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ORIGINAL ARTICLE

Tackling Mental Health in Youth Sporting Programs: A Pilot Study of a Holistic Program

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Abstract

Linking mental health services to organised sport offers an avenue to identify and improve mental health among adolescents. In this study, we investigated the efficacy, acceptability and feasibility of an integrated mental health system embedded within a junior sports development program. A three-step integrated mental health program for 12- to 15-year-old rugby league players (N = 74) was delivered in urban (n = 44) and rural (n = 33) areas. Specifically, this system (a) assessed participant mental health on primary outcome measures of anxiety, depression, and anger/conduct problems (and secondary outcome measures of personal attributes and relationships), (b) provided feedback to participants, parents and program coordinators, and (c) connected participants and parents to a multi-component intervention including online resources, a group-based workshop program (4 × 30-min sessions), and tailored individual-level follow-up and referral to further care for participants at high risk of mental health problems. From pre- to post-program, boys' anxiety symptoms declined significantly (with only a trend-level reduction in depression), and there were significant improvements in grit (for urban boys only), efficacy to manage negative emotions, and prosocial behaviour. In addition, when boys reported symptoms associated with high risk for mental health problems, providing parents with feedback enhanced boys' access to care and was associated with significant declines in anxiety symptoms. The program was generally acceptable and feasible, with very high retention in the youth sports development program. Overall, early findings support further deployment and evaluation of integrated mental health systems embedded within sporting contexts to address mental health problems among adolescent boys.

Keywords Mental health · Youth · Organised sport

Introduction

Mental Health is among the single most critical issue faced by young people globally [1]. In the US, 49.5% of youth met criteria for a lifetime mental disorder, with 27.6% of these reporting severe impairment [2]. In the UK, 12.8% of young people met criteria for a mental disorder [3], and similar rates are reported in Australia, where 14% of all adolescents have been diagnosed with a mental health problem, and young males are slightly more at risk than females (15.9% compared to 12.8%) [4]. Suicide is the leading cause of death for people aged 15–24 in both Australia and the UK [5, 6] and is the second leading cause of death in the US for this age group [7]. These mental health problems carry heavy personal, social, and economic burden. Illustratively, in the US and Australia youth mental health disorders are estimated to cost governments more than $10 billion each year [8, 9]. Given most mental disorders have their onset during adolescence [10], early detection and intervention are of vital importance to prevent lifelong recurrence and significant impairment [11]. Further, rising rates of mental health issues in adolescence are forecasted to lead to unprecedented demands for services, further highlighting that investment in prevention and early intervention is of vital importance [1].

Current research indicates that the high prevalence of mental health issues among boys and young men is grossly disproportionate to the services they access; young men are

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the least likely subgroup to seek help for mental health concerns [12]. For instance, data from the UK indicated that 21.8% of young males likely to experience mental distress had sought help (compared to 34.8% of young females) [13]. Similarly, Australian data indicated that only 13% of young men aged 16 to 24 years who were experiencing clinically significant mental health symptoms accessed care compared to 33% of young women over a 12-month period [14]. Moreover, there is good evidence that boys, relative to girls, begin to disconnect from accessing health care services during adolescence [15], and furthermore, sustain poor health care utilisation relative to women throughout adulthood [16].

The disparity between boys mental health risk and service utilisation indicates a clear need to improve the accessibility and acceptability of their mental health services [17]. In doing so, it is important to consider underlying reasons for these disparities in health care access. Research consistently indicates that common barriers to boys and young men's help seeking align with themes of masculinity, such as difficulty showing vulnerability and gender-based stigma [18]. Not surprisingly, then, a recent review of young men's wellbeing programs found that male-targeted interventions tended to be more beneficial than gender-neutral programs [19]. Here, Gwyther and colleagues concluded that boys may be more likely to value programs in which information is specifically tailored to their needs and that includes male role-models and well-known athletes who can normalise communication about emotional concerns [20].

Given shortcomings in existing services found globally, one productive approach for enhancing mental health behaviours among boys is to integrate mental health and wellbeing strategies within normative contexts in which they participate, such as organised sports [21]. Participation in sport plays a central role in the lifestyle of children and adolescents, especially boys [22, 23]. More specifically, within the Australian context, more than 66% of boys report engaging in organised sport each year, for up to eight hours or more per week [24]. Moreover, qualitative research indicates that adolescent boys perceive organised sport to be a more engaging context than school for supporting mental health [25], and sport clubs to be important networks for supporting young people and their families more generally [26].

Despite the potential for organised sports to serve as a critical access point for receiving intervention, including mental health services, this idea has not yet been implemented in an organized nor broad scale. Illustratively, a recent review indicated that only 11% of sports organisations in the Australian context offer campaigns that target player mental health and wellbeing in general [27]. Moreover, programs to date have primarily had a broader focus on general wellbeing rather than mental health problems. That is, early programs have generally concentrated on helping young people to build on their strengths and competencies and acquire 'life skills' for managing hardships [28]. While competencies are helpful and important for assisting young people as they manage the challenges of adolescence and young adulthood, they cannot fully speak to the underlying problems associated with mental health struggles [29, 30]. That said, early findings suggest that relative to control groups, recipients of such wellbeing programs report improvements in prosocial values [31], emotion regulation skills, social skills, perceived academic competence [32], and self-beliefs related to goal-setting and problem-solving [33]. Again, however, while useful in speaking to the importance of positive youth development strategies [34, 35], these programs have not focused on mental health problems (e.g., anxiety, depression, anger, conduct problems) as target outcomes, nor their associated mechanisms for intervention content. Those very few studies that have done so have either lacked adequate control conditions and valid measures, failed to report effect sizes, and/or demonstrated a high risk of bias [see 36 for review).

Tailored Interventions

Young people participating in organised settings, including sports, arguably have varied needs in relation to their wellbeing and mental health. As a result, interventions that are delivered within a specific organised setting, including sports, should ideally be tailored to meet individual needs within the constraints of their setting and the availability of suitably trained staff and resources. Moreover, researchers advocating for mental health programs in the context of youths' activity settings, including sporting contexts, have emphasised the importance of intervening at multiple levels of influence (e.g., individual, parental, community) based on the needs of each individual [37, 38]. Therefore, interventions delivered within this context need to be scalable and flexible. Helpfully, modular psychotherapy protocols offer one way to achieve this, by providing a structured approach to tailoring treatment to young people's needs. Modular treatment strategies are presented as a series of free-standing, evidence-based modules that can be altered in terms of sequencing and format (e.g. face-to-face, online, telephone-based) and can be delivered multiple times or not at all. For example, all individuals may receive a set of core modules that are likely to be of benefit to the group, and selected individuals may receive additional unique modules based on their individual needs [see 39]. Modular interventions have been found to significantly outperform usual care in instances where empirically supported treatments have not at post-intervention and at 2-year-follow-up [40, 41]. Notably, the flexibility provided by modular interventions also allows for greater

collaboration between relevant stakeholders and increases the likelihood that evidence-based treatments will translate effectively into different service contexts [42].

