intervention. Program intake data were collected in-person at the CCP partner organization's location upon referral to the program (pre-) and upon completion (post-). Partner organization staff assisted participants to complete the intake and assessment questionnaires, which covered aspects of general socio-demographic information and the QoL and loneliness specific measures included in this study. QoL and loneliness measures were used at pre-assessment by staff to determine eligibility into the program. Post-intervention data were collected upon participant's completion of the program and staff again collected the data in-person. The total period of data collection for the pilot ranged from 1 July 2021 to 3 June 2022. Data were extracted from the DHS proprietary software then provided to, and stored securely by, the research team for analysis and reporting. At the time of analysis, pre-post data were available for 195 participants. In total, pre- post intervention analyses were performed on a sample of $n = 195$. Flinders University Human Ethics approval was granted for this project (ID 5158).

Measures

Quality of life (QoL)

Quality of life was assessed with the Assessment of Quality of Life (AQoL), a participant/patient reported multi-attribute utility instrument that has undergone validation studies in clinical, economic, and community settings and performed well [41, 42]. As a participant reported outcome, it captures the individual's own perception of their quality of life [41]. The AQoL-6D instrument was chosen for the current study because this version of the AQoL is suited to studies where both physical health and psychosocial dimensions are important [43, 44, 45].

The AQoL-6D consists of 20 items covering six dimensions about QoL: mental health (4-items), coping (3-items), relationships (3-items), pain (3-items), senses (3-items) and independent living (4-items) [43, 45],. The three dimensions, *mental health*, *coping* and *relationships* form the psychosocial super dimension of the AQoL-6D. The physical super dimension of the AQoL-6D is comprised of the three dimensions, *pain*, *senses*, and *independent living* [43]. Respondents select the response to each item that best describes their situation as it has been over the past week. Items are measured on 4-, 5-, or 6-point scales [43, 45]. For example, an item in the *relationships* dimension asks, 'How happy are you with your close and intimate relationships?' The response options for this item range from 1 = very happy to 5 = very unhappy.

AQoL instruments can be used as a psychometric measure (unweighted) or as a utility measure (weighted) [45, 46]. The current study used AQoL as a psychometric measure because the study did not seek to compute health state utility values. Each dimension has a maximum sum of 13 to 22 which is then standardized, or converted, to a score out of 100 using the AQoL scoring algorithm [47]. The final overall AQoL-6D score ranges from 0 to 100, where 0 represents the worst score and 100 represents the best score [41]. Previous studies in specific populations and health settings show mean AQoL-6D scores range from 59 for young people (aged 12-25years) attending primary mental health services [11] to 78 for food allergic children as reported by their caregivers [48].

Loneliness

Loneliness was assessed in the current study with the Campaign to End Loneliness Tool (CtELT). The CtELT is a 3-item, 5-point scale (Table 1). The tool was co-designed in the United Kingdom with older people, service providers, commissioners, and housing associations [15] for use by service providers to measure change resulting from an intervention to address loneliness [15]. The CtELT tool is an indirect measure of loneliness, where respondents rate how strongly they agree or disagree with a series of items that do not include the word 'lonely'. The items use positive, rather than negative language and scale points range from 0 'strongly agree' to 4 'strongly disagree' [18]. The item scores are summated to produce the respondent's overall loneliness score ranging from 0 to 12, where 0 represents the lowest score and 12 represents the highest [15]. Currently, there is no validated baseline or cut-off score for determining 'lonely' with the CtELT [49].

Participant characteristics

A range of socio-demographic data were collected at program intake. These data include participants' age (captured as categorical data), gender, their status regarding Aboriginal identification, culturally and linguistically diverse (CaLD) identification, and financial disadvantage (captured by a range of options such as being unemployed at the time of data collection) [40]. Participants were also asked about their status regarding chronic illness, mental illness, and disability. Respondents reported their status as being one of the following, 'diagnosed', 'undiagnosed', 'both diagnosed and undiagnosed', 'none' or 'not stated'.

