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# An Intervention for Mental Health Literacy and Resilience in Organized Sports

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**ABSTRACT**

VELLA, S. A, C. SWANN, M. BATTERHAM, K. M. BOYDELL, S. ECKERMANN, H. FERGUSON, A. FOGARTY, D. HURLEY, S. K. LIDDLE, C. LONSDALE, A. MILLER, M. NOETEL, A. D. OKELY, T. SANDERS, M. J. SCHWEICKLE, J. TELENTA, and F. P. DEANE. An Intervention for Mental Health Literacy and Resilience in Organized Sports. *Med. Sci. Sports Exerc.*, Vol. 53, No. 1, pp. 139–149, 2021. **Purpose:** In this study, we tested the effectiveness of a multicomponent sports-based program aimed at promoting early intervention, help seeking, and resilience among a sample of adolescent male sport participants. **Methods:** The Ahead of the Game program comprised four intervention components and a messaging campaign. Two components targeted mental health literacy, intentions to seek and provide help, and resilience among adolescent boys. A mental health literacy program for parents and a coach education program to assist in the support of athletes' psychological needs were also included. We evaluated the program using a nonrandomized controlled trial matching two regional communities. In total, 350 sport participants (mean, 14.53 yr) were included in an intervention group, whereas 466 (mean, 14.66 yr) received usual practice in a matched control community. One hundred and eighty parents or caregivers and eight coaches also participated in the intervention components. Between-group mean differences on the primary and secondary outcomes were analyzed using linear mixed models, adjusted for clustering at club level, participant age, and socioeconomic status. **Results:** Significant positive group–time interactions were found for the primary outcomes of depression and anxiety literacy, intentions to seek help from formal sources, confidence to seek mental health information, and resilience. We also found a significant positive group–time interaction for the secondary outcome of well-being. There were no group–time interactions for social distance (stigma), intentions to seek help from informal sources, implicit beliefs about adversity, perceived familial support, or psychological distress. **Conclusions:** Given the high rates of sport participation worldwide and the increasing focus on mental health in this domain, translation and dissemination of the program may be warranted after replication. **Key Words:** HELP SEEKING, MENTAL HEALTH LITERACY, RESILIENCE, WELL-BEING

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Mental health problems are one of the greatest contributors to the global burden of disease among young people (1). Half of all mental health problems have their onset before the age of 14 yr (2), and the personal and social costs of such problems can last decades. The lifetime prevalence of any mental illness is approximately 22% among US adolescents, with the median age of onset for mood disorders approximately 13 yr (3). Young men may be at particular risk of suffering the personal and social costs of early onset mental health problems. For example, adherence to traditionally masculine norms has a negative effect on help seeking, contributing to treatment delays (4). As such, there is a need to support gender-sensitive evidence-based policies and programs aimed at promoting young men's health (5).

Outside of school, the most time-consuming organized activity for young men is organized sports. Participation in organized sports during childhood and adolescence is over 40% in most countries worldwide, with participation much higher in high-income countries (6). In Australia, 75% of all children and adolescents participate in organized sports in any given year (7). Furthermore, adolescent boys spend, on average, more than 8 $h \cdot wk^{-1}$ in organized sports (8). Recent policy recommendations regarding young men's mental health care has highlighted organized sport as a priority area to engage young men who do not follow traditional help-seeking pathways, which may improve early intervention efforts and prevention (9). As such, sports settings are seen as the vehicle through which programming can be delivered to facilitate engagement with traditional forms of mental health care. However, a review of applied sports-based mental health programming shows that it is rarely evidence based and has few data to support efficacy (10). A systematic review of research shows that studies in this area have typically been of low quality (11).

Organized sports, especially among young people, have the potential to be an engaging vehicle for interventions targeting mental health literacy (11) and resilience (12). Mental health literacy refers to one's knowledge and beliefs about mental health that influence the recognition, management, and prevention of mental health disorders (13). Mental health literacy includes knowledge of preventative strategies regarding mental health disorders, the ability to recognize warning signs, knowledge of help-seeking options, and skills to support others who are developing a mental health disorder (13). Mental health literacy is generally poor among adolescent boys and is a barrier to help seeking for mental health problems (14). Poor mental health literacy as indicated by poor symptom recognition and high levels of stigma may also be a barrier to seeking help among athletes (15), and could be an important component of sports programs going forward (16). In sport, psychological resilience is defined as the mental processes (e.g., problem solving) and behaviors (e.g., accessing social support), which promote personal assets and protect an individual from the potential negative effect of stressors (17). For example, psychological resilience can provide a buffer to the onset of mental health problems after common stressors such as injuries among young athletes (18). Indeed a combination of psychological resilience and mental health literacy may be key to facilitating the most optimal mental health outcomes among young athletes when they face significant stressors (18). Both constructs lend themselves