Specific to a sport setting, providing a variety of intervention modalities offers another way to achieve flexibility and reach multiple sources of influence on young people's mental health (e.g., coaches, parents, players). This may include low intensity modalities for delivering module content, such as telephone communication, computer-delivered resources, and print resources, and high intensity modalities such as short or long duration individual or group-based programs with a mental health professional, referrals to specialists, or engagement in multi-module approaches [e.g., 43, 44, 45].

It is worth noting that this provision of an intervention approach tailored to young people's needs and settings further requires the reliable assessment of mental health and wellbeing outcomes and the timely provision of user-friendly feedback to relevant stakeholder roles within the service provision model (i.e., individual, parental, organisational). Drawing upon studies in school contexts, universal screening and feedback regarding youth mental health is increasingly being implemented by education administrators and deemed to be acceptable and helpful by parents [46, 47]. However, this approach is only sustainable in the presence of stakeholder partnerships between youth organisations and mental health professionals in the development and implementation of holistic wellbeing programs that include mental health.

One evidenced-based approach for creating a sustainable partnership to assist youth in their natural settings, is the use of a community-based participatory framework [48, 49]. This widely used framework involves all partners in the research process and recognises the unique strengths that each brings to the project including access to shared resources, knowledge, and expertise [50]. Of course, the central purpose underpinning community-based participatory approaches is for key stakeholders (researchers and community members) to work together to define the problem and research methods, implement the research, disseminate the findings, and apply them in practice. What makes community-based participatory frameworks especially salient in this context, is that this approach affords the opportunity to tailor service provision to take account of context-specific factors, which in sporting contexts for boys, can include stigma about mental health, preserving player confidentiality, and strongly held masculine stereotypes that discourage emotional disclosure and vulnerability [e.g., 18]. Close collaboration between mental health experts and those individuals leading and organizing sports also increases the likelihood that interventions within these contexts are developed based on up-to-date evidence as well as include key ingredients for enhancing boys' engagement in mental health programs, such as the inclusion of relevant male role models and mentors, anti-stigma interventions, and consideration of gendered social and environmental determinants of health [19, 20].

The Current Study

All told, the research to date suggests that youth settings, including sport organizations, offer strong potential as an effective context for enhancing mental health among adolescent boys. Emerging evidence has converged on the view that programs could be of greater benefit if they (a) tailor the content of these programs to the needs and interests of young males, (b) include an integrated, multi-component approach to intervention, (c) use collaborative teams to co-design and deliver program content, and (d) evaluate this approach effectively. The aim of the present study was to address these gaps by conducting a preliminary evaluation of the efficacy, acceptability and feasibility of an integrated system targeting player mental health embedded within an organised sport setting for boys, a junior development program for 12- to 15-year-old male rugby league players.

Rugby league is a highly popular sport in Australia, with more than 116,490 boys participating between ages 5 to 18 years of age in 2018 [51]. Given the sports' popularity, the National Rugby League (NRL) in collaboration with the present research team, comprised a RISE Development Program for junior rugby league players, which was developed within a community-based participatory research framework, and focuses on holistic player development. A key feature of this development program includes youths' mental health and wellbeing, and involves a multi-component approach, tailored based on the assessment of group and individual needs. At the broadest level, this involved the provision of emailed print resources to all players, parents/carers, coaches and officials. A sequence of four modules were delivered face-to-face with all players in small groups at each site. These modules were selected in collaboration with the RISE team to ensure that they aligned with the values and goals of the program. Finally, individual referral services were provided for players identified as being at high-risk of mental illness based on their self-reports of anxiety, depression, and/or anger/conduct problems at pre-assessment.

The current study provides feasibility and proof-of-concept from the pilot investigation of the RISE program outcome data. The first aim was to examine mental health outcomes and program acceptability in 12- to 15-year-old adolescent boys who participated in RISE within an urban vs. a rural setting. The second aim was to describe implementation feasibility, defined in terms of participant attrition, obstacles, and challenges. It was hypothesised that the primary outcome measures of anxiety, depression and anger/conduct problems would reduce significantly from

pre- to post-intervention among boys participating at each site. Mental health concerns for individual participants and procedures used for parent/carer follow-up were also described, with a focus on boys who reported symptoms in the high-risk range prior to the program. Changes in the secondary outcome measures of grit, optimism, gratitude, negative emotion self-efficacy and prosocial behaviour are also reported.

Method

Participants

Participants were 74 boys who participated in the RISE Rugby League Development program developed by the NRL in conjunction with university-based clinical and developmental mental health experts. Boys (aged 12 to 15 years) were recruited by the NRL via online advertising for the RISE Rugby League Development Program. Recruitment occurred in an urban community ($n = 44$), and a rural community ($n = 30$) ($M_{age} = 13.23$, $SD = 0.96$). Fifty-nine participants (79.7%) identified as white European Australians, 14 participants (18.9%) identified as Australian First Peoples, and one participant (1.4%) identified as Maori. Age and ethnicity did not differ between sites.

Participants were eligible to participate in the RISE program if they were between the ages of 12 and 15 years, were currently registered with a junior rugby league club, had been playing rugby for a minimum of two seasons, and were not participating in any concurrent rugby academy or development programs. While 100% of participants who elected to participate consented to take part in the RISE program, 17 (23%) young men did not complete the initial mental health assessment. Of the remaining 57 (77%) participants, one participant (2%) discontinued the RISE program after one session and a further 20 participants (35%) did not complete the online post-assessment of mental health, resulting in a final sample of 36 participants (63%) who completed measures at pre- and post-assessment (assessment completion rate of 49%; see Fig. 1 for CONSORT diagram).

