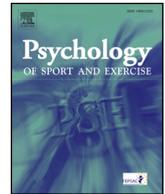




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Sports-based mental health promotion in Australia: Formative evaluation

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ABSTRACT

Objectives: Formative evaluation is critical in maximising the implementation strategies and processes of interventions. It is also critical to both providing contextual explanations for and maximising the success of such interventions. The purpose of this study was to undertake a comprehensive formative evaluation of the implementation process of a multi-component, sports-based mental health program for adolescent males ("Ahead of the Game").

Methods: Primary outcomes included program reach, dose, fidelity and cost during initial piloting and two distinct implementation phases. The iterative formative evaluation process provided opportunities to adapt the program and its implementation strategy to optimise reach, dose and fidelity relative to implementation cost.

Results: Formative evaluation data showed that the program failed to achieve optimal reach in the initial pilot phase (Phase I), with low doses of the program received by stakeholders, and moderate fidelity. Bottom up implementation strategies improved dose and club ownership during Phase II but resulted in high costs and lower fidelity and was associated with implementation staff retention and management issues. Phase III with more streamlined staffing and club integrated implementation resulted in high reach, dose, fidelity and club ownership and an associated reduction in implementation cost per participant. **Conclusion:** Formative evaluation succeeded in maximising the Ahead of the Game program engagement over three distinct phases. Results are salient for informing cost-effective implementation strategies for sports-based health promotion.

1. Introduction

Organised sports are one of the most popular and time-intensive forms of physical activity worldwide, with high participation rates in high income countries such as Denmark (> 80%), Sweden, Canada and Australia (> 60%) (Tremblay et al., 2016). In Australia, the average time spent by adolescents in organised sports is over 7 h each week (Vella, Cliff, Okely, Scully, & Morley, 2013). Established health benefits, a large participation base, and extended access to children and adolescents during sports participation make sports clubs ideal settings

for health promotion (Geidne, Quennerstedt, & Eriksson, 2013; Kokko, 2014; Kokko, Green, & Kannas, 2013).

The 'settings approach' to health promotion recognises the influence of context, where interdependent factors at numerous levels influence health behaviour (Geidne et al., 2013; Kokko et al., 2013). As recognition of socio-ecological approaches to health has increased, the settings approach has become a 'fundamental international foundation of health promotion' (Kokko et al., 2013) (p. 495). Specifically, the socio-ecological approach to health purports that there are multiple levels of influence on one's health and health behaviours, including

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intra-personal, proximal interpersonal, organisational, community, and policy levels (Sallis & Owen, 2015). Intervention at multiple levels of influence is assumed necessary to achieve meaningful behaviour change (Sallis & Owen, 2015). The settings-based approach to health promotion is an application of the ecological approach whereby the audience targeted for intervention, as well as the specific channels and policies proposed for behaviour change, are defined within a particular setting (such as a school, workplace, or sports club; Kokko, 2014). Socio-ecological approaches to examining health through sport participation (e.g., Eime, Young, Harvey, Charity, & Payne, 2013a; 2013b), as well as settings-based approaches to health promotion through sport (Geidne et al., 2013; Kokko, 2014; Kokko et al., 2013) have each conceptualised sports clubs as incorporating multiple levels of influence on one's health and health behaviours. The implication of socio-ecological based models within sport is that the implementation of sports-based health promotion initiatives is complex, with multiple levels of influence that operate with respect to a broad range of social, cultural, environmental, and economic determinants (Kokko, 2014; Kokko et al., 2013).

Prior research points to the quality and dose of program implementation being key to community engagement with and success of complex health promotion and prevention programs (Durlak & Dupre, 2008). Rigorous implementation protocols are critical within research studies, but even more critical in the successful adoption and translation of programs over time. The maintenance of health-promoting programs over time requires reproducible, sustainable and effective implementation strategies, which are dependent upon knowledge of the constructs that influence implementation success (Durlak & Dupre, 2008; Horodyska et al., 2015). Several large-scale reviews have summarised constructs which influence implementation success. For example, Damschroder et al. (2009) articulated the widely used Consolidated Framework for Implementation Research (CFIR). The CFIR is comprised of 37 distinct constructs over five major domains comprising characteristics of: the intervention (e.g., complexity, adaptability); the outer setting (e.g., patient needs); the inner setting (e.g., networks and communications); the individual (e.g., self-efficacy); and processes (e.g., planning, reflecting). Durlak and Dupre (2008) outlined 23 contextual factors that influence implementation over four distinct domains: community level factors (e.g., community resources/funding); provider characteristics (e.g., perceived need); characteristics of the program (e.g., compatibility); and, the prevention delivery system (e.g., communication, staffing). Finally, Horodyska et al. (2015) identified 17 good practice characteristics for implementation, divided among eight categories: participation processes; practitioner training; use/integration of existing resources; feasibility; maintenance/sustainability; partnerships; consistency/adaptation processes; and, transferability.

