Physical activity to address mental health in a remote Australian community: community readiness assessment

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Abstract

Purpose – *The mental and physical health of those residing in Australian rural and remote communities is poorer compared to major cities. Physical health comorbidities contribute to almost 80% of premature mortality for people living with mental illness. Leisure time physical activity (LTPA) is a well-established intervention to improve physical and mental health. To address the physical and mental health of rural and remote communities through LTPA, the community's level of readiness should be first determined. This study aims to use the community readiness model (CRM) to explore community readiness in a remote Australian community to address mental health through LTPA.*

Design/methodology/approach – *Individual semi-structured interviews were conducted using the CRM on LTPA to address mental health. Quantitative outcomes scored the community's stage of readiness for LTPA programmes to address mental health using the CRM categories of one (no awareness) to nine (high level of community ownership). Qualitative outcomes were thematically analysed, guided by Braun and Clark.*

Findings – *The community scored six (initiation) for community efforts and knowledge of LTPA programmes and seven (stabilisation) for leadership. The community's attitude towards LTPA and resources for programmes scored four (pre-planning), and knowledge of LTPA scored three (vague awareness).*

Originality/value – *To the best of the authors' knowledge, this is the first Australian study to use CRM to examine community readiness to use LTPA to improve mental health in a remote community. The CRM was shown to be a useful tool to identify factors for intervention design that might optimise community empowerment in using LTPA to improve mental health at the community level.*

Keywords *Rural population, Behaviour change, Rural health, Co-design*

Paper type *Research paper*

1. Introduction

Poor mental health is a global problem, with one in every eight people living with a mental disorder (World Health Organisation, 2022). The mental health of those residing in Australian remote communities is often poorer compared to those in major cities (Fennell *et al.*, 2018). The reasons for poorer mental health in rural communities is multifactoral and may include geographical isolation resulting in health access disparities, health workforce shortages, lower health literacy and limited knowledge of available services (Fennell *et al.*, 2018). There are also subcultural values in rural areas in seeking support for health-related matters such as stigma, reluctance to seek help from "new-comers", confidentially and self-reliance (Fennell *et al.*, 2018; Crnek-Georgeson *et al.*, 2017).

The lack of engagement with health services also contributes to people with a mental illness being at an increased risk of developing physical illness (Australian Institute of Health and Welfare, 2020a). People living in rural and remote areas have a larger consumption of alcohol (Perceval *et al.*, 2020; Brumby *et al.*, 2011), higher rates of obesity and chronic disease (e.g. diabetes) resulting from suboptimal diet, insufficient exercise and poor sleep

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(Brumby *et al.*, 2011; Taylor *et al.*, 2005). Physical health comorbidities, such as cardiovascular and respiratory diseases, and certain cancers, have been reported to account for 80% of early mortality for Australian people living with mental illness (Australian Institute of Health and Welfare, 2020a); with a shortened life expectancy between 10 and 25 years (Edmunds, 2018). However, mental and physical illnesses can be successfully managed with the appropriate intervention and treatment.

One well-accepted non-pharmacological intervention to prevent and treat mental and physical health concerns is physical activity (Wells *et al.*, 2019). Physical activity is known to improve outcomes for future depressive episodes, post-traumatic disorder, anxiety disorders and psychotic illnesses (Wells *et al.*, 2019). To improve health benefits, leisure time physical activity (LTPA) is recommended, which is defined as "dynamic movements at conditioning intensity levels, sufficient to improve cardiorespiratory fitness and metabolism and is more performed voluntarily over short periods with enough recovery time" (Holtermann *et al.*, 2018). When considering geographical location, occupations in remote communities have a high level of occupational physical activity (OPA), with the population physically active for the majority of their days for most of the year (Holtermann *et al.*, 2018). However, OPA does not deliver the same benefits seen by participation in LTPA (Bonekamp *et al.*, 2023; Cillekens *et al.*, 2020). Indeed, there are increased health risks linked with OPA due to the constant loading, heavy lifting and repetitive and awkward postures over a prolonged time period (Holtermann *et al.*, 2018). As a consequence, OPA is associated with elevated blood pressure, heart rate and inflammation levels, without adequate time for the body to recover (Holtermann *et al.*, 2018). These adverse outcomes highlight the importance of regular LTPA even when community members have high levels of OPA. Additionally, to successfully address physical and mental health in remote communities, health and social factors should be explored using community-driven interventions (Wells *et al.*, 2019). For success in health behaviour change within rural and remote populations, evidence-based models (Deniz *et al.*, 2021) with an individualised approach (Jenelle *et al.*, 2021) are recommended. This is also applicable to people living with a mental illness (Chapman *et al.*, 2016).