Primary Outcome Measures

Anxiety

The Revised Children's Anxiety and Depression Scale (RCADS-25) [52] Anxiety Subscale (15 items) was used to assess anxiety symptoms. A sample item is: "I worry when I think I have done poorly at something" (0 = *never*, 3 = *always*). The possible range of scores was 0 to 45, with higher scores indicating higher levels of anxiety symptomology. Cronbach's α was 0.73 at pre and post-intervention.

Depression

The RCADS [52] Depression Subscale (10 items) was used to assess for depressive symptoms. A sample item is: "I feel sad or empty" (0 = *never*, 3 = *always*). The possible range for scores was 0 to 30, with a higher score indicating higher levels of depressive symptomology. Cronbach's α was 0.56 at pre-intervention and 0.81 at post-intervention.

Anger and Externalising Behaviours

The Strengths and Difficulties Questionnaire (SDQ) [53] Conduct Problems Subscale (5 items) was used to assess difficulties related to externalising behaviours. A sample item is: "I get very angry and often lost my temper" (0 = *not true*, 2 = *certainly true*). The possible range of scores on the measure is 0 to 10, with higher scores indicating higher misconduct issues. Cronbach's α was 0.52 at pre-intervention and 0.31[1] at post-intervention.

Secondary Outcome Measures

Grit

The Academic Grit Scale (10 items) [54] was used to assess levels of consistency of interest and perseverance towards long-term goals in general, without reference to academic activity in particular. A sample item is: "I keep trying even after I fail" (1 = *definitely not like me*, 6 = *definitely like me*). The possible range of scores is 1 to 6, with higher scores indicating higher levels of grit. Cronbach's α was 0.85 at pre-intervention and 0.80 at post-intervention.

Optimism

The Youth Life Orientation Test (YLOT) [55] Optimism Subscale (6 items) was used to assess levels of optimism. A sample item is "When I am not sure what will happen next, I usually expect it to be something good" (0 = *not true for me*, 3 = *true for me*). The possible range of scores is 0 to 18, with higher scores indicating higher levels of optimistic thinking. Cronbach's α was 0.76 at pre-intervention and 0.77 at post-intervention.

[1] Given the low α for anger and externalising behaviours, one item from the scale that was found to have low inter-correlations was removed and analyses were run as a sensitivity check. No significant differences were observed in the results when analyses were performed with the item excluded.

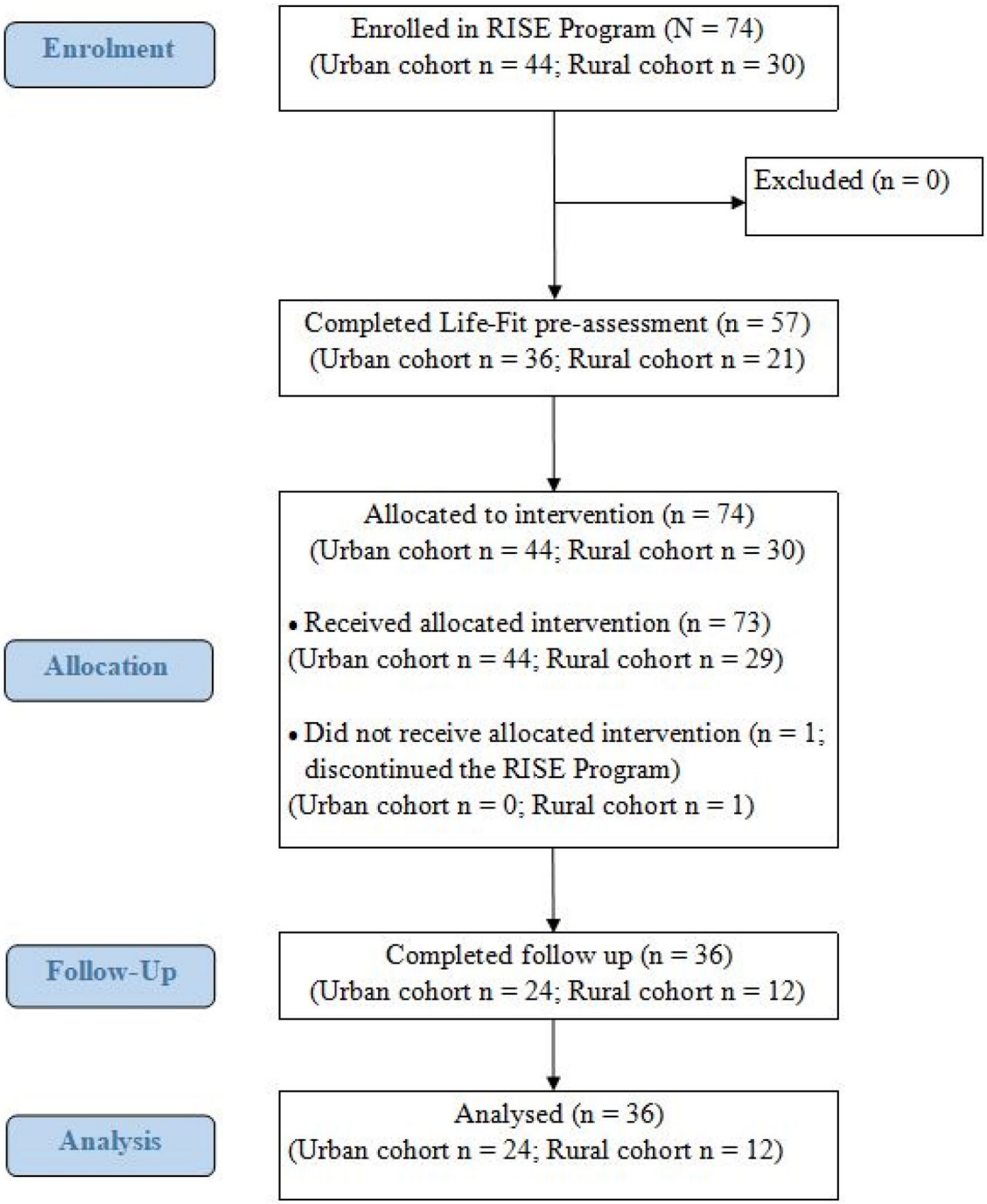

Fig. 1 CONSORT Diagram depicting participant flow for both cohorts

Gratitude

Gratitude was assessed using the Gratitude Questionnaire (GC-6; 6 items) [56], which measures the extent to which an individual possesses a grateful disposition. A sample item is "I have so much in life to be thankful for" (0 = *strongly disagree,* 6 = *strongly agree*). The possible range of scores is 6 to 42, with higher scores indicating higher levels of gratitude. Cronbach's α was 0.77 at pre-intervention and 0.78 at post-intervention.