Many of the above characteristics overlap meaningfully with the model of sports clubs as a setting for health promotion (Kokko, 2014; Kokko et al., 2013). However, because these reviews are general in nature (Durlak & Dupre, 2008), focus on specific target contexts and settings such as the health system (Damschroder et al., 2009) and intervention types such as diet and physical activity (Horodyska et al., 2015), it is not known whether their findings generalise to community sporting clubs. Further, the sports club as a setting for health promotion may be unique for several reasons. Notably, the primary role of sports clubs is to facilitate participation in sport and not everybody involved in sports clubs view them as responsible for health promotion (e.g., coaches: Guagliano, Lonsdale, Rosenkranz, Kolt, & George, 2014; and parents: Hurley, Swann, Allen, & Vella, 2017). Second, community sporting clubs are generally run by volunteers who typically have no relevant training in health promotion and few resources at their disposal. Third, efforts to implement evidence-based health programs in community sports clubs are hampered by a limited understanding of the social, cultural, environmental, economic and organisational complexities in this context. The development and evaluation of implementation strategies within community sporting clubs is therefore an

important endeavour.

Finch and Donaldson (2009) have proposed a framework for the implementation of health promotion interventions within community sport. The RE-AIM sport settings matrix sets out all possible evaluation dimensions for intervention research in community sports settings. Based on the RE-AIM framework (reach, effectiveness, adoption, implementation, maintenance; Glasgow, Vogt, & Boles, 1999), the matrix specifies the various levels of intervention which may be relevant to intervention research. These include: national sporting organisations; state/provincial sporting organisations; regional associations or leagues; clubs; teams; and, participants. The resultant matrix sets out the various evaluation considerations relevant to community sports in a five (RE-AIM) by six (level of implementation) matrix. In their concluding remarks, Finch and Donaldson (2009) state:

Whilst it is important to continue to build a strong efficacy evidence base of the prevention measures or strategies we want to implement, it is also critical that researchers better understand implementation issues and develop appropriate strategies to implement and evaluate interventions in “real-world” settings ... During intervention planning, sports injury researchers need to begin to consider more than just the efficacy of the intervention. They should also ask questions about the implementation context, such as: what are actual behaviours? are attitudes and knowledge favourable? What would make people/communities more or less likely to adopt it? What setting/cultural delivery factors are also important? What infrastructure support is needed in the setting? (p. 977).

Formative evaluation is “a rigorous assessment process designed to identify potential and actual influences on the progress and effectiveness of implementation efforts” (Stetler et al., 2006; p. S1). The most basic purposes of formative evaluation are to maximise the effectiveness of implementation processes, and to provide contextual explanations for the success (or otherwise) of interventions. In this study we aimed to formatively evaluate the implementation process of a multi-component sports-based mental health program for adolescent males (Ahead of the Game; AOTG). We conducted the evaluation over three phases, including an initial pilot implementation (Phase I), implementation trial and development (Phase II), and full implementation phase (Phase III). During Phase I we collected preliminary data on contextual variables, including any local adaptations within sporting clubs, to optimise the intervention design and implementation model. We formatively evaluated full-scale implementation attempts in Phases II and III, which corresponded to two distinct sporting seasons (winter and summer). In the first (summer) sporting season, we trialled the full-scale implementation plan for the first time, and collected data on the dose, reach, fidelity, and cost of the intervention during Phase II. We used those data to modify the intervention content and implementation strategy for Phase III. In Phase III, we evaluated implementation effectiveness, and collected contextual information for interpreting intervention effectiveness, including its cost-effectiveness and potential mechanisms of change (Stetler et al., 2006). Comparing findings from Phases I, II and III informs better implementation strategies for future sports-based health promotion programs.

2. Methods and results

2.1. AOTG program development and content

As part of the exploration stage of implementation (Fixsen, Naoom, Blase, Friedman, & Wallace, 2005) we engaged in extended community consultation to assess readiness for change, community needs, judge the feasibility of different interventions to meet identified needs, and decide on an action plan and resources needed. We reported data from three key stakeholders: adolescent male sport participants (Swann et al., 2018), their parents (Brown, Deane, Vella, & Liddle, 2017; Hurley et al., 2017), and their coaches (Ferguson, Swann, Liddle, & Vella, 2018). We also ran a two-day workshop with two non-government

health program and service providers, five national sporting organisations, and local sporting representatives to assess the feasibility of implementation approaches and potential barriers at a policy, regional, and local level.