1.1 Current research

Despite the support for evidence-based models and individualised approaches, there is limited research utilising community engagement frameworks to design and develop interventions to address rural and remote mental health (Russell *et al.*, 2023). A recent systematic review (Russell *et al.*, 2023) determined that there were only six studies worldwide that implemented community engagement methods when addressing mental health in rural and remote communities (Barnard *et al.*, 2004; Barry *et al.*, 1999; Bryant *et al.*, 2015; Chomat *et al.*, 2019; Stacciarini *et al.*, 2011; Thirlwall and Whitelaw, 2019). Additional studies (Kelter *et al.*, 2022; Lavrencic *et al.*, 2021) have recently been identified that implement community engagement on this topic and population. Although there were similarities from the studies included in the literature review and the two additional studies, such as population and locations, community engagement strategies varied.

All were conducted in rural communities of the USA, the UK, Guatemala and Australia, with the population ranging from 1,000 to 4,000 people. Collectively, these studies all implemented varying evidence-based models for community engagement, and included community-built approaches (Barnard *et al.*, 2004; Barry *et al.*, 1999) and participatory action research (Bryant *et al.*, 2015; Chomat *et al.*, 2019; Stacciarini *et al.*, 2011; Thirlwall and Whitelaw, 2019; Kelter *et al.*, 2022; Lavrencic *et al.*, 2021). However, only two of the studies (Stacciarini *et al.*, 2011; Thirlwall and Whitelaw, 2019) progressed to community empowerment, where locals were able to address mental health by independently influencing one another (Wilson and Sanyal, 2013). This demonstrates a significant gap in knowledge of appropriate evidence-based models that support rural and remote communities to achieve empowerment to address mental health.

Even with the appropriate evidence-based models for community engagement, the success of an intervention resulting in community empowerment depends on if the community is ready to address a social issue (Oetting *et al.*, 2001). Since communities differ in their level of engagement and readiness to adapt or acknowledge social concerns, the level of readiness can significantly influence the effectiveness of an intervention that is supported by local people (Edwards *et al.*, 2000). One way to determine a community's readiness for change is using the community readiness model (CRM); an evidence-based approach developed to determine a community's current level of readiness for addressing a recognised social concern and facilitate actions appropriately (Kelly *et al.*, 2003).

The CRM is based on the transtheoretical model personal stages of readiness: precontemplation, contemplation, preparation, action and maintenance (Prochaska and DiClemente, 1983). To transfer these stages into a community setting, principles based on how groups adapt to interventions (Rogers, 1995) and stages for a collaborative approach at a community level (Warren, 1971) were used to develop the CRM. The CRM is based on the assumptions that communities vary in their stage of readiness, the readiness can be assessed, the communities can move between stages and the stage of readiness must be quantified to apply appropriate interventions (Edwards *et al.*, 2000).

The CRM provides a framework to engage the community to determine the current programmes in the community for the social concern and their knowledge of the programmes, knowledge of the social concern, current leadership for the social concern and resources available for the social concern to guide interventions. Given LTPA is an effective intervention to address poor mental health (Wells *et al.*, 2019) and rural and remote communities are known to have poor mental health compared to metropolitan areas (Fennell *et al.*, 2018), this research aimed to implement the CRM in a single remote community to determine the level of readiness for using LTPA to address the mental health of adults living in the community. The CRM has previously been used to address mental health through LTPA (Brand *et al.*, 2016; Ehlers *et al.*, 2013; Gansefort *et al.*, 2018; Jones *et al.*, 2012; Wells *et al.*, 2019). Thus, the CRM is an established tool for assessing community readiness across a range of populations and cultural contexts. The results from the CRM will guide future LTPA interventions that target rural mental health interventions that are culturally appropriate, encourage community ownership and have long-term sustainability (Australian Institute of Health and Welfare, 2020b). For the purpose of this paper, rural and remote will be used interchangeably to cover any area outside major cities [population over 100,000 people (Australian Bureau of Statistics, 2021)] based on the Australian Statistical Geography Standard Remoteness Structure (Australian Institute of Health and Welfare, 2022).

2. Methods

Ethical approval was obtained through the James Cook University Human Research Ethics Committee (H8529).