Prosocial Behaviours

The SDQ [53] Prosocial Behaviours Subscale (5 items) was used to assess prosocial behaviours. A sample item is: "I try to be nice to other people. I care about their feelings (0 = *not*

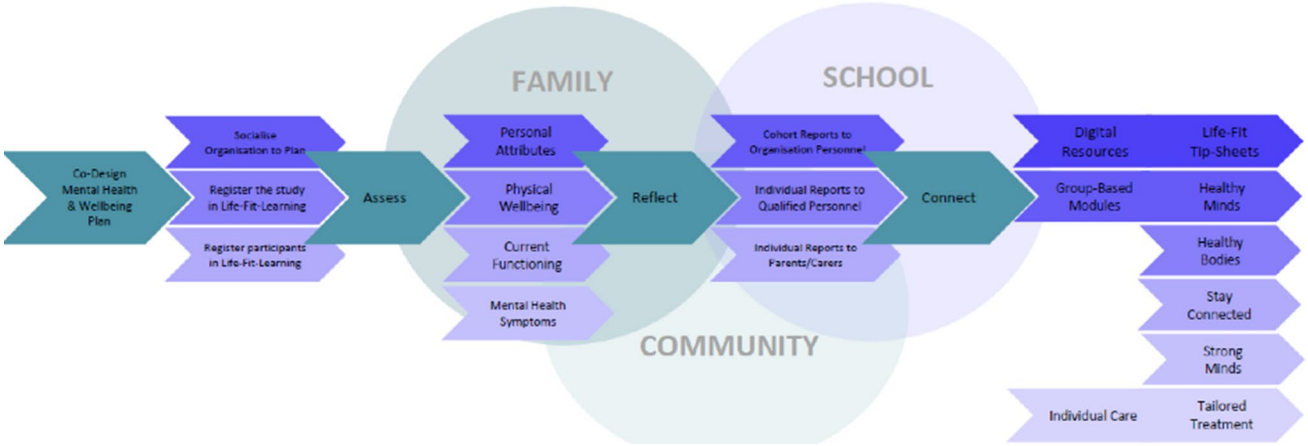

Fig. 2 The Life-Fit-Learning system depicting the procedure stages of study registration, participant registration, the Assess step, the Reflect step, and the Connect step

true, 2 = *certainly true*). The possible range of scores on this measure is 0 to 10, with higher scores indicating higher levels of prosocial behaviour. Cronbach's α was 0.68 at pre-intervention and 0.69 at post-intervention.

Self-efficacy for Negative Emotions

The Multidimensional Self-Efficacy Scale for Children [57] Negative Emotions Subscale (5 items) was used to assess the level to which participants felt they could manage negative emotions. A sample item is: "I can quickly calm myself when I am distressed" (0 = *cannot do at all,* 10 = *highly certain can do*). The possible range of scores is 0 to 50 with higher scores indicating higher perceived levels of self-efficacy. Cronbach's α was 0.87 at pre-intervention and 0.84 at post-intervention.

Tailored Individual Care Measures Parents of participants were contacted via telephone at post-assessment to ask about taking action as a result of having received individual feedback about their son and were asked to choose one of the following five response options: (1) No action taken; (2) Had initiated a conversation with their son about the results and their well-being; (3) Had sought additional information pertaining to their son's difficulties; (4) Had sought professional assistance or support for their son; (5) Were already receiving support at the time of the assessment. Parents were also asked about improvements in their son's well-being since receiving the feedback, with response options ranging from 1 (*much worse*) to 5 (*much improved*).

Acceptability Measures At the conclusion of each workshop session participants completed four questions assessing satisfaction; (1) *How helpful did you find the last session?* (2) *How enjoyable did you find the last session?* (3) *How difficult was it to understand the last session?* (4) *How helpful was the workbook in explaining the last session?* Response options ranged from 1 (*not at all*) to 6 (*very much*).

Overview of the Personalized Intervention System An integrated, three-step system, referred to as The Life-Fit-Learning System, was used in this study. This system was designed to (a) assess the health and wellbeing of young people (Assess step), (b) provide immediate assessment summary reports for young people (and their parents/carers; i.e., individual level reports) and the organisations in which they are participating (i.e., cohort level reports) so they receive feedback tailored to their level of involvement with the young person/s (Reflect step), and (c) connect young people to care via a multi-component intervention system including digital psychoeducational resources, group-based, modularised interventions and tailored care for individuals at greatest risk. (Connect step; see Fig. 2).

Assess Step Registered participants are emailed a link to the Assess step, which is an online assessment instrument containing a range of measures to assess the dimensions of Personal Attributes, Physical Wellbeing, Current Functioning, and Mental Health Symptoms. In the present study, the following dimensions under Mental Health Symptoms were selected as primary outcome measures: anxiety, depression, anger, in addition to the following secondary outcome measures under Personal Attributes and Current Functioning: grit, optimism, gratitude, self-efficacy in managing negative emotions, and prosocial behaviour. Participants completed the assessment on a PC, laptop or tablet in their own time prior to attending the first workshop.

Reflect Step Following completion of the Assess Step, de-identified individual Reflect Reports were generated for

each participant, and cohort Reflect Reports were generated for each site separately. The individual report indicated how each participant scored on selected mental health and relationships well-being measures (anxiety, depression, self-satisfaction, peer problems, anger, and prosocial behaviours) relative to established norms for their age. The report depicted whether the participant scored within the 'healthy range' (within one SD of the mean), 'possible risk range' (one SD above the mean), or 'probable risk range' (two SD above the mean) on each measure. The report also indicates whether the participant is meeting national standards on several physical health measures (e.g., sleep, vegetable intake, fruit intake, water intake). These measures were included as feedback to participants and parents on their general physical health and wellbeing but were not primary or secondary outcomes in the present study. The Reflect Report also contained a cover letter explaining the content of the report, and referral advice should parents wish to seek additional assistance for mental health concerns. These included a university-based clinic, links to search for a private psychologist in their area, and several psychology websites with helpful resources and links to national support service helplines. A glossary of terms was also included to provide an explanation of each measure included and the national standards for physical health measures.

