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Research

# Evaluating the effects of a Therapeutic Day Rehabilitation program and inclusion of gardening in an Australian Rural Community Health Service

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**Abstract.** Therapeutic day rehabilitation (TDR) is a non-residential intensive structured program designed for individuals recovering from substance misuse. A weekly afternoon of therapeutic gardening was a new incentive initiated in a TDR program at one Australian community health service, designed to give participants the opportunity to spend time outdoors connecting with nature and each other. The aim of this study was to explore perceptions of participants enrolled in this program by employing a convergent parallel mixed-method design using qualitative individual, semi-structured interviews ($n = 14$) and longitudinal quantitative quality of life (QOL) data at three different intervals ($n = 17$). The analysis of the quantitative data showed that there was a statistically significant increase in the participants' QOL scores in three of four domains (physical health, psychological, social relationships) when comparing baseline and post completion of the TDR. These observed changes were maintained at the 4-week follow up. The key findings from the semi-structured interviews include positive effects for participants on social connectivity, structure and achievement, understanding of recovery and relaxation from contact with nature. This study shows that a combination of TDR and therapeutic gardening can improve participants' physical health, psychological health and social relationships.

**Keywords:** community healthcare, therapeutic gardening, mixed methods, non-residential rehabilitation programs, quality of life, program development and outcomes, nature experiences, well-being.

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## Introduction

Therapeutic day rehabilitation (TDR) is a 6-week, non-residential intensive structured rehabilitation program designed for individuals recovering from substance misuse. The program staff support individuals to learn relapse-prevention skills, build life skills and promote their general wellbeing (Latrobe Community Health Service 2015). TDR involves motivational enhancement, cognitive behavioural therapies, individual and group counselling, self-help and peer support (health.vic 2017). A new initiative at one Australian rural community health setting was to enhance the TDR curriculum with an afternoon of therapeutic gardening (TG) in the Grow Hope Garden (GHG) once a week. The role of nature and TG has been recognised in the literature for enhancing the health and wellbeing of individuals and providing psychological benefit (Clatworthy *et al.* 2013; Marsh *et al.* 2018). Horticultural TG has also been known to be a meaningful therapeutic modality for veterans with substance abuse issues (Lehmann *et al.* 2018). Gardening was also used as a modality to help prisoners recover from substance abuse (Brown *et al.* 2016). In this paper, we explore the perceptions of program participants on the TDR program and the new GHG component, as well as longitudinal evaluation of its effect on their QOL.

TDR is a program specifically designed for low-risk individuals who have enough stability and support in their lives to address their substance use (health.vic 2017). This program allows the participant to remain at home surrounded by their individual support network while being immersed in holistic person-centred therapeutic and recovery services to assist them with a broad range of issues to reach and maintain an optimal state of wellbeing (health.vic 2017). The content of the program varies between recreation, work and formal therapeutic interventions across the 6 weeks. Previous evaluations of non-residential rehabilitation programs have demonstrated a range of positive treatment outcomes, including abstinence or reduced

substance use, better management of substance-use triggers, and an overall increase in participants' self-reported confidence to resist using their primary substance at a 3-month follow up (Kiehne and Berry 2012; Harney and Lee 2015). Service users in addiction treatment programs have also identified an improvement in their QOL (Lubman *et al.* 2014).