2.1 Procedures

The study was undertaken in a remote Australian community with a population of several thousand. A community champion (a former health professional and respected community member) not associated with the study design or data collection was initially engaged to distribute an information sheet to their personal contacts via email. To improve the reach of recruitment, the lead researcher (KR) used purposive sampling to distribute information to selected community members through email and social media. Community members were invited to undertake a one-on-one semi-structured interview regarding community LTPA programmes, community knowledge and attitude of LTPA, community leadership for LTPA and availability of community resources (Table 1). Interviews were conducted by the lead researcher (KR) between December 2021 and April 2022, either face-to-face at a mutually

Table 1 CRM dimensions

Dimension	*CRM question*
A. Community efforts	What are the efforts, programmes and policies in place to address physical activity?
B. Community knowledge of efforts	How aware are community members of the local efforts, and how effective and accessible are the physical activity programmes?
C. Leadership	Who are the leaders of physical activity in the community, and are they supportive of physical activity efforts?
D. Community climate	What is the community's attitude towards physical activity?
E. Community knowledge about physical activity	What do community members know about physical activity and the links between physical and mental health? Does the community have access to information?
F. Resources for physical activity programmes	Are the local resources (people, finances and facilities) able to support physical activity efforts?

Source: Table adapted from Plested *et al.* (2009)

agreed location or via electronic means (Zoom or telephone). The interviews were audio-recorded and transcribed *verbatim* by the lead researcher.

2.2 Participants

Seven community members provided verbal informed consent and were interviewed. The CRM manual notes that data repetition tends to occur after six interviews (Plested *et al.*, 2009). Eligible interviewees were remote community-dwelling adults. Male and female participants were recruited with ages ranging from the late 20s to early 70s. The CRM requires interviewees to be people who represent different segments of the community, such as service providers and users within the health, education and government systems. Based on these guidelines, interviewees were purposefully chosen to ensure a range in age, sex, their role in the community and their willingness to contribute to the research. To maintain the confidentiality of the interviewees in this small remote community, interviewee demographics were not recorded.

2.3 The community readiness model

Semi-structured interviews with community members were guided by the CRM assessment. The CRM was adapted for this study to focus on LTPA for mental health as the social concern. Open-ended questions in the CRM semi-structured interview are categorised into six dimensions (Table 1), with responses assigned a numerical value according to the description in Table 2. A higher score is indicative of a greater level of readiness to action the social concern, which in this study, was LTPA for community mental health.

Table 2 Stages of the CRM

Stage	*Description*
1. No awareness	LTPA may not be an issue or is not recognised as an issue by the community/leaders
2. Denial/resistance	Some of the community accept LTPA as a concern yet not seen as a local concern
3. Vague awareness	Most accept there is a local concern for LTPA yet there no immediate motivation to address
4. Pre-planning	Clear recognition LTPA should be addressed however efforts are not specific
5. Preparation	Leaders are actively planning LTPA programmes with modest support from the community
6. Initiation	Enough information to justify efforts and activities is underway
7. Stabilisation	Physical activity programmes are supported by community and leaders. Staff are trained and experienced
8. Confirmation/expansion	LTPA is implemented. Local use and support programmes expansion. Local data is regularly obtained
9. High level of community ownership	Community members have extensive knowledge about LTPA, specifically links to physical and mental health. Evaluations may direct new programmes

Source: Table adapted from Plested *et al.* (2009)

2.4 Interviews

The interviews were informed by LTPA to support community mental health. The open-ended questions in the CRM were adapted to the local context by using the community's name and local vernacular, for example, using common abbreviations for local landmarks. CRM questions were based on a previous study that examined LTPA in the context of mental health (Wells *et al.*, 2019) (Table 1). Probing questions were used to elicit more detailed information from interviewees in each dimension, e.g. community knowledge of efforts prompted questions about advertising for programmes, what locals did and did not know about LTPA efforts, and the strengths and weaknesses of current LTPA programmes.

Interviews began with an overview of the research and an explanation of the nature of the information being sought. LTPA was defined, and interviewees were reminded of the voluntary nature of the interview and how data collected would be used. In addition to the CRM, the final questions in the interview explored the community's perceived level of fitness and identified population groups with limited access to or engagement with LTPA.