In the present study, after the close of the Assess step, de-identified individual reports were emailed automatically to a clinical psychologist (study first author; see Fig. 2; Individual Reports to Qualified Personnel). Together with a second clinical psychologist (second author), the reports were reviewed and emailed individually to each participant's parents/carers (see Fig. 2). Individual Reflect Reports were not provided to the NRL RISE team to maintain participant confidentiality. However, they were provided with automatically generated Cohort-level Reflect Reports to provide a de-identified overview of average scores for participating boys (at each site) on all measures (see Fig. 2; Cohort Reports to Organisation Personnel). The Cohort-level Reflect Reports were provided to the RISE team at pre- and post-assessment to inform staff of the mental health and wellbeing of all players.

Connect Step The next step in the system was *connect*, which included multiple components in terms of resources, programs and support (see Fig. 2):

Digital Resources After the Reflect Step had closed and the individual and cohort Reflect Reports had been produced, parents were emailed the link to the intervention website and were also emailed a copy of intervention Tip-Sheets along with their son's individual Reflect Report. The handouts contained psychoeducation and evidence-based tips for broadly improving well-being, and links to access additional information online.

Modularised Group Program The modularised group-based component of the Connect Step involved four 30–40 min sessions delivered in rotation with sports-based components of the RISE program once per month over 4 months at both the rural and urban site. The sessions were conducted by two co-facilitators (first and second authors), who followed a detailed therapist manual. Sessions were supplemented by a participant workbook, which summarised the information presented in sessions, and included activities to be completed between sessions. The four key areas included in the program were determined collaboratively and were selected because they aligned with key values emphasised in the NRL's player development program and were identified as important areas to target: Strong Minds (grit and optimism); Keep Cool (emotional self-control); Stay Connected (social connectedness); and Healthy Habits (sleep, diet, technology and social media use).

Session One: Strong Minds Module (Grit and Optimism)

Participants were provided with psycho-education about the importance of grit and optimism in achieving goals [58]. Each term was defined and participants were encouraged to identify famous male sports players who had overcome significant challenges and to identify a person in their own life who had overcome challenges through grit and determination. Participants were provided with psycho-education about the influence of thoughts on their feelings and actions and were introduced to the concept of positively-oriented thoughts (referred to as "strong thoughts" for boys) in order to foster an optimistic outlook on life [59]. They were encouraged to develop their own strong thoughts to use in challenging situations in which grit and optimism were required in relation to rugby league, school, home and with friends.

Session Two: Keep Cool Module (Emotional Self-control)

Psychoeducation was provided pertaining to the influence of emotions on actions and performance in sport [60]. Participants were presented with case vignettes of well-known male athletes who described their strategies for managing negative emotions. They also completed an activity requiring them to identify their own body signals for anxiety, sadness and anger. They were instructed in somatic symptom management, and completed exercises involving abdominal breathing and progressive muscle relaxation and how to adapt these strategies to use them 'on the spot' during challenging situations identified by participants. These situations included preparing for a game, dealing with difficult peers at school, and prior to exams and tests at school [59, 61]. Participants were also provided with education about

mindfulness and how to implement simple mindfulness-based practices at home [62].

Session Three: Stay Connected Module (Acts of Kindness and Gratitude)

Participants were encouraged to consider the different areas of their lives and the importance of being connected to others in their community, sport, school, family and friendships [63]. They were presented with case vignettes of well-known players who described how they connect with important others in their lives. Participants took turns in reading these vignettes within their group and sharing their thoughts about what they learned. In-session activities were completed to educate participants about performing acts of kindness in connecting with others (i.e., referred to as 'positive actions') [64]. These included a 'pie chart' exercise depicting home, school, sport, and friendships, and participants shared with the group and recorded in their workbooks how they currently engage in positive actions and new ways they can enhance their connectedness in each domain.

Session Four: Healthy Habits (Sleep, Nutrition and Time Use Module)

The final session focused on the importance of physical health in well-being and sport. Psychoeducation was provided about the recommended amount of sleep, and daily intakes of vegetables, fruit, and water consumption [65–67] and participants compared this to their own health habits in these areas. They also received information from the Assess step at pre-assessment which summarised the daily amount of sleep, intake of vegetables, fruit, and water for their group and how this compared to the national standards. Participants received a handout summarising the Australian National Standards for diet, sleep, and time use to display on their refrigerator or other prominent place at home as a reminder for themselves and their families. Lastly, participants completed activities to select strategies from a list of evidence-informed options for improving their own sleep-related behaviours, time use, and impact of these on their lives.

Tailored Individual Care Parents of participants who scored in the 'possible risk' or 'probable risk' ranges on any mental health measures depicted in the Reflect Report (i.e., anxiety, depression, anger/conduct problems) received a follow-up phone call from the first author to provide further feedback on these scores, recommendations for further action and referral information for additional support (See Fig. 2; Tailored Individual Care). These parents were contacted again by the first author 3 months later after the program was completed to ascertain the outcome of having received the initial Reflect Report feedback and any action taken to address their son's mental health concerns. All parents were again emailed the Tip-Sheets which provided information and strategies, as well as additional referral contact options for seeking assistance in relation to areas covered in the Reflect Report.

Procedure

Following approval from the university Human Research Ethics Committee (GU HREC: 2018/426), participants were recruited via online advertising conducted by the NRL RISE team. When applying to take part in the RISE development program, participants were required to provide information about their age, gender, and ethnicity, as well as provide a 100-word statement describing their motivations for participating in the program as the RISE team were interested in understanding boys' reasons for engagement in the program to inform future recruitment. Potential participants were screened by the NRL and invited to take part in the program, providing that they met eligibility requirements (i.e., were not already taking part in a Rugby development program). All participants who took part in the program were asked to pay a $200 fee to the NRL to cover costs with developing and implementing the program. This cost was either covered by parents or by club sponsorship in cases of family financial hardship.

The measures selected as primary and secondary outcome measures in this study were determined collaboratively between based on participant needs and developmental considerations for young boys between 12 and 15 years of age. Active parental consent was obtained for each participant at the orientation session, which ran separately at each of the two sites. Following the orientation, participants were registered and emailed the link to complete the Assess step online, which was completed over a 2-week period prior to the first workshop.