An existing evidence base acknowledges the potential benefits of exposure to the natural environment. These benefits include a decrease in depression and anxiety, reduction in stress levels, improved social skills and positive impacts on a person's general wellbeing (Rappe *et al.* 2008; Kam and Siu 2010; Marsh *et al.* 2018; Thompson 2018; Howarth *et al.* 2020). The outcomes from evidence-based models reporting on the diversity of TG and gardening interventions provide confidence for clinicians considering gardening as a social prescription for a range of populations (Howarth *et al.* 2020). From this evidence, it was decided with the support of an experienced community volunteer, to add gardening to the mix of activities offered in the TDR program at one community health service. TG has been designed to be used as a component in rehabilitation, or vocational programs with the specific aim of getting participants to reconnect with nature, to assist them to reach their set personal goals and maximise their health benefits (Therapeutic Gardens Australia (TGA) 2021). A garden can be defined as being therapeutic when it has been purposely designed to meet the requirements of a particular group. TG models have been documented as being employed with older populations, people experiencing mental illness and those with developmental disabilities in a variety of healthcare organisations (Smidl *et al.* 2017; TGA 2021), though there is limited research on its use within TDR programs. The GHG at this community healthcare service is a purposefully designed outdoor area with fruit trees and raised vegetable garden beds. This TG model includes weekly gardening sessions with the service users being involved in the garden planning, watering, seed planting, weeding and crop rotation. The produce from the garden is used in the weekly home-cooked lunch session, which is prepared by program service users with the help of a staff member. Extra produce is taken home by the service users.

In this paper, we examine the longitudinal impact of the TDR program participants' QOL and explore their perceptions of the overall program, including the GHG component. Specifically, it aimed to answer the following three questions:

1. Is there a significant difference in the participants' QOL before the program, at the end of the program, and at 4 weeks follow up?
2. What are the perceptions of participants on their experiences with the 6-week TDR program?
3. What are the perceptions of participants engaging with TG?

## Methods

### *Study design*

To gain an in-depth understanding of the perceptions of participants and the effects that TDR and TG have on participants, we employed a convergent parallel mixed-method design. This approach relied upon qualitative individual, semi-structured interviews and quantitative QOL satisfaction responses to obtain information that was collected during the same phase, analysed separately, and compared (Creswell and Plano Clark 2011).

### *Sampling*

A purposive sampling approach was used with all service users ($n = 25$) who completed one of the four consecutive 6-week TDR programs running from September 2018 to April 2019 and who were invited to take part in this research. Service users were informed that participation in the study was voluntary and received a verbal briefing and a written explanatory statement explaining both data collection methods for this research. Written informed consent was obtained from all participants when completing the survey and from those willing to take part in an interview at the end of their program. Participants were assigned numbers to protect their identities in the reporting of findings. Following ethical approval by Monash University Research Ethics Committee (project number: 2018–14148), data collection commenced in September 2018.

### *Data collection*

The World Health Organization (WHO) (2019) QOL-BREF (WHOQOL-BREF) survey was used to assess the participants' perception of their QOL. The WHOQOL-BREF instrument comprises 26 items; two items from the overall QOL and general health and the remaining 24 items are divided into four broad domains: physical health (seven items), psychological health (six items), social relationships (three items), and environment (eight items) (WHO 2019). The psychometric properties of the WHOQOL-BREF has shown this instrument to display good discriminant validity, content validity and test–retest reliability (WHO 2019). Data collection using this tool was conducted at three time points: start of the program (T0), end of the program (T1), and at 4 weeks follow up (T2).

Participants' perceptions of the overall TDR program and the GHG component were sought through individual semi-structured interviews. An experienced researcher, external to the TDR program, conducted the interviews face-to-face in a room at the program venue that ensured privacy. A predetermined 10-question interview schedule was used (Appendix One). Interviews were undertaken on the final day of each of the four programs between October 2018 and April 2019. The audio-recorded interviews took between 15 and 30 mins to complete and were transcribed verbatim by a second researcher.

### *Data analysis*

The results of the WHOQOL-BREF were encoded in Stata version 14 for analysis. Repeated-measures ANOVA and a post-hoc Bonferroni test were used to determine if there was a significant difference in the participants' QOL score at baseline (T0), end-of-program (T1), and at a 4-week follow up (T2).

A thematic analytic process was conducted collaboratively and reflexively by two researchers on the interview transcripts to generate themes that would tell the stories of the participants' experiences with the program (Braun and Clarke 2013, 2019).