Analysis

Data were analyzed using IBM SPSS® Statistics (Version 27). Descriptive statistics (means, standard deviation, and percentages) were used to describe socio-demographic data. The differences between the pre-CCP and

Table 1 Descriptive characteristics of sample at baseline (*n* = 195)

Age (years), *n* (%)	
18–29	20 (10)
30–39	24 (12)
40–49	45 (23)
50–59	60 (26)
60–69	56 (29)
Gender, n (%)	
Female	128 (66)
Male	66 (34)
Diverse	1 (0.5)
CaLD status	
No	150 (77)
Yes	39 (20)
Not stated	6 (3)
Identify as Aboriginal	
No	177 (91)
Yes	12 (6)
Not stated	6 (3)
Disability status	
Diagnosed and/or undiagnosed	121 (62)
None	56 (29)
Not stated	18 (9)
Chronic illness status	
Diagnosed and/or undiagnosed	124 (64)
None	61 (31)
Not stated	10 (5)
Mental illness status	
Diagnosed and/or undiagnosed	142 (73)
None	35 (18)
Not stated	18 (9)
Financial disadvantage*	
Unemployed	106 (31)
Low-income healthcare card	90 (27)
Accommodation at risk	18 (5)
Mortgage/rental stress	17 (5)

CaLD = culturally and linguistically diverse. *Multiple responses possible; response options receiving 5% or more of total responses reported above - additional response options available in the data set

post-CCP scores using a paired sample t-test on data from the AQoL-6D measure and CtELT measure were analyzed for statistical significance at $p < .05$. This significance level was selected as it is conventional and acceptable in the evaluation of public health interventions [50, 51]. To measure the intervention within-group effect size, the present study applied a distribution-based method by calculating the standardized mean difference, Cohen's delta (*d*) = (mean A – mean B / pooled standard deviation) [34]. Cohen [52] suggests the following values for interpreting effect sizes, *d*: 0.20–0.49 = small effect, 0.50–0.79 = a moderate effect, and ≥ 0.80 = a large effect.

Results

Sample characteristics

On average, a CCP placement lasted 130 days (*SD* = 64), which is approximately 18 weeks. Originally designed as a 12-week program, the CCP allowed flexibility for extensions to accommodate participants requiring additional support. Table 1 shows the largest age group was 60–69 years old (29%), followed closely by those aged 50–59 years (26%) and 40–49 years (23%). Females accounted for 66% of participants; 20% identified as having CaLD status; 6% of participants identified as Aboriginal. Regarding disability status, a total of 62% program participants stated they had some type of diagnosed, undiagnosed, or both (diagnosed and undiagnosed) disability. Some form of chronic illness was reported by a to

tal of 64% of participants. Mental health conditions were reported by a total of 73% of participants. Finally, most (87%) participants experienced some form of financial disadvantage, including unemployment (31%), being on a low-income government-issued healthcare card (27%), and accommodation at risk (5%) (multiple responses to this question were possible).

Intervention effects on QoL

All dimensions of the AQoL-6D significantly improved on average by nine points (Table 2). The AQoL-6D mean score improved by 9 points ($t(194) = -9.73$). At the dimension level, the largest improvements were in *mental*

Table 2 AQoL-6D (comparison pre- and post- pilot CCP intervention)

	Baseline AQoL-6D (*n* = 195)			**Post-intervention AQoL-6D (*n* = 195)**			**Effect size**
	Mean	**SE**	**SD**	**Mean**	**SE**	**SD**	**d**
AQoL-6D	**57**	**1.2**	**16**	**66**	**1.0**	**13**	**0.62**
Mental Health	44	1.6	22	60	1.3	18	0.80
Coping	46	1.6	23	58	1.2	17	0.59
Relationships	56	1.7	23	68	1.2	17	0.59
Senses	78	0.8	12	82	0.7	10	0.36
Pain	53	2.3	33	61	2.0	28	0.26
Independent Living	64	1.7	23	68	1.5	22	0.18

AQoL-6D = Assessment of Quality of Life 6 dimensions. SE = standard error. SD = standard deviation

Table 3 Loneliness comparison of pre- and post-CCP intervention

	Baseline ($n = 194$)			Post-intervention ($n = 188^*$)			Effect size
	Mean	SE	SD	Mean	SE	SD	d
Loneliness overall	**6.7**	**0.22**	**2.99**	**4.4**	**0.15**	**2.00**	**0.90**
My relationships are as *satisfying* as I would want them to be	2.3	0.09	1.21	1.5	0.07	0.89	0.75
I have enough people I feel comfortable *asking for help* at any time	2.3	0.09	1.27	1.5	0.07	0.99	0.70
I am *content* with my friendships and relationships	2.1	0.09	1.21	1.4	0.06	0.90	0.66