This formative stakeholder process in large part informed AOTG program content through highlighting that: [1] adolescent males desired more information about mental health problems, how to recognise them, and how to provide help to their friends prevent or manage a mental health problem (Swann et al., 2018); [2] parents of adolescent males were not adequately knowledgeable, prepared, or confident to assist children who experience a mental health problem (Hurley et al., 2017); [3] there was significant variation in the role that coaches believed that they should play in adolescent athlete mental health, with most coaches not willing to take an active role; they were more interested in content regarding adolescent motivation and wellbeing, as opposed to mental health (Ferguson et al., 2018). In line with our community-based participatory research approach to intervention development (Viswanathan et al., 2004), the research team worked with community members to define the research methods, including the format and content of all intervention components. Such actions are held to strengthen the sustainability of public health interventions. Based on these principles, the research team dictated the multi-level, multi-component nature of the AOTG program, with programs specified for adolescents, coaches, and parents. The content and format of specific intervention components was shaped by the community engagement and formative research process.

We subsequently developed four distinct intervention components and a supporting messaging campaign to meet stakeholder needs in a feasible and engaging manner. A detailed description has been reported elsewhere (Vella et al., 2018), and is summarised in Table 1. In brief, based on the socioecological model (Eime, Young, Harvey, Charity, & Payne, 2013b) and the settings-based approach to health promotion in sport (Kokko, 2014) AOTG was designed as a multi-component program targeting distinct levels of influence regarding adolescent mental health through sport. Community engagement and formative research in line with the guiding Community-Based Participatory Research framework (Viswanathan et al., 2004) were used to develop the content of the four intervention components. Two programs were developed for adolescent males. The first program, called Help Out a Mate, is a 45-min mental health literacy program delivered via a face-to-face workshop within the sports club. The second component, called Your Path to Success in Sport, was designed as an online program that aimed to equip adolescent sport participants with the psychosocial skills that they need to overcome adversities. This component incorporated six key modules based on the resilience in sport literature (Fletcher & Sarkar, 2012, 2013; Sarkar & Fletcher, 2014a, 2014b). Each module took 10–15 min to complete.

A parent mental health literacy program targeting adolescent mental health was also developed, and was delivered via a 60-min face-to-face workshop within the sports club.

A coach education program was developed based on self-determination theory (Ryan & Deci, 2000), with the aim to teach coaches strategies to support their players' basic psychological needs. In total, 11 modules were developed covering the satisfaction of players' autonomy (feeling self-directed and capable of making choices about one's actions), competence (feeling effective in one's interactions with the physical and social environment), and belongingness (feeling closely connected and cared for by others). The modules were delivered using a blended delivery model, including face-to-face workshops, online self-paced modules, and a combination of online or face-to-face mentoring. The face-to-face delivery and mentoring was designed to be facilitated by a registered sport psychology practitioner.

Finally, a club-based promotional campaign based on principles of social marketing (Stead, Hastings, & McDermott, 2007) was developed to reinforce the key messages of the AOTG program components. Materials included posters and banners for display at sports clubs, as well

as branded merchandise such as boot bags and drink bottles that are given to participating adolescents.

2.2. Evaluation methods

In line with Saunders, Evans, and Joshi (2005) we developed a process evaluation plan for formative purposes that included consideration of: dose delivered; dose received; reach; recruitment; fidelity; contextual influences; cost; and, resources required. We used data pertaining to each of these outcomes to monitor and document implementation success and to refine intervention strategies. Contextual factors affecting implementation were considered in accordance with the five broad domains of the CFIR, namely: intervention characteristics, outer setting, inner setting, individual characteristics, and the process of implementation (Damschroder et al., 2009). This information was captured during weekly meetings and during formal reflection workshops following each phase of implementation. Facilitators and barriers affecting each club were formally discussed and we noted where they fit within these five broad CFIR domains. This information arose from our process of consensus building during each iteration of the project.

2.3. Phase I: pilot implementation

Using an implementation model developed *a priori* based on the CFIR (Damschroder et al., 2009) and the National Implementation Research Network (NIRN; Fixsen et al., 2005) models, we piloted the implementation strategy in a small number of sporting clubs. We aimed to detect any unanticipated difficulties or barriers, understand the nature and implications of local adaptations, understand the enabling and limiting aspects of the contexts, assess resource and infrastructure requirements, and optimise intervention effectiveness.

2.3.1. Implementation model used

The implementation team included eight research team members and two club engagement officers (undergraduate students with > 10 years of participation in local sporting clubs). In line with the NIRN Framework (Fixsen et al., 2005), we mapped local sporting organisations and contacted clubs primarily via regional soccer and Australian rules football sporting associations.

We trained and then employed club engagement officers for approximately 10 h per week. Engagement officers made first contact with the sports clubs following expressions of interest via regional associations. Participating clubs were asked to appoint a voluntary 'club champion' to facilitate the program with the club engagement officer. The club engagement officer negotiated times for the programs to be delivered within the club and coordinated logistics with the club champion. Research team members attempted to deliver all aspects of the programs with support from undergraduate student volunteers.

2.3.2. Results

Although reach, dose delivered, and dose received were secondary considerations of the initial pilot implementation, they indicated the readiness, resources, and necessary competencies of the research team. The research team presented at three regional sports association meetings where 37 clubs were represented. Of the 37 possible clubs, 27 (73%) returned expressions of interest. One basketball club was approached independently and expressed their interest in participation. Eleven clubs participated, representing 40% of the clubs who expressed interest, and 30% of all potential clubs. Across the 11 participating clubs, 198 adolescents, 53 parents, and 13 coaches provided written informed consent for participation. Within these 11 clubs, adolescents from four clubs received some component of the intervention, representing 14% (28/198) of consenting adolescents. The parent intervention was presented in three clubs (n = 18 parents) and in two central locations (n = 26 parents), with a total participation rate of

Table 1
Summary of AOTG program content.

Intervention Component	Target Audience	Format	Aims	Key Components	Behaviour Change Techniques
Help Out a Mate	Adolescents	45 min face-to-face workshop presented around regularly scheduled training sessions	Increase: mental health literacy; skills and confidence to help a peer; help-seeking behaviours. Decrease: stigmatising attitudes.	Information on prevalence and symptoms of mental health problems Role modelling (by presenters) of help provision scenarios Role plays (by adolescents) of help provision scenarios Information on resilience-enhancing behaviours Applied behavioural examples via video Formal reflection Action planning	Education (e.g., symptoms of depression) Modelling (e.g., how to start a conversation about mental health) Training (e.g., role plays for help provision) Education (e.g., information of brainstorming solutions to problems) Training (e.g., practice brainstorming solutions to likely problems)
Your Path to Success in Sport	Adolescents	6 online modules of 10–15 min each. A 45 min face-to-face workshop was added in Phases II and III.	Increase resilience and adaptive implicit beliefs about overcoming setbacks.	Information on prevalence and symptoms of mental health problems Role modelling (by video) of help provision scenarios Social support via group discussion Overview of desirable coaching behaviours Examples of poor practice Examples of good practice Action planning (repeated for each module)	Education (e.g., symptoms of depression) Modelling (e.g., how to start a conversation about mental health) Enablement (e.g., facilitating social support networks of parents)
Parent Program	Parents and caregivers of adolescents	1 h face-to-face workshop	Increase: knowledge of common mental health disorders, health-promoting behaviours, help-seeking options; confidence in supporting adolescent mental health. Decrease: stigmatising attitudes.	Information on prevalence and symptoms of mental health problems Role modelling (by video) of help provision scenarios Social support via group discussion Overview of desirable coaching behaviours Examples of poor practice Examples of good practice Action planning (repeated for each module)	Education (e.g., symptoms of depression) Modelling (e.g., how to start a conversation about mental health) Enablement (e.g., facilitating social support networks of parents)
ABCs of Motivation	Coaches of adolescents	2 face-to-face workshops of 2 h duration; 11 online modules of 15 min each; 2 mentoring sessions of 1 h duration.	Increase adolescent: basic psychological need satisfaction; intrinsic motivation; engagement in sport. Decrease adolescent: burnout in sport; perceived coach controlling behaviour.	Information on help-seeking and help-provision Engaging graphics	Education (e.g., important coaching behaviours) Modelling (e.g., how to give feedback) Enablement (e.g., facilitating action plans for coaching behaviours)
Messaging campaign	Adolescents	Banners, posters, merchandise	Reinforce key mental health messages delivered throughout AOTG.	Information on help-seeking and help-provision Engaging graphics	Education (e.g., help seeking options) Persuasion (e.g., Use of imagery to motivate help provision and help seeking)

Note. Behaviour change techniques informed by Beard et al. (2019).

83% of all parents who provided consent (44/53). The coach intervention was undertaken by one club ($n = 2$ coaches), and the program was also offered at a central location where 11 coaches attended.

Of the 28 adolescent participants who received some component/s of the AOTG program, 18 adolescents over three clubs received only the face-to-face Help Out a Mate intervention, and 11 adolescents commenced the online resilience intervention with seven completing the online intervention. Forty-four parents received the face-to-face parent program (83%). All 13 consenting coaches attended the first workshop, but none completed the program as prescribed. No adolescent participant received more than one intervention component of the program. However, where programs were delivered, fidelity was high, largely because a research team member delivered or co-delivered the interventions (i.e. delivery by those who had developed the programs). In this phase, we regarded fidelity of intervention delivery to be high, owing to the following factors:

- i) The parent intervention was developed by the team and on all occasions delivered according to the team-approved manual by the same person. Each occasion of intervention delivery in this phase occurred with research team observers present.
- ii) The coach intervention was a pre-existing intervention, adapted to this context and delivered by the original developer, who was highly-experienced in presenting the workshop content. For the two programs that were delivered, research team observers were present.
- iii) The adolescent mental health literacy intervention manual was first approved by the team. Following this, the delivery team was trained by the intervention developer, who also co-delivered the intervention. We ensured fidelity to the intervention by requiring that all presenters: i) presented to each other, ii) practiced their delivery with the research team until it adhered to the intervention manual, and iii) co-presented with research team members until judged to be confident and skilled enough to co-present with each other.
- iv) The adolescent resilience component delivery was standardised during phase I owing to the online nature of the intervention. All program components had self-reported reflections and team observations regarding intervention delivery that were discussed at each weekly meeting to assess fidelity and note any changes from protocol.

In sum, while initial reach was high (73% of possible clubs expressing interest), there was significant difficulty in translating expressions of interest into program delivery. At every level of planning and delivery, difficulties were experienced in recruiting participants and arranging program delivery. The major barrier was resources. Specifically, the program was under-staffed given the high number of expressions of interest, and follow-up was too onerous for part-time club engagement officers.

Sports clubs also experienced numerous operational, infrastructure, and social difficulties. Reasons for poor engagement included scarce club resources available at the start of the season and poor communication channels. Availability of volunteers as well as administration and organisational resources was minimal – and non-optimal for introducing a new program. Further, we found that both top-down and peer-to-peer channels of communication were not strong, and most teams/potential participants were not aware of the program when first contact was made. Additionally, the influence of the club champions – appointed by the club – was typically limited to the personal networks of each club champion. We also encountered research-related barriers, including the time required to complete study questionnaires, especially among younger participants (aged 12–15 years).

Broadly, we perceived that the top-down approach was a major limitation of program implementation. In this approach, clubs usually signed up via a club leader (e.g. President) and neither the research team nor the clubs had the resources or practices to support the

implementation of the program as it was designed. Furthermore, the top-down approach did not allow us to take advantage of the strengths within participating clubs, such as existing coaching groups, popular social media accounts, skilled administrators (beyond the club champion), and people with significant influence within the club. Nevertheless, some contextual factors did facilitate implementation such as; use of regional sporting bodies to first approach sporting clubs, club champions with a wide network of influence and established relationships, and devoting significant time with coaches who acted as gatekeepers (for example, by allowing time for a club engagement officer to explain the program before a training session).

2.4. Changes made for Phase II

Learning from Phase I, we made significant changes to the implementation plan, along with some changes to the Your Path to Success program for Phase II. First, the pool of club engagement officers was expanded to 16 (up from two in Phase I). Second, in Phase II we sought to employ club engagement officers with existing relationships within the clubs and/or sports targeted for implementation. We also sought club engagement officers who could devote the time necessary to be immersed within their allocated clubs (e.g., attend all relevant training sessions and fixtures). This would enable them to build and cultivate relationships, trust, visibility, and increased knowledge about the AOTG program. We encouraged greater AOTG presence on the clubs' social media accounts, along with a plan to engage clubs through local media. Given the low uptake of the online resilience program ($n = 11$) a brief face-to-face workshop was added that provided an overview and rationale for the online program. The final major change was to promote a 'bottom-up' approach which allowed clubs the flexibility to choose which interventions they would like to disseminate, and how they would like to do so. It was hypothesised that this autonomy would allow clubs to engage their existing strengths, increase buy-in and support, and allow minor local adaptations that would support implementation.

At this point, a fidelity checklist was developed for application to the face-to-face components of the program. We defined fidelity in community interventions as an intervention being delivered as intended by the program developers and in line with the program model (Breitenstein et al., 2010). Fidelity focused on the following dimensions: adherence (conformation to protocol), content (all content aspects delivered), process (date, venue, time started, time finished, timing of each content section), dose, self-reported quality of delivery (overall), competence (self-ratings of organisation, engagement, clarity of delivery, perceived speed and awkwardness), facilitator-rated participant responsiveness (self-rated rapport with group). We also recorded qualitative data regarding: 1) participant attentiveness and engagement, 2) how well participants contributed to discussions, and 3) whether any issues or concerns arose in each session. Recording data on the form involved a combination of self-report from the facilitator of each face-to-face component and when resources allowed, independent observer (in vivo). Fidelity checklists were used until the team was assured that intervention delivery was proceeding according to the approved manual.

2.4.1. Phase II: implementation trial and development

The purpose of the process evaluation in Phase II was to enable and promote continuous improvement of program implementation. In this phase, we aimed to work with sports clubs to improve implementation protocols, learn from mistakes, and facilitate greater program ownership. We also aimed to examine the implementation model, the extent to which it succeeded, and monitor the associated ongoing resource and infrastructure needs when rolled out on a wide scale.

2.4.2. Implementation model used

In Phase II, each club engagement officer was assigned

approximately five local sports clubs, depending on their availability and existing networks. Club engagement officers were expected to be available regularly on weekday afternoons, with a less structured time commitment to the project on weekends.

Engagement officers were trained over two days, including 6 h of workshops that covered: program history; content; implementation model; a series of Frequently Asked Questions; ethical obligations; and, procedural/administrative requirements. A training manual was also provided to all club engagement officers.

When a club agreed to participate, the club engagement officer sought to negotiate times for the programs to be delivered. They approached clubs and potential participants, coordinated logistics, and ensured all infrastructure and resource needs were met. A key difference from Phase I was the availability of extra resources (time and supervision) to support the club engagement officers' work. Further, volunteers were recruited to deliver the Help Out a Mate intervention (this was not a duty of the club engagement officers).

During Phase II, we convened weekly research team meetings to discuss arising factors important to enabling sustained program implementation, to increase ownership of the program among clubs over time, and provide feedback loops to identify barriers and develop solutions quickly.

2.4.3. Results

Fifteen of 44 (34%) eligible clubs signed up to participate in Phase II. One hundred and sixty-seven adolescents participated in the program over the 15 clubs, at a rate of ~37% of total potential participants in the clubs. Another 64 parents and 11 coaches also participated. Every club received the programs that they requested. Two clubs chose all four AOTG programs, four clubs opted for all programs except for the coach program, and another four clubs chose all programs except for the parent program. Where a club had multiple eligible teams, adolescent programs were run multiple times in one club. Of the 167 adolescent participants, 123 (73.7%) attended a Help Out a Mate program, 150 (89.8%) attended a Your Path to Success in Sport workshop, and 109 (65.2%) attended both. Only 25 participants (15%) registered for the online components of the resilience program, and only 6 of these (3.6% of total participants) completed all six modules. Of the 11 coaches who started the training program, four completed. On average, coaches completed 6.36 of the 11 online modules.

Greater resources were expended in this phase. On average, club engagement officers spent 4.8 h per participant. As a result, the program dose delivered, dose received, and fidelity were all reasonably high, but the cost of ~AUD\$200 per participant was high, and the majority of clubs (13/15) elected to receive less than the full program. Club engagement officers also raised concerns about club preferences conflicting with program requirements, such as including others from outside the club (e.g., local schools), and the lack of provision of programs to females. Lastly, some coaches acted as gatekeepers and withheld access to the program for their team despite interest expressed by parents and adolescents.

We identified numerous implementation barriers during Phase II. First, attitudinal barriers were prevalent, such as stigma around mental health, and low perceived importance and/or disinterest in the program on behalf of key gatekeepers such as coaches. Second, internal resource factors within clubs also acted as barriers. These included: (1) volunteers that run the club perceiving themselves to be 'at capacity'; (2) poor flow of communication from club to coach to potential participants, and (3) lack of available infrastructure (e.g., club house); to run the programs. There were also barriers related to the research process, including lack of timely access to participants to provide study information, complete consent processes, and administer questionnaires. We had difficulty managing the club recruitment process via a large pool of club engagement officers who differed in their approach and expertise in recruiting clubs. Further, we encountered barriers with the availability of the club engagement officers to undertake required tasks.

For example, the position included only part-time afternoon and evening work, and as a consequence, 10 of the 16 club engagement officers left their position during the sporting season to pursue full-time employment elsewhere.

Facilitators of successful program implementation included the involvement of a well-connected club champion able to influence all teams within the club. Further, if the club champion could facilitate contact with other key club personnel that process led to a much greater dose delivered and dose received. The community identity of local sporting clubs was also perceived as a facilitator as it meant that the collective group of people responsible for running the club were open to programs perceived to be of benefit to their members and also perceived the club as having a duty to contribute positively to the community. Finally, addressing lessons of Phase I, the bottom-up process facilitated increased ownership and optimised existing club strengths, resources, and infrastructure for implementation.

2.5. Changes made for Phase III

Several major changes were made to the implementation strategy and the program content following Phase II. For the online resilience program, changes were made to address the low numbers of adolescents who registered, and subsequently completed online tasks. The face-to-face workshop content was tailored so that participants gained access to the website/app and completed Module 1 online in the group setting, when possible. Following coach feedback, a shortened version of the coach program was also developed. This program represented a streamlined version of the full program whereby content was delivered in half the number of workshops/online modules.

Given the difficulties associated with the large implementation team, low retention of club engagement officers and tensions arising with the bottom-up process, we made several further implementation changes. A smaller number of club engagement officers were employed on a full-time basis. Club engagement officers were also required to be largely responsible for delivering the programs within their designated clubs where previously the research team had delivered most of the programs. To reduce the high (and unsustainable) number of hours that club engagement officers spent in each club, we removed the requirement for them to be immersed within the clubs. To compensate for this reduced contact, in selecting the designated club champion we required a person of influence within the club (such as a President or Secretary) to enable a stronger influence, easier relationship building, and greater trust. These changes attempted to combine the benefits of both top-down and bottom up facilitators by streamlining and better integrating program implementation and ownership across stakeholders.

2.5.1. Phase III: final implementation model

Phase III represented full implementation, the primary aim of which was to roll out an effective, well-integrated suite of programs. The process evaluation aimed to ensure that program components were integrated into the organisation and functioning effectively. We aimed to assess (and continually increase) the effectiveness of organisational supports, efficiency of building staff competency, and monitor systems alignment. Increasing uptake of program components was a priority and we aimed to monitor and maximise implementation fidelity, dose, and reach.

2.5.2. Implementation model used

The implementation model was pared back to include only two full-time club engagement officers (mean = 30 h per week), with more responsibility for implementation assigned to the club hierarchy. Club engagement officers worked with club representatives to undertake and share the major duties previously assigned only to the club engagement officers. These included: approaching potential participants, explaining the program, coordinating logistics, and ensuring all infrastructure and resource needs were met. Club engagement officers also presented

program components with assistance from volunteers and research team members. This reflected a deliberate concentration of duties to a smaller, better trained and knowledgeable implementation team.

2.5.3. Results

In the third phase of implementation 283 adolescents and 181 parents were recruited from 8 clubs, while 8 coaches participated from 3 clubs. Both adolescent programs were run in seven of the eight participating clubs, while one club chose to only receive the Help Out a Mate program. In total, 271 adolescents participated in the Help Out a Mate program (95.7%), 251 (88.7%) participated in the Your Path to Success program, and 239 (84.5%) participated in both programs. The majority of Your Path to Success workshop attendees (77%) logged in to the online program, and 47% of those who logged in completed all six modules. Alongside significantly improving the dose delivered and received, the engagement team in Phase III spent only 0.67 h per participant delivering programs, compared to 4.8 h in Phase II. Overall, Phase III represented high fidelity, with the greatest dose, and reach; and with the lowest resource cost per participant. The combined delivery model whereby delivery was shared by club engagement officers, research team members, and volunteers didn't detract from our perceptions or recordings of the fidelity of program delivery in terms of content delivered, participant attentiveness and engagement, or participant responsiveness to discussions. Phase III's more streamlined and better integrated implementation enabled improved club engagement which improved the dose delivered and reduced resource needs and costs, and, hence, unequivocally represents our most scalable implementation model.

The major barriers faced during Phase III were isolated to the research components of the study, such as the time and resources associated with informed consent of all participants, and the difficulty and length of participant surveys. These barriers were particularly evident for younger participants (12–15 years), for whom informed parental consent was an additional requirement, and who had some difficulties in completing the questionnaire in timeframes that coaches were willing to allocate. Importantly, attitudinal barriers and challenges of managing a large implementation team were avoided in Phase III full implementation.

Facilitators of successful implementation in this phase included: the ability and experience of the implementation team to maximise usage of organisational supports; core implementation team members with a depth of knowledge and experience; and, an implementation model that allowed the implementation team to align information and communication requirements with the systems already in place within clubs. A combined top down and bottom up implementation model that allows competent staff to work with the most influential people in the clubs as well as tapping into a club's existing strengths and systems, was the culmination of lessons learned over previous implementation phases.

3. Discussion

In this study we aimed to formatively evaluate the implementation process of a multi-component sports-based mental health program for adolescent males. We have described the three phases of implementation models developed, the barriers and facilitators experienced, lessons learnt, and changes made to improve program fidelity, dose delivered, dose received, resource use and costs. During three distinct implementation phases, we made large and meaningful changes to the implementation team and the implementation model, learning lessons across both those which succeeded and those that did not. The culmination of lessons over the three implementation phases are important in considering future implementation and sustainability of the AOTG program beyond the study setting and timeframe.

The most successful implementation model (Phase III) combined numerous and interdependent elements. These included full time employment of a small group of experienced implementation team

members with knowledge of the organisational systems and competencies of local sporting clubs. It also included an implementation model which allowed those staff to adapt the program processes to utilise organisational strengths and systems, but maintain delivery and content fidelity and dose.

For public health initiatives in complex community settings such as sporting clubs to be effective and cost effective they need community ownership to enable successful implementation and positive network effects (Hawe, Shiell, & Riley, 2009). In this study, we found most value in engaging opinion leaders, formally appointed internal implementation leaders, and champions to enable optimal sport club community engagement, ownership and network benefits. For example, when we appointed only champions in Phases I and II, the network of influence of those champions was limited and the dose delivered was reduced because they typically held great influence over only one (or a few) teams, but had limited/no influence over other club teams. As such, both opinion leaders and formally appointed internal implementation leaders are key to optimising ownership, fidelity and dose implemented within sports clubs. Where both these roles were enacted by the same person within a club this was advantageous.

We found much benefit was derived for implementation from lessons learnt in the process of reflection and evaluation. According to the CFIR model, reflection and evaluation is constituted by qualitative and quantitative evidence regarding the progress and success of the implementation model and its execution (Damschroder et al., 2009). Our study data and evaluation support the importance of weekly team meetings and ongoing debriefing in both formal and informal contexts regarding the process and experience of implementation.

The constructs which our evaluation shows to be most important for successful implementation of a health program within sporting clubs are the characteristics of the inner setting (Damschroder et al., 2009). The inner setting, in this case, refers most notably to the structural characteristics of the club, its existing networks and communications, and its readiness for implementation. The inner setting of clubs heavily influenced both fidelity and dose. Further, the ability of the implementation team to maximise those characteristics was also shown to leverage resource use and minimise cost of implementation. Additionally, the social architecture of the club is important. Specifically, clubs with strong social networks lend themselves more readily to successful implementation, as do clubs where the leadership are afforded trust, respect and influence. Allowing the implementation team the flexibility to tap into the existing networks and communications of the clubs was important, and clubs with strong networks and communication systems reduced both the research and implementation related barriers. Finally, the readiness of the club for implementation in terms of leadership engagement and available resources were critical to implementation success. Leadership engagement, advocacy, and influence increased the dose delivered and dose received, while the availability of resources such as club administrators also increased dose and reach, and reduced implementation costs.

A meta-analysis has shown that both fidelity and adaptation can facilitate positive outcomes for health promotion programs (Durlak & Dupre, 2008). Furthermore, fidelity and adaptation, rather than being antithetical, can frequently co-occur. This has been the case with the AOTG program. Our data demonstrate that a solid understanding of the core components of programs that are related to positive outcomes is necessary, as well as an understanding which program features are amenable to change. Where local adaptation can occur in consultation with the implementing organisation, fidelity can be maximised. Given that some level of local adaptation may be inevitable (Durlak & Dupre, 2008), the research team may be best served by working with administering organisations (such as sporting clubs) to take advantage of their implementation and organisational strengths and in maximising ownership of health promotion strategies.

Given the heavy influence of implementation success on program effectiveness, ideally programs should be evaluated only after sufficient

time has been allocated to its effective implementation (Durlak & Dupre, 2008). While estimates of sufficient time allocations vary from one to three years (Fixsen et al., 2005), implementation improves from year to year (Durlak & Dupre, 2008). This has been the case with the AOTG program, where evaluation of program effectiveness in Phases I or II would not do justice to the true impact of the program. While decisions regarding readiness for evaluation should be made case-by-case, the monitoring of implementation processes can help to inform readiness for evaluation.

We have not included effectiveness data for the intervention components in this formative evaluation as it was not the primary purpose of this paper. Effectiveness data will shed more light on the success or otherwise of changes made to the implementation plan and effectiveness is one key component in evaluating implementation of research on a wide scale (Glasgow et al., 1999). The AOTG program was not offered to clubs independent of a research study. The constructs which we have pinpointed as being critical to implementation success, therefore, may differ when programs are offered on a larger scale. It could also be that there was a significant self-selection bias where the sports clubs that signed up to the AOTG program were those clubs interested in and most capable of disseminating a health promotion intervention. The constructs which underpin the successful implementation of programs within clubs who are not self-selected may vary.

4. Conclusions

Several key factors support the successful and cost-effective implementation of a health promotion program within organised sporting clubs. Within the organised sports clubs that participated in the AOTG program, the most important characteristics for successful implementation were those related to the inner setting, namely the structural characteristics, networks and communications, and readiness for implementation of the clubs themselves. Given that implementation of health promotion programs within sporting clubs can meaningfully improve over time, formative evaluation of the implementation processes is critical in determining when the intervention is ready for formal evaluation, dissemination, and translation.

Declaration of interest

None.

Trial registration

Australian New Zealand Clinical Trials Registry
ACTRN12617000709347. Date registered 17 May 2017.
Retrospectively registered.

Ethics approval

This study has been approved by the University of Wollongong Human Research Ethics Committee (HE15/243). All participants provided written informed consent to participate. Participants aged 15 years and under also received written informed consent from their parent or caregiver.

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