## Results

A total of 25 participants from the four TDR programs that ran during the 8-month period dedicated to this research from

**Table 1. Statistical analysis of the participants' WHOQOL scores for the three-time intervals**

| WHOQOL domain | Mean $T_0$ | Mean $T_1$ | Mean $T_2$ | Repeated-measures ANOVA (*P*-value) | Post-hoc: Bonferroni test (*P*-value) | | |
|---|---|---|---|---|---|---|---|
| | | | | | $T_0$ vs $T_1$ | $T_0$ vs $T_2$ | $T_1$ vs $T_2$ |
| Physical health | 49.82 | 61.24 | 67.76 | 0.000 | 0.028 | 0.000 | 0.369 |
| Psychological health | 45.29 | 60.06 | 65.12 | 0.000 | 0.005 | 0.000 | 0.751 |
| Social relationships | 46.71 | 59.65 | 59.88 | 0.004 | 0.039 | 0.035 | 1.000 |
| Environment | 59.29 | 70.00 | 61.24 | 0.054 | | | |

September 2018 to April 2019 were asked to complete the survey. Out of 25 participants, only 17 participants completed the WHOQOL survey tool at all three time points and analysis was limited to the data provided by these 17 participants. Demographic data collected revealed that there were nine ($n = 9$) females and 12 ($n = 8$) males and their ages ranged from 24 to 56 years.

### *WHOQOL scores*

The analysis showed that there was a significant increase in the participants' WHOQOL scores in three of four domains (physical health, psychological, social relationships) when comparing baseline ($T_0$) and post-intervention ($T_1$). These observed changes were retained during follow up ($T_2$).

Analysis of the physical domain scores showed a significant difference when comparing baseline ($T_0$) scores with post-intervention ($T_1$) scores ($P = 0.028$) and when comparing baseline ($T_0$) with the 4-week follow-up ($T_2$) scores ($P = 0.000$). This demonstrated an improvement in the participants' perception of their physical health on the completion of TDR. There was no significant difference observed in participants' physical health when comparing post-intervention ($T_1$) with 4-week follow-up ($T_2$) scores ($P = 0.368$). This suggests a retention of the observed post-intervention changes during follow up.

Analysis of the psychological domain scores showed a significant difference when comparing baseline ($T_0$) scores with post-intervention ($T_1$) scores ($P = 0.005$) and when comparing baseline ($T_0$) with the four-week follow-up ($T_2$) scores ($P = 0.000$). This demonstrated an improvement in the participants' perception of their psychological health on the completion of TDR. There was no significant difference observed in participants' psychological health when comparing post intervention ($T_1$) with 4-week follow-up ($T_2$) scores ($P = 0.751$). As with physical health perception, this indicates a retention of the observed post-intervention changes during follow up.

Analysis of the social relationships domain scores showed a significant difference when comparing baseline ($T_0$) scores with post-intervention ($T_1$) scores ($P = 0.039$) and when comparing baseline ($T_0$) with 4-week follow-up ($T_2$) scores ($P = 0.035$). This demonstrated an improvement in the participants' perception of their social relationships on completion of TDR. There was no significant difference observed in participants' social relationships when comparing post-intervention ($T_1$) with the 4-week follow-up ($T_2$) scores ($P = 1.000$). Post-intervention changes during follow up also appeared to be retained.

There was no significant difference in participants' environmental domain scores ($P = 0.054$) when comparing baseline to post-intervention measures. The changes in the means from the baseline to post-intervention of participants' QOL scores are listed in Table 1. This would not be unexpected due to the timing of the questionnaire. Aspects of the environment include changes in financial status, physical safety and security, access and quality of health and social care, the home and physical environment; all aspects of life that are impacted significantly by addiction, but also would not have changed significantly while a person is focussed on managing their addiction and participating in a therapeutic day program. As these areas are complex, a person's perception of their agency or ability to see change in these areas is likely to only be evident after a longer time period.

To gain a deeper understanding of perceptions of participants regarding the TDR program and GHG component, semi-structured interviews were conducted with 14 consenting participants. Demographic data for this cohort showed there were eight females and six males and their ages ranged from 24 to 56 years. Four themes were generated through the analysis of the qualitative data; these themes were building social connections, providing structure and a sense of achievement, better understanding of recovery, and relaxation from accessing nature in the GHG. The subsequent results are illustrated in the descriptions and text extracts for each theme. Illustrative quotations are used to demonstrate participants' voice.