After the Assess step, Individual Reflect Reports were generated and sent to parents of participants, and Cohort Reflect Reports were sent to the team. The Program took place over a 5-month period (May–September, 2018), and consisted of 4 monthly sessions which were held separately at each site. Sessions ran for 2.5 h, with participants rotating between four stations in groups of approximately 15 participants. Each station involved activities which aimed to target either physical skills or wellbeing skills (i.e., the Life-Fit component). All participants completed the intervention phase, regardless of whether they had completed the initial Assess step. Following the completion of the program, players who had completed the initial Assess step were emailed a link to complete the same Assess step measures at post-assessment, which were completed over a 2-week period. Individual and Cohort Reflect reports were generated and

reviewed by the first and second authors, and were then sent to parents and the RISE team, respectively.

Overview of the Data Analyses

As the primary aim of this pilot study was to assess intervention efficacy, analyses were based on the partial sample of participants (n = 36) who completed the intervention and both pre- and post- assessments. Intent-to-treat procedures were not employed given all but one participant completed the program and the small completer sample size solely reflected on the failure of participants to complete either the pre- or post-assessment. Furthermore, initial comparisons of completers and non-completers revealed that the latter group reported significantly *lower* anxiety symptomology at baseline (see "Results"). Had their last data points been carried forward in accordance with an intent-to-treat procedure [45, 68, 69], the level of post-assessment anxiety in the overall sample would have been lower, possibly confounding the level of anxiety with change in anxiety over time.

Intervention outcome data and session ratings data were analysed using mixed factorial analyses of variance (ANOVA), χ^2 tests, and t-tests. For primary and secondary outcome measures, analyses were conducted to compare the two cohorts from pre- to post-intervention using 2 Group (Urban; Rural) × 2 Time (Pre-; Post-Assessment) mixed design ANOVA. Bonferroni adjustments were made for multiple comparisons as required and partial eta squared (η^2) was calculated to estimate effect sizes.

Results

Initial Group Comparisons

Table 1 presents descriptive information for all participants. Those who completed the initial assessment (n = 57) were compared to participants who did not complete the initial assessment (n = 17) on demographic variables of site, ethnicity and age, which were available from their initial registration in the RISE program. χ^2 tests indicated no significant differences between initial assessment completion and site χ^2 (1, N = 74) = 1.48, $p = 0.22$, $phi = 0.17$, ethnicity (p = 0.17 Fisher's Exact Probability Test) and age for those who did ($M_{\_}$ 13.13, $SD = 0.94$) compared to did not complete the initial assessment ($M = 13.56$, $SD = 0.98$), t (72) = − 1.68, $p = 0.10$.

Participants who completed the pre- and post-assessments (completers; n = 36) were compared to those who completed the pre- but not post-assessment (non-completers; n = 21) on demographic variables (Table 1) as well as pre-assessment measures (Table 2). Chi-square tests indicated no significant association between assessment completion and site χ^2 (1, N = 57) = 0.51, $p = 0.66$, $phi = 0.10$, country of birth (Australia versus not Australia), and living situation (living at home with both parents versus other living arrangement), $p = 0.66$ and $p = 0.08$ (Fisher's Exact Probability Tests) respectively. Independent samples t-tests revealed no significant differences between completers and non-completers in age ($M_{\_}$ 13.42, $SD = 0.97$ versus $M_{\_}$ 13.38, $SD = 0.97$ respectively), t (55) = 0.13, $p = 0.89$ or any outcome measure, apart from anxiety, whereby completers reported significantly higher pre-assessment levels of anxiety ($M = 6.97$, $SD = 3.76$) compared to non-completers ($M = 4.86$, $SD = 2.54$), t (55) = 2.29, $p = 0.03$.

Table 1 Demographic information for completers and non-completers of the pre- and post-assessments

Measure	Urban completers (N = 24)	Rural completers (N = 12)	Non-completers (N = 21)
Age (years/SD)	13.29 (0.95)	13.67 (0.99)	13.38 (0.97)
Country of birth			
Australia (N/%)	21 (87.5%)	12 (100%)	18 (85.7%)
New Zealand (N/%)	3 (12.5%)	0	1 (4.8%)
Great Britain (N/%)	0	0	2 (9.5%)
Living situation			
Lives with both parents (N/%)	20 (83%)	12 (100%)	14 (66.7%)
Lives with mother (N/%)	1 (4%)	0	5 (23.8%)
Lives with father (N/%)	1 (4%)	0	0
Shared living situation (N/%)	2 (8%)	0	2 (9.5%)

Primary Outcome Measures: Cohort Level

Anxiety

Table 2 presents the mean outcome measure scores at pre- and post-intervention for both the urban and rural site. As can be seen, there was a significant main within subject effect of Time, $F(1,34) = 6.25$, $p = 0.017$, $\eta^2 = 0.16$, indicating that the mean anxiety score declined from pre- to post-intervention. The main effect of Group, $F(1,34) = 1.215$, $p = 0.28$, $\eta^2 = 0.04$, and the Time × Group interaction were not significant, $F(1,34) = 0.25$, $p = 0.62$, $\eta^2 = 0.01$. Thus, the decline in anxiety did not differ between the urban and rural sites.

Depression

The Time × Group mixed factorial ANOVA of depressive symptoms revealed a marginally significant main effect of Time, $F(1,34) = 3.97$, $p = 0.054$, $\eta^2 = 0.11$ (see Table 2),

Table 2 Outcome measures for completers at each site (pre- and post-intervention), and baseline measures for non-completers

Measure	Urban completers (N = 24)		Rural completers (N = 12)		Non-completers (N = 21)
	Pre *M* (*SD*)	Post *M* (*SD*)	Pre *M* (*SD*)	Post *M* (*SD*)	Pre *M* (*SD*)
Primary outcomes					
Anxiety	7.50 (3.82)	6.00 (3.89)	5.92 (3.55)	4.92 (3.15)	4.86 (2.54)
Depression	5.29 (2.42)	5.08 (3.28)	6.08 (3.55)	4.42 (3.01)	4.95 (3.37)
Anger/externalising behaviours	1.96 (1.57)	1.54 (1.14)	1.33 (1.30)	1.42 (1.44)	1.71 (1.38)
Secondary outcomes					
Prosocial behaviours	7.33 (1.63)	8.04 (1.55)	7.58 (2.02)	8.01 (1.56)	7.71 (1.68)
Grit	4.37 (0.74)	4.70 (0.71)	4.62 (0.77)	4.48 (0.55)	4.43 (0.74)
Optimism	12.75 (2.96)	13.54 (2.25)	13.42 (3.12)	13.67 (3.00)	12.86 (3.28)
Gratitude	36.54 (3.79)	35.79 (4.06)	35.50 (4.93)	36.42 (4.52)	35.33 (5.31)
Negative emotion self efficacy	37.67 (8.41)	39.67 (7.19)	39.33 (6.42)	41.33 (6.51)	36.43 (9.94)

reflecting that depression symptoms decreased, on average, from pre- to post-assessment. The Group main effect, $F(1,34) = 117.52$, $p = 0.95$, $\eta^2 < .001$, and the Time × Group interaction were not significant, $F(1,34) = 2.30$, $p = 0.13$, $\eta^2 = 0.07$. Thus, the marginal decline in depression did not differ between the urban and rural sites.