2.5 Data analysis

The CRM uses two coding systems: quantitative and qualitative. Quantitative scoring of the CRM determines the community's level of readiness, through the use of a Likert scale. For the qualitative component, thematic analysis was undertaken for each individual dimension, guided by Braun and Clarke (2006). Thematic analysis was chosen to enable the research team to both identify and interpret key components from the interviews (Clarke and Braun, 2017). Thematic analysis is also recommended for the use of qualitative descriptive research (Kim *et al.*, 2017), particularly with a social meaning around a topic (Clarke and Braun, 2017); hence, it is applicable for physical and mental health research. The following steps identified and interpreted key components from the interviews: becoming familiar with the data, initial coding, searching for themes, reviewing themes, defining and naming themes and report production (Clarke and Braun, 2017).

2.5.1 Community readiness model. As per the CRM guidelines, researchers (SV, KR) separately read the interview transcripts and scored the dimensions between stage one and nine for each interviewee's perception of the community level of readiness (Table 3). Both reviewers' scores were identical in all dimensions except leadership. The disparity between reviewers for the leadership dimension was resolved by averaging the scores of the two reviewers, as per the CRM guidelines. Interviewees' scores were averaged and rounded down to whole numbers to correspond with stages of readiness.

2.5.2 Thematic analysis. Transcripts were thematically analysed by one author (KR), guided by Braun and Clarke (2006) through familiarisation of data and the development of codes and themes. Interviews were analysed using Nvivo (version 12, QRS International, Burlington, MA). Themes were extracted and organised under headings and sub-headings. Authors (KR, RS, FB) reviewed and discussed themes and sub-themes. Upon consensus, themes were renamed and categorised. Relevant interviewees quotations were extracted.

Table 3 Community readiness score

Interviews	*#1*	*#2*	*#3*	*#4*	*#5*	*#6*	*#7*	*Score*	*Stage*
Community efforts	6.00	5.75	7.00	7.63	7.50	7.75	3.18	6	Initiation
Community knowledge of efforts	5.17	7.34	6.88	7.25	7.63	7.38	4.83	6	Initiation
Leadership	7.00	7.63	7.50	8.38	6.75	8.00	4.38	7	Stabilisation
Community climate	4.50	4.50	1.50	6.50	6.50	3.50	5.00	4	Pre-planning
Community knowledge	3.33	3.67	2.67	4.33	4.67	3.33	3.00	3	Vague awareness
Resources	5.00	4.40	3.00	6.80	4.80	5.30	4.20	4	Pre-planning

Source: Table by authors

3. Results

Seven eligible interviewees were interviewed, averaging 34 min in duration (range: 20 to 60 min).

3.1 Quantitative results

Average community readiness scores from the seven interviewees varied between 3 (vague awareness) and 7 (stabilisation) (Table 3). Vague awareness was scored for community knowledge, indicating that most of the community accepts there is a concern for LTPA; however, there is limited motivation to address this concern. Pre-planning was scored for community climate and resources where the community acknowledged that LTPA needs to be addressed; however, efforts were not specific. Initiation was scored for knowledge of efforts and community efforts, showing that enough information justified efforts for an LTPA programme, with activities currently in place. Stabilisation was scored for leadership, indicating that LTPA is supported by community and leaders, with staff trained and experienced in providing LTPA programmes.

3.2 Qualitative results

Thematic saturation was reached with themes developed from the seven interviewees. Result headings were categorised based on the dimensions of the CRM (Table 1):

- Community efforts

All seven interviewees were able to identify the current LTPA programmes in the community. Programmes run by the Police-Citizens Youth Club (PCYC) were highlighted by six of the interviewees. The PCYC programmes included the gym, senior fit, wild womens programme, personal training, boxing and group fitness. Team sports were a common topic, with six interviewees discussing local sporting competitions such as touch football, netball, rugby union, soccer, rugby league, tennis, basketball, cricket and futsal (indoor soccer). A variety of self-directed recreational activities were raised by four of the interviewees. The recreational activities included water skiing, walking, mountain biking, kayaking and the shooting club. The self-directed activities included the use of the swimming pool, the PCYC gym facilities, walkways, tennis courts and basketball courts. Less commonly mentioned activities were Parkrun, Pilates and equestrian events:

- Community knowledge of efforts

Community knowledge of efforts discussed the interviewee's awareness of current local programmes, accessibility of programmes for the community, and if the programmes are effective.