*pre- post- sample sizes vary due to missing data for some participants. CtELT = Campaign to End Loneliness Tool. SE = standard error. SD = standard deviation

health ($t(194)$ = -10.61), *relationships* ($t(194)$ = -7.93) and *coping* ($t(194)$ = -8.68). Improvements were also found for *pain* ($t(194)$ = -4.87), *senses* ($t(194)$ = -4.52), and *independent living* ($t(194)$ = -3.54). All changes were statistically significant at $p < .05$. The difference between pre- and post-intervention AQoL-6D scores represented a moderate within-group effect size ($d = 0.62$) (Table 2). Of the six dimensions of quality of life, the greatest within-group effect size was found for *mental health*, indicating a large improvement among the CCP participants. Moderate within-group effect sizes were observed for *relationships*, and *coping*. Small within-group effects sizes were observed for the remaining three dimensions, *senses*, *pain*, and *independent living.*

Intervention effects on loneliness

Table 3 shows the pre- and post-CCP loneliness scores as measured by the CtELT tool. The overall measurement of loneliness was the sum of scores for all three statements [15, 18]. A lower score post-intervention indicates a reduction in loneliness [15]. Responses for all three statements of the loneliness scale declined between pre- and post-intervention, indicating a reduction in self-reported feelings of loneliness (Table 3). Participants' overall feelings of loneliness significantly decreased between pre- and post-intervention measurement ($t(186) = 10.50$, $p < .05$). The t-tests show that all observed differences between pre- and post-intervention scores were statistically significant at $p < .05$. The difference between pre- and post-intervention CtELT scores represented a large within-group effect size ($d = 0.90$) (Table 3). Of the three items, the greatest within-group effect size was found for *satisfying relationships*, indicating a moderate-large improvement among these intervention participants. Moderate within-group effect sizes were observed for the other two items, *asking for help* and *content with my friendships.*

Discussion

This study explored the effect of a community-based intervention pilot program on participants' self-reported QoL and loneliness. To understand the impact of the CCP intervention, the within-group effect size was computed. The change in CCP pre-post QoL showed a moderate within-group effect size ($d = 0.62$), suggesting a successful pilot program intervention for these $n = 195$ participants. These results must be considered within the confines/scope of this study and the single-group pre-post design utilized. Results in Table 2 show that at the dimension level, the three largest within-group effect sizes were reported for *mental health*, *coping*, and *relationships.* These three dimensions are the psychosocial super dimension of the AQoL-6D, whereas the other three dimensions represent the physical super dimension [43]. Therefore, results indicate that the CCP program had the greatest effect on these participants' psychosocial aspects of QoL. These findings suggest that future stages of the program could explore ways to assist participants to further improve on the physical dimensions of QoL, as well as maintain improvements on psychosocial dimensions. This pilot program shows support for the CCP achieving its aim of improving participants' QoL by increasing their social connectedness.

The success of an intervention can also be measured by determining how well the intervention performed compared to a benchmark such as a population norm [41]. Population norms allow researchers to compare study samples with populations for various reasons including interpreting intervention outcomes [41]. The CCP participants' *pre*-intervention AQoL-6D score was 57, which is substantially below the Australian national population AQoL-6D norm of 84 [43]. To the authors' knowledge only Maxwell et al. [43] reports on Australian population-level data with the AQoL-6D. The present study contributes new empirical data and extends Maxwell et al.'s [43] research in the Australian context by comparing population norms to a specific sub-population. Moreover, the present study provides benchmarks for future longitudinal analyses of the CCP at scale (at the state-level and potentially national-level).

The current study findings also reveal that although CCP participants' overall QoL significantly improved from program intake to completion, the *post-* intervention AQoL-6D mean score of 66 is below the Australian population mean of 84 [43]. This result indicates that there is still room for improvement for these CCP participants to reach the population norm for QoL. For CCP participants, the difference between their post-intervention QoL with the population norm may reflect the short duration of the program being approximately only 18 weeks on average. Results of the present study suggest that for these CCP participants, additional support and connection-building activities may be needed over an extended period. Howard et al., [1] note that community connection is a lifelong journey and fluctuations in QoL outcomes may be expected over time. These circumstances highlight the need for interventions like the CCP to be made available on a large scale and for sustained periods of time.