Anger and Conduct

Table 2 also presents the pre- and post-intervention conduct and anger measure for both the urban and rural site. There were no significant effects (Time main effect, $F(1,34) = 0.65$, $p = 0.43$, $\eta^2 = 0.02$, Group main effect, $F(1,34) = 0.73$, $p = 0.40$, $\eta^2 = 0.02$, Time × Group interaction, $F(1,34) = 1.46$, $p = 0.24$, $\eta^2 = 0.04$).

Secondary Outcome Measures: Cohort Level

Grit

As can be seen in Table 2, the mixed factorial ANOVA showed a significant Time × Group interaction, $F(1,34) = 4.25$, $p = 0.047$, $\eta^2 = 0.11$. Pairwise comparisons revealed that scores increased significantly from pre- to post-assessment in the urban cohort ($t(23) = 2.12$, $p = 0.045$), whereas no significant difference in pre- to post-program scores was observed in the rural cohort ($t(11) = 1.39$, $p = 0.19$). The Time, $F(1,34) = 0.58$, $p = 0.45$, $\eta^2 = 0.02$, and Group, $F(1,34) = 0.01$, $p = 0.94$, $\eta^2 < 0.001$ main effects were not significant.

Optimism

There were no significant effects of Time, $F(1, 43) = 1.52$, $p = 0.23$, $\eta^2 = 0.04$; Group, $F(1, 34) = 0.22$, $p = 0.64$, $\eta^2 = 0.01$; or Time × Group interaction, $F(1,34) = 0.41$, $p = 0.53$, $\eta^2 = 0.01$, for optimism (see Table 2).

Gratitude

There were no significant effects of Time, $F(1, 34) = 0.01$, $p = 0.92$, $\eta^2 < 0.001$; Group, $F(1,34) = 0.03$, $p = 0.87$, $\eta^2 = 0.001$; or Time × Group interact effect, $F(1,34) = 1.12$, $p = 0.30$, $\eta^2 = 0.03$, for gratitude (see Table 2).

Prosocial Behaviours

Prosocial behaviour increased from pre- to post-assessment, with a significant within subject effect of Time $F(1,34) = 4.93$, $p = 0.03$, $\eta^2 = 0.13$ (see Table 2). The Group effect, $F(1,34) = 0.04$, $p = 0.84$, $\eta^2 = 0.001$, and the Time × Group interaction, $F(1,34) = 0.33$, $p = 0.57$, $\eta^2 = 0.01$, were not significant.

Negative Emotion Self-efficacy

Reports of efficacy in managing negative emotions increased from pre- to post-assessment, with a significant within subject effect of Time, $F(1, 34) = 3.95$, $p = 0.05$, $\eta^2 = 0.11$ (see Table 2). The Group effect, $F(1, 34) = 0.48$, $p = 0.50$, $\eta^2 = 0.01$, and the Time × Group interaction, $F(1, 34) = 0.00$, $p = 1.00$, $\eta^2 < 0.001$, were not significant.

Individual Follow-Up and Support

At pre-assessment, 8 participants (22%) scored within the high-risk range on at least one mental health measure. Parents of 7 of these participants (87%) were able to be reached via telephone to provide additional feedback and referral information, and again at post-assessment. Of these 7 parents, 6 parents (86%) reported taking some

Table 3 Mean satisfaction ratings for the urban and regional sites

Measure	Urban site (N = 41)	Regional site (N = 29)
Helpfulness of sessions	4.66 (0.71)	4.42 (0.66)
Enjoyment of sessions*	4.73 (0.77)	4.28 (0.85)
Ease of understanding content	4.70 (0.72)	4.87 (0.69)
Usefulness of workbook content	4.62 (0.85)	4.65 (0.72)

*$p < .05$

form of action to address mental health problems identified in the Reflect Report: 4 parents (68%) reported having discussions with their son about his difficulties and working on the problems together; one parent (16%) reported their son was now seeing the school counsellor for individual sessions, and one parent (16%) reported their son was already seeing a psychologist and they would monitor the problem and contact them again if need be. One parent (14%) reported no direct action. When asked to rate participant improvement as a result of actions taken, 5 of the 7 contactable parents (71%) reported some or much improvement, and two (29%) reported no change (the parent who took no action; and one of the parents who spoke with their son). In accord, at the post-assessment Assess step at which all 8 participants identified in the risk-range at pre-assessment completed the post-assessment, 5 participants (63%) were in the normal range on all areas that were in the risk-range at pre-assessment and 3 participants (37%) remained in the risk-range for one area at post-assessment: two of these participants for anger/conduct problems and one participant for anxiety. One of these three participant's parent (33%) was the uncontactable parent at pre- and post-assessment, another participant's parent (33%) was the parent who reported taking no action after receiving the Individual Reflect Report and follow-up telephone call, and the third participant's parent (33%) reported their son was receiving ongoing individual sessions with his school counsellor and thus, the problem had improved but remained an elevated area of concern.

Acceptability: Session Ratings

The mean session ratings for each site are displayed in Table 3 and indicate scores that were within the 'a lot' to 'very much' range on average at both sites. The mixed factorial ANOVA revealed a significant Rating Type x Group interaction effect, $F(3, 66) = 4.94$, $p = 0.004$, $\eta^2 = 0.18$, with pairwise comparisons confirming that the urban boys rated the sessions as significantly more enjoyable than rural boys, $t(68) = 2.29$, $p = 0.025$. There were no significant differences between sites for other ratings (all p's > 0.12).