### *Building social connections*

Participants recognised building social connections as a key benefit of TDR, with several participants highlighting that they were able to build friendships with others in the program.

> So I really liked forming some friendships, and it was amazing how quickly friendships formed in six weeks… there's a couple of friends that I've met that I'll continue to keep contact with outside of the TDR [TDR1].

The participants found that being with a group of individuals having had similar experiences of addiction helped in building these social connections. This shared experience allowed participants to open up and be honest to other individuals in the group and not feel judged for their addiction and their usage. This is exemplified by a participant who stated:

> You don't feel judged or anything here. Which is a big thing when you are using drugs. Everyone is a judger. Everyone tends to really look down at me…I could come here it's just safe, it's good [TDR5].

Participating in the TDR program minimised the feeling of isolation and differences for participants. They became aware of

the commonalities in their experiences during group sessions where they spoke about their personal experiences with other participants.

> You don't feel alone, there are other people that are going through things similar to what you have [TDR12].

The GHG provided a relaxed external environment giving the participants another opportunity to socialise and work together in teams.

> Once we knew we were doing gardening, everyone sort of relaxed and you just talked to anyone about anything and people were really helpful… definitely was a team approach [TDR11].

Social connections were further developed as participants wandered around the garden helping each other, openly talking during this informal unstructured activity. One participant noted that some participants acted differently when in the garden, more relaxed than when they were inside.

> Just watching everyone else participate in it, it just kind of like, we seem to act a little bit differently in the garden than when we do when we are sitting around TDR in a group setting. They [service users] would come out of their shell more in the garden [TDR1].

### *Providing structure and a sense of achievement*

Enabling participants to establish structure and routine for their week was identified as an important element of TDR. Participation in the program gave participants something to do on a regular basis and a reason to get out bed in the morning.

> It's given me more structure to my life I didn't really have any. It has given me reason to get up and to work on my stuff [TDR12].

> Just a feeling of achievement, to stay sober, during the day, something to get up out of bed for, something to get me back on my feet [TDR14].

Being able to take part in the program gave the participants a sense of doing something to benefit themselves. There was a feeling of accomplishment for joining and completing the program and this helped participants build their self-confidence – especially if they managed to decrease their substance use.

> I benefited a lot [from the program]. I'm not sitting at home drinking [or] smoking. That's a big difference [TDR6].

> I wanted to actually finish something because when I was using, I just always start things and never finish, it was good to see it through [TDR13].

Several participants also highlighted a sense of achievement they felt from the gardening activities in the GHG by watching plants grow, cultivating them and growing them for future groups. For example:

> I felt like I had a purpose… giving back because we use seedlings and start a plant. So, we're not necessarily going to see the outcome but we, you know, we cultivate zucchinis and other things that other people have grown, put some love towards, it's really good. Now, in the future, some people will be cultivating some snow peas and watermelon and broccoli and things like that to take home [TDR9].

Overall, participants gained confidence at the end of the 6-week TDR program, as it allowed them to feel more comfortable in tackling and accomplishing life goals. This is exemplified in the following quotes:

> You know, in all aspects, not just with myself but now I feel more confident about getting a job and stepping out into the work, setting myself up a bit better [TDR14].

> I've enrolled in a TAFE course next year. That's the best thing that I got out of this place is getting my confidence back. Yeah…that's huge [TDR3].

### *Better understanding of recovery*

TDR enabled participants to have a better understanding of their recovery by reflecting on their personal experiences and experiences of other participants. Various elements in the TDR program allowed participants to contemplate a broader perspective of recovery, discovering that it is more than just being abstinent. This is evident in the following quotes:

> I've got a lot more insight into recovery, into triggers, into people's life experiences and more into my own journey [TDR10].

> I have discovered more about myself…more about addiction. And recovery is not what I thought it was. Definitely. I thought abstinence is recovery. And it's not… I really got an education from it [TDR] [TDR11].