Loneliness results (Table 3) show that CCP participants' overall feelings of loneliness significantly reduced from program intake to completion, indicating a successful intervention for these participants. The Campaign to End Loneliness [49] suggests there are no minimum, or typical, levels of change in pre-post CtELT scores; instead, a decrease in loneliness scores should be interpreted as a reduction in respondents' perceived experience of loneliness. To the authors' knowledge, only one published study [15] uses the 3-item CtELT to evaluate an intervention in either a clinical or non-clinical setting. Therefore, the current study helps to establish benchmarks for future research with this measurement tool. Smith et al. [15] examined the impact of a community-based program, Chronic Disease Self-Management Education, on participants' loneliness. Results indicated a reduction in participants' CtELT loneliness score, though no effect size was reported [15]. In the current study, the within-group effect size ($d = 0.9$) is above the benchmark value for a large effect [52], which suggests a successful pilot program intervention for these participants. These results should be considered within the confines/scope of the study and the single-group pre-post design.

Limitations and future directions

A single-group pre-post research design was used to investigate the effect of the pilot intervention in one Australian state, which may limit the validity and generalizability of the results. A more robust study design would be to conduct a randomized control trial (RCT) that compares the intervention sample to a control group and considers potential geographic factors. However, with RCTs requiring substantial time and financial resources, community-based interventions such as the CCP typically adopt a single-group pre-post design. Furthermore, the type of evaluation possible for an intervention is determined by the research study design, which is often determined by funding and resources, and is the case with the current study. This study assessed only two participant-level outcomes of the CCP. Future research should consider evaluating service dose and system-related factors.

Both instruments, AQoL-6D and CtELT utilize self-reported data, which may be subject to recall and social-desirability biases. The sample was predominantly female, older, and unemployed. The data do not include participants that disengaged from the program and did not complete the post-intervention survey; therefore, those participants' outcomes were not captured. Analysis was constrained by the number of participants for whom completed pre- and post- data were available at the time of program evaluation. In addition, the data were captured immediately post-intervention. Additional waves of data collection are recommended, for example, six months and 12-months after program completion to determine if the positive trend has been sustained for participants who have completed the CCP – an important long-term outcome for a community intervention.

Conclusion

Interventions that positively impact a person's QoL and loneliness can potentially help to improve their overall health, wellbeing, and life-expectancy [11, 12]. The CCP was developed by DHS South Australia to support individuals experiencing vulnerabilities by strengthening their connections with communities, social networks, and health services. The CCP employed a place-based and person-centered approach to provide tailored connection-building support activities to meet individual needs [35, 36, 40]. The current study explored the effect of this community-based intervention pilot program on participants' self-reported QoL and loneliness – the program's two primary participant outcomes. The findings showed that participants of the CCP pilot intervention reported significantly improved QoL and reduced loneliness at program completion. Results of this CCP pilot study support the findings of the WECCC developmental phase evaluation [1], suggesting that community-based, connection-building interventions may effectively enhance QoL and reduce loneliness. The CCP may potentially be used to help inform the development or refinement of similar community-based programs, and to support resourcing of community and social services systems aimed at improving wellbeing. However, additional research is needed to substantiate the generalizability of these pilot results and to assess long-term impacts on broader health and wellbeing outcomes.

Abbreviations

AQoL-6D	Assessment of Quality of Life–6 dimensions
CaLD	Culturally and linguistically diverse
CCP	Community Connections Program
CtELT	Campaign to End Loneliness Tool
DHS	Department of Human Services
HRQoL	Health related quality of life
QoL	Quality of life
RCT	Randomized control trial
SD	Standard deviation
SE	Standard error

WHOQOL World Health Organization Quality of Life

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Author contributions
Study conception and design: SR, PB, MZ, CV, CT, IGS, CM, SB. Project lead: SB. Data curation: PJT, DEW, BJ. Data analysis: PJT, BJ. Interpretation: BJ, PJT, SB. First draft of the manuscript: BJ, PJT, SB. Critical revision of the manuscript: BJ, AP, SB. All authors commented on previous versions of the manuscript. All authors read and approved the final manuscript.

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Data availability
The data were collected as part of the commercial-in-confidence project and is not publicly available.

Declarations

Ethics approval and consent to participate
This study was approved by the Flinders University Ethics Committee, Adelaide, South Australia, Australia (ID 5158) and conducted in accordance with the National Statement on Ethical Conduct in Human Research (2023) and National Health and Medical Research Council Act 1992. Informed consent was obtained from all individual participants included in the present study.

Consent for publication
Not applicable.

Competing interests
The authors declare no competing interests.

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