Interviewees agreed that word of mouth was the most common method used to disseminate LTPA information. Four interviewees discussed the effectiveness of community advertising, such as community notice boards. Notably, the absence of a local newspaper was highlighted by these interviewees. Four interviewees brought up online advertising methods such as social media, council website and council emails. They expressed the community knowledge of efforts in the following ways:

> *In some areas, it's just sort word of mouth. Depends on what circles they circulate in too.*

Interviewee 7

> *[. . .] if we could get the paper going again to be able to advertise like events coming up [. . .].*

Interviewee 6

> *When people come to town they go look online and stuff.*

Interviewee 5

Local knowledge of programmes was divided. Four interviewees stated locals are aware of programmes and how to access them. In contrast, three interviewees believed that locals were not aware of available LTPA programmes and what they offer. Three interviewees expressed that locals need to actively seek out information:

[. . .] everyone always understands how to get involved and what the program is.

Interviewee 5

The other portion of the community that may be interested, aren't or generally don't know that the groups are happening.

Interviewee 2

Once they make the enquiry they definitely know. I suppose that's the challenge of the ones really wanting to do something.

Interviewee 4

Six interviewees noted that social interactions are key aspects of community perceptions of a programme's strengths. Four interviewees highlighted human resources and local education for programmes as weaknesses:

[. . .] providing people opportunities to meet others and then for social interactions

Interviewee 1

There just aren't enough people to generate [help/support for programs]. Because if someone drops off, that is a fair percentage of your group.

Interviewee 3

even if they were given a bit more education and had it a little bit more individualised to the clients

Interviewee 2

- Leadership

The perceived support from leaders for LTPA programmes was explored, and interviewees identified the local leaders for LTPA, including the PCYC and Council. The PCYC was seen as the "sports hub" in the community, where people can access information and activities. The Council was acknowledged for funding and supporting new activities.

PCYC is absolutely a hub for sports in town

Interviewee 5

Council put out things from time to time, that talk about being out and being active and promoting things like Clean up Australia Day is some sort of outdoor physical activity, so there is probably a lot of indirect stuff.

Interviewee 4

- Community climate

Interviewees were unanimous when discussing the community's attitude towards LTPA. All interviewees spoke of locals' desire to engage but acknowledged the range of barriers. All agreed that there is a portion of the community who are active by choice, in contrast to those choosing not to partake in LTPA for a variety of reasons:

[. . .] comes down to the individual whether they want to engage in the physical activity behavior
[. . .] whether they want to do anything with physical activity it's up to their choice.

Interviewee 1

Along with people's desire to engage, many barriers for undertaking LTPA were acknowledged. These included the heat, local's jobs, travel and human resources.

Apart from a bit of the time when it does get a bit hot, there is no other barrier to not wanting to be outside doing something fun and healthy.

Interviewee 4

[. . .] sporting groups is a bigger commitment, and a lot of people don't or can't see that they can commit due to work.

Interviewee 3

Probably one of the biggest barriers for sport is the distance [. . .].

Interviewee 7

[. . .] massive gaps [. . .] people run programs [. . .] community sports and activities are volunteer based.

Interviewee 5

- Community knowledge about physical activity

Interviewees discussed their own knowledge of LTPA and their assumption of the community's knowledge of LTPA. From the discussions, it appears that there is a general knowledge of the benefits of LTPA from both groups and commonly noted the link between LTPA and mental health. Interviewees also acknowledged local involvement in LTPA, which correlated with an increase in knowledge of the benefits of physical activity:

[. . .] we probably do [know the link between physical and mental health], but don't link it together. Like we think "oh gee we feel good after that". But then it doesn't register why.

Interviewee 6

You've got the ones that would know everything just about, but they are the ones that are physical fit and want to remain so.

Interviewee 3

When prompted for knowledge of specific information, e.g. National Physical Activity Guidelines, the responses suggested limited knowledge. Interviewees suggested locals required more education on the benefits of physical activity, and resources for education are limited for people not accessing LTPA programmes:

I don't think they know much about it [national physical activity guidelines and recommendations].

Interviewee 1

Probably not, because they don't seem to think that they need to [know specific information on physical activity] [. . .] it would be fairly low their knowledge of anything like [physical activity] [. . .] So you've got one extreme to another [involvement and knowledge of physical activity].

Interviewee 3

- Resources for programmes

All interviewees discussed community facilities, however opinions differed. Some interviewees spoke about facilities being easily accessible to the public, with others considering facilities a barrier due to cost and useability under extreme environmental conditions, such as the high temperatures. While some interviewees suggested access to facilities is negatively impacted by cost, four interviewees believed that funding is not a concern due to support from larger organisations within the community. Five interviewees acknowledged that finances were also associated with accessing equipment. If people chose to do their own LTPA or lived out of town, they would need to purchase their own equipment. However, for locals involved in planned activities, there was access to equipment:

[. . .] so it's mainly public areas people can use and there seem to be quite a few about.

Interviewee 6

[. . .] good gym they can access, but again that is a cost some people aren't willing to pay [. . .].

Interviewee 2

[. . .] facilities is always going to be a big one. That comes back to environment as well.

Interviewee 5

[. . .] there's no issues with sponsorship and support like [financial donations and space] [. . .] it's not hard in these mining communities and mines helping out. They all have grant programs.

Interviewee 7

"[. . .] difficultly purchasing and getting items in terms of being able to do physical activity at home [. . .] exercise bikes, treadmills, bands, dumbbells."

Interviewee 2

"[. . .] if people are involved in activity, say volleyball for here. Everything is provided for them."

Interviewee 5

Despite planned activities providing equipment in the community, interviewees spoke of challenges for planned activities. They identified difficulties associated with the transient workforce in the community, lack of volunteers and lack of resources to support local knowledge. This aligned with a common theme of burnout.

[. . .] always a portion of the population that is itinerant [. . .] we'll get some new people that will come and they're really keen, then they might go [. . .] a core of locals that are just active in everything.

Interviewee 4

[. . .] the volunteers is a big issue facing a lot of sports in town [. . .].

Interviewee 5

It just burns you out and having those people to maybe have the support behind them and, but they can go to people for support, even mentor them in what they can do better so they don't lose interest or burn out.

Interviewee 7

3.3 Community level of fitness

Interviewees were asked their opinion on how fit they perceived the locals in community are. Six interviewees believed the community would have low to moderate levels of fitness due to low participation in LTPA. One interviewee stated that the community is rather fit due to their physical work:

[. . .] majority of the population probably aren't hitting the physical activity guidelines at the moment [. . .].

Interviewee 2

There would be some very fit people. There'd be a good portion that don't do much planned activity, but because of their work, reasonably fit because of that.

Interviewee 4

3.4 Limited population groups

Interviewees were asked about population groups in the community that were limited in participating in LTPA. Four interviewees suggested that the elderly are lacking LTPA,

especially men. Three interviewees acknowledged shift workers were limited in their engagement with LTPA.

4. Discussion

The use of the CRM to address physical activity is limited (Brand *et al.*, 2016; Ehlers *et al.*, 2013; Gansefort *et al.*, 2018; Jones *et al.*, 2012; Wells *et al.*, 2019), even more so for the mental health of adults living in remote Australian communities. The present study used an evidence-based model (CRM) to determine a remote community's current level of readiness regarding LTPA to support community mental health. Future interventions can be guided by the CRM based on the quantitative score of each dimension and qualitative themes developed.

For interventions to be actioned by the local community, the community's vague awareness in their knowledge of LTPA must be acknowledged. The interviewees indicated that the community acknowledges LTPA should support community mental health yet have limited motivation to address the social concern. This is not surprising with 60% of adults living in Australian rural and remote communities being insufficiently active (Australian Institute of Health and Welfare, 2018). Social and environmental factors, such as family responsibilities, lack of services to assist with family responsibilities and limited available LTPA facilities are known barriers limiting motivation for LTPA in rural and remote areas of Australia (Boehm *et al.*, 2013), as supported by interviewees of this community.

The community's vague knowledge of LTPA could be underpinned by the community's low motivation for activity, which may be addressed through raising awareness for LTPA. CRM strategies to raise awareness include having LTPA on agendas at non-health-related community groups (Plested *et al.*, 2009). Regular community interactions through community health events and informal education sessions/surveys to gauge community attitudes towards LTPA are also suggested (Plested *et al.*, 2009).

The community scored pre-planning for their attitude, suggesting that locals realise LTPA needs to be addressed; however, efforts are not focused or detailed (Plested *et al.*, 2009). In this scenario, the CRM recommends conducting local focus groups and visiting and investing in community leaders. The local focus groups will encourage community engagement through involving locals when developing strategies (Russell *et al.*, 2023). The high score of stabilisation for leadership in the community indicates a successful intervention. Support from local authorities and community management is recommended to allow for community engagement to move towards empowerment, where locals can independently influence one another to address LTPA (Russell *et al.*, 2023).

Although support from local authorities and community management is beneficial, a review of the existing programmes and target populations in the community are recommended to address community attitude (Plested *et al.*, 2009). This may maximise the uptake of LTPA programmes involving a wide range of populations. Despite the strong support from leaders and extensive current LTPA in place, the interviewees regularly emphasised there is only a select population within the community consistently involved in the LTPA programmes.

This limited involvement may be a result of word of mouth being the most common advertising method for LTPA programmes. The word-of-mouth phenomena requires interactions, and in small communities, this is more influential than commercial advertising (Cannarella and Piccioni, 2008). In this community, it is evident when locals are interacting at the LTPA programmes, word-of-mouth advertising for other programmes occurs. Consequently, the same group of locals are regularly involved in LTPA programmes with the same group of locals volunteering for the LTPA programmes.

Locals living in remote communities take pride in working together for positive change (Eversole, 2011). A common opinion is that volunteering is the only way to provide additional services in the community (Eversole, 2011). Interviewees in the present study

acknowledged that while relying on the same volunteers caused burnout, the social interactions of being involved in LTPA programmes were beneficial at the personal and community level. Volunteering can produce both positive and negative outcomes for locals relative to physical and mental health (Morse *et al.*, 2022). As well as the community's smaller population, the community's workforce creates a transient population, with shift work impacting the support for LTPA programmes. For population groups not involved in LTPA programmes, this raises many challenges to accessing social interactions, physical and mental health information and facilities.

The elderly, particularly men, were noted as the main population group not participating in LTPA. Older men living in rural areas have a reluctance to access professional help for health-related disorders (Radermacher and Feldman, 2015). When implementing strategies, the community needs to be cognisant that strategies targeting older men need to be specially tailored to that population group (O'Kane *et al.*, 2008). Often, midlife men may demonstrate their masculinity based on their physical work and income produced by their labour (Carnahan *et al.*, 2018). As a result, the community may value OPA over LTPA as supported by the interviewees reporting low to moderate levels of fitness.

4.1 Research implications

The CRM is a feasible model to determine a community's level of readiness to address mental health through physical activity for rural and remote communities by implementing appropriate community engagement strategies. Community engagement includes individuals, their support structures and social networks, organisations providing services to the individuals and other community stakeholders (Wilson and Sanyal, 2013). This evidence-based model of community engagement can guide health professionals and future research, especially when working in rural and remote areas.

For future practice, health professionals can use the CRM to engage with a range of health, education and government service users and providers to determine the community's level of readiness to address a social issue. This will provide the health professionals with appropriate individualised strategies to implement interventions based on the CRM results and recommendations. Consequently, health professionals can guide the community through the stages of change to achieve empowerment, where individuals and groups within the community can influence one another (Wilson and Sanyal, 2013).

However, it must be noted the CRM represents the individual community needs at that point in time. Future research should re-evaluate the community's level of readiness regarding the social issue to determine if strategies should be updated. The community in this study will be provided with strategies to support the current level of readiness, and future research should include reassessing the community to determine their stage of change.

4.2 Limitations

The results of the CRM are individualised based on the chosen community. The outcomes and recommendations in this research are specific to that community and not applicable for other rural or remote communities in Australia. The quality of data could have been enriched by purposively sampling people who are currently not involved in LTPA programmes. While the sample size is small, it meets the requirements of the CRM, thus can be considered representative for the purpose of this study.

5. Conclusion

The present study within a remote Australian community found the CRM to be a feasible model to determine the community's level of readiness to use LTPA to improve the mental health of community-dwelling adults. This is consistent with previous studies showing the

CRM to be an effective model to empower communities according to their level of readiness across a number of cultural contexts. Importantly, the CRM provides strategies that are unique to the community based on their quantitative score of readiness and themes determined from the qualitative information obtained. This supports the viability of the tool in future research for LTPA and mental health in remote communities.

The CRM results determined the community has strong support from leadership with many current LTPA programmes in place that the community is aware of. However, the assessment scored low in physical activity knowledge, community attitude and resources. Recommendations based on the CRM include raising awareness of LTPA for mental health through regular community interactions, conducting focus groups with locals to determine future strategies and investing in community leaders. These strategies should be considered as critical next steps for this community to further its readiness to implement LTPA for the improvement of mental health at the community level. Future research should include interventions which are community designed and led, to further enhance autonomy and evaluated for effectiveness and efficacy.

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