Discussion

Study findings provide preliminary support for a holistic sports program that specifically targets mental health and was associated with reductions in primary mental health outcomes. More specifically, a three-step, multi-component mental health and wellbeing system (i.e., Life-Fit-Learning) was integrated within a sports program focusing on physical competencies and delivered to 12- to 15-year-old boys by a collaborative team of role models and coaches, and youth mental health professionals. This system assessed youth mental health and wellbeing (Assess step), provided feedback via Cohort and Individual Reflect Reports (Reflect step) to the team staff, and youth participants and parents respectively, and connected youth and parents to online resources, group-level interventions, and individual-level referral to further care (Connect step). On average, boys in the program showed reductions in anxiety scores (and depression scores only at trend level) from pre- to post-assessment. However, no significant change was observed for anger or conduct problems (arguably a measurement artefact or indicative of a need for enhanced focus on externalizing). Moreover, when individual boys were considered, 22% were identified as having elevated risk of a mental health problem and parents were contacted. Eighty-six percent of parents reported taking action between the pre- and post-assessments to address the concerns raised, and by post-assessment, 63% of boys (5 of 8 participants) were no longer at elevated risk, and 71% of parents (5 of 7 participants) reported observing improvement in their son's mental health.

In terms of secondary outcomes, there were significant improvements from pre- to post-assessment in prosocial behaviour and efficacy managing negative emotions; grit was also found to increase significantly among urban but not rural boys. More research is needed to understand this possible link between grit and urban location. No significant changes were found on optimism and gratitude. Finally, the program sessions were rated very positively by participants in terms of satisfaction, enjoyment, and learning measures, with the urban cohort finding the sessions more enjoyable than the rural cohort.

These preliminary findings are encouraging. Findings suggest that integrating a multi-component mental health system within the context of a boys sport program can be effective in reducing anxiety, improving confidence in managing negative emotions, and enhancing desirable social behaviour at the cohort level. That said, the sample size was small, and no control comparison was available. As a result, findings are preliminary. That said, encouraging indicators suggest that the nature of our sample is line with the broader population, in that 22% of participants were identified within the elevated risk range, which is consistent with national prevalence rates of mental health problems in the general population of adolescent males (15.9%) [4]. Moreover, reductions in symptoms among 63% of these high-risk participants by post-assessment following a putatively brief targeted intervention (4 × 30 min group-based sessions spaced over 5 months) plus individual-level parent follow-up and support (i.e., tailored care), is a promising outcome. This is especially the case when considered relative to findings observed in high-risk youth following more intensive, universally delivered interventions specifically for mental health that to date have primarily been delivered in school contexts (e.g., 8–12 × 30–50 min group-based sessions over 4–8 weeks) [69, 70]. At the same time, comparison with outcomes from sport-specific programs is not possible given the lack of controlled trials and rigorous evaluation [36]. Arguably, then, the present findings warrant a larger-scale efficacy trial and economic analysis to determine whether tailored multilevel approaches are more effective than fully universal and targeted programs alone in a sports context.

The combination of both digital resources, a modularised group program and individual-level support, offer several potential advantages in the context of interventions within a youth sport setting. Participants can engage in social learning experiences by discussing emotions and feelings in confidence that their privacy is maintained. The group-level sessions were also rated very positively and suggest that delivering mental health interventions in a small group format that specifically focuses on using examples from well-known athletes to illustrate key session content is an effective approach for engaging this age group. In this case, the time-limited nature of the group-level sessions necessitated that content focus on broad aspects of wellbeing, whilst specific mental health problems (anxiety, depression, and anger/externalising symptoms) were addressed with parents to facilitate additional support where required. This individual-level support would likely be beneficial for other mental health issues faced by adolescent boys, such as eating concerns [71], and warrants further exploration.

Despite encouraging findings, a significant challenge in relation to the feasibility of implementation was the lower rate of both pre- and post-assessment completion. Having youth complete the Assess step at home prior to and after the program meant that, despite attempts to follow-up with reminder phones calls and emails, many youths did not complete the outcomes measures in the required timeframes. Similar rates of low completion have been observed in survey-based research conducted with adolescents, especially boys [72, 73]. It is worth noting that the loss of participants at post-assessment was not due to attrition (only one player dropped out of the youth sports development program) but was solely due to the assessment procedure. Furthermore, the higher rates of non-completion at post-assessment may have been influenced by the timing of school vacation, as many participants were not found to be contactable at this time. For these reasons, analyses were based only on data from participants who completed the assessment at pre and post timepoints given our focus on program efficacy. Further, intent-to-treat procedures were not performed given the non-completers at pre-assessment had lower anxiety scores than the completers. In undertaking future research, offering a monetary reward appears to be an especially efficacious strategy for retaining participants in this age group [72, 73] and should be an important consideration for subsequent studies. That said, despite the challenges with home-based completion of the Assess step, this format does offer several advantages over group-based administration in terms of maintaining youth privacy in relation to completing measures about mental health and notable differences in reading ability among this age group.

As touched on earlier, the most notable limitation is that a control group was not included in this study. Therefore, it cannot be determined that the program was more effective in reducing mental health problems compared to the passage of time and participation in grassroots rugby league as usual. As a smaller point, the present study does not clarify whether the inclusion of the mental health component further enhanced outcomes beyond an existing rugby league program focused on physical skills only. Likewise, being a multicomponent program, the present study does not elucidate which components were active ingredients of the intervention while others may not be necessary. Finally, low internal consistency was observed for the conduct problems sub-scale used to measure anger/externalising behaviours. This has been observed in other studies conducted with adolescents using this sub-scale [74–76], and is hypothesised to be influenced by the low endorsement frequency of some items (items measuring stealing and fighting) [76]. Future research should consider using an alternative measure of anger/externalising behaviours, such as the Reactive-Proactive Aggression Questionnaire, which has been found to have high internal consistency when used with adolescent boys [77].

Summary

The disparity between boys' mental health risk and service utilisation indicates a clear need to improve the accessibility and acceptability of their mental health services. Our pilot study found that embedding an integrated mental health system involving assessment, feedback and a multi-component intervention within the context of a holistic youth sports program resulted in reductions in anxiety (only trend-level reductions in depression), and improvements in grit, efficacy to manage negative emotions, and prosocial behaviour. At the individual level, there were encouraging preliminary findings to suggest that contacting parents of youth at high risk for mental health problems enhanced access to care and reductions in some symptoms. The present findings are encouraging and highlight promise in better characterizing the efficacy and cost-effectiveness of a sports program including the Life-Fit-Learning multi-component system to address mental health problems in adolescent boys.

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