Participants also valued learning about strategies to avoid substance use and learning about other services that are available to them. For this participant, being part of the day rehabilitation program was helpful after being in residential rehabilitation. It offered them an understanding of how to move back into their own community and to be more in control of situations that interfered with their recovery.

> I think that it's really helpful to be able to know how to be clean, but how to do it with life in general, like, when you're in rehab, you kind of get told what to do and when to do it. Not that's a bad thing. But here you're given tools and stuff, but then you go back to life. So, I think that stepping out of rehab and coming into here into the day rehab is really helpful [TDR7].

The GHG had an impact on participants during their time spent in TDR, with two participants drawing analogies between what they were doing in the garden and their recovery process.

> There was just so much to do down there [garden]… it was good to be able to pull out a lot of weeds, refresh the flower bed and everything. That was like cleansing I would say [TDR13].

> Learned something new, learnt something about gardening and you get to watch this thing grow. A bit like ourselves, I guess [TDR5].

### *Relaxation from accessing nature in the GHG*

Participants highlighted that gardening activities provided them with a feeling of tranquillity and relaxation in the GHG. Some participants attributed this to the relaxed atmosphere and exposure to nature. As exemplified by one participant who stated:

> [Gardening] gives you like a tranquil mind frame for the day, it actually inspired me to do my own garden [TDR9].

Other participants mentioned that they got a sense of enjoyment from the sensory experience of working in the garden by getting back to nature.

> The hands on, touch, feel, smell. There's the sharing, the look on peoples' faces, the excitement associated with getting back to basics… A lot of people don't get a chance to stop and smell the roses [TDR8].

Due to the varied backgrounds of participants, not all participants found the GHG relaxing. One participant actually experienced adversity while working in the garden and found it difficult to suppress memories from their childhood, so this participant chose to spend this time cooking and preparing lunch.

> I really struggled as a child… we were not only hit but we were made to do the gardening…it just unearths a lot of triggers for me. It's kind of like PTSD or whatever. But I then had to face it, I've got a good bunch of people in this class. So it's been easier to do. I do drag my feet …it's not my favorite thing to do. I usually spent the time cooking though it is awesome to have fresh veggies [TDR7].

Another two participants found gardening to be physically challenging, with one participant stating their health issues made it difficult for them to participate in gardening activities and is exemplified by the following quote.

> There was nothing that I didn't like. I went to the garden one day, but I got really bad arthritis and I wasn't really capable of doing much planting, I planted a few sunflowers and that was it. I sat down for the rest of the day. But the other times I was in here doing the cooking and enjoying it [TDR10].

## Discussion

The aims of this study were to gain an understanding of how participants perceived both the TDR and GHG, and to report on any significant changes in their QOL scores at three separate intervals. We found that participants had statistically increased their QOL scores post-program in three out of the four dimensions of the WHOQOL tool, demonstrating overall improvement in their general wellbeing. These results are consistent with other studies that demonstrated significant gains in the QOL scores of their participants post-program compared with their baseline scores (Kiehne and Berry 2012; Lubman *et al.* 2014). The only notable difference was that our research showed no significant improvement in the environment dimension, and it could be proposed that this may be due to the short follow-up period of 4 weeks of our re-evaluation; one may assume that items in this dimension might not show change quickly.

Environmental domain in the context of the WHOQOL tool refers to an individual's relationship to the salient features of their environment (WHO 1997). This specifically includes important environmental factors such as living conditions, financial status, safety, security, access to services, quality of health care, and ease of transport, which are all shaped by structural factors that go beyond individual agency to change. As these factors are complex, a person's perception of their agency or ability to perceive change is likely to be only evident following an extended time interval. The lack of change in this domain could also reflect the reality that participants returned to their normal home environment every evening while participating in this program. Certainly, the results reported in this study reflect the positive value of participation in the program on physical, psychological health and social relationships of participants, but leaves us with little understanding of why this is so. The qualitative data findings from the semi-structured interviews are essential to unpack the positive reception of TDR and to develop a richer representation of participants' experiences.

The findings from interviews highlighted the success of this TDR program in helping participants to gain a better understanding of their recovery. This is consistent with the study by Kiehne and Berry (2012), where participants developed a better understanding of the risks and triggers for them and was shown to have lasting impact 6- and 12-months post completion of the program. Participants in our study reported that partaking in TDR gave them a purpose, and it decreased their social isolation by meeting peers who have had similar experiences. It gave participants a sense of connection as they were able to openly share their experiences with each other, without feeling judged for their problematic addiction. This helped participants reconnect with people and form new friendships, often decreasing the isolation that they had been experiencing previously. These are positive outcomes, but as the data were collected on the last day of the 6-week program, future research needs to be undertaken to see if participants continue to experience these outcomes long-term. The findings also highlight the benefit of interventions that utilises group work for individuals that may be experiencing social isolation. There is value in utilising groups in primary health care despite the global trend towards a more individual focus (Freeman *et al.* 2021).

Having access to a garden, working within it, and being responsible for the garden was a new experience for several participants in this study. The practice and opportunity to do something different, particularly in the context of rehabilitation, was highly valued. The findings from this study found participants enjoyed doing activities in the garden, which they perceived as meaningful, and gave them a sense of achievement. This resonated with other studies where they found therapeutic gardening decreased the passivity and improved the occupational balance in their participants in various settings (Kam and Siu 2010; Clatworthy *et al.* 2013; Haith and Trenoweth 2015; Marsh *et al.* 2018). A key benefit of the GHG acknowledged by participants was that they enjoyed working together and building social connections during their time in the garden, as they found this outdoor activity relaxing. This is consistent with other studies on horticulture and ecotherapies, where this improvement in social skills was accompanied by the development of comradery and connectedness and a sense of shared purpose while developing new gardening skills (Haith and Trenoweth 2015; Smidl *et al.* 2017; Soga *et al.* 2017; Cutcliffe and Travale

2016). As found in the study by Smidl *et al.* (2017), there was improvement in social skills, and participants developed communication skills as they relaxed in a non-judgmental environment with a joint endeavour.

Although participants in other studies have reported increased energy (Smidl *et al.* 2017; Cutcliffe and Travale 2016), and enhanced cognition (Hardin-Fanning *et al.* 2018) due to the vigour of gardening activities, some of the participants in the current study found they actually struggled with the physical demands. This demonstrates that when it comes to designing therapeutic gardens, the fitness and capabilities of potential participants need to be considered to reduce physical workload and enhance accessibility. Although participants' QOL scores showed an improvement in the physical health domain, this theme was not highlighted by participants during interviews. This suggests that from the participants' perspective, the perceived primary benefits of the program are psychological and social in nature.

### *Limitations of the study*

The sample size was small compared with other similar programs and limits the transferability of the findings to other programs. In addition, we recognise that the formation of a control group could have improved the research design for this study, but was not operationally feasible. However, the outcomes from this research have given us insight into this program and the inclusion of the GHG, and has hopefully raised the need to evaluate such elements in other programs. Using the WHOQOL over a shorter-term may not afford the data required to influence policy and inform program direction, as program impact is limited. Addiction is a chronic condition and shorter-term studies, although useful for service improvement, require ongoing follow up to yield more constructive data. It was not possible to isolate the impacts and perceptions related to participation in TG from the wider TDR program. Although specific questions were included to draw out the participants' experience, the GHG was only one component of the overall program.

## Conclusions

The results of this study validate the appropriateness of incorporating TG within this TDR program by showing that when participants have contact with nature, they experience a sense of tranquillity, relaxation and, more importantly, a sense of achievement. It has demonstrated that TG may improve psychological health and social relationships, but that questions remain about physical health and the need to customise TG designs depending on the participants' mobility levels. Ultimately, the findings of this study can help inform staff facilitating the TDR program at this rural community health service and further improve its implementation, particularly with the TG aspect.

## Conflicts of interest

The authors declare no conflicts of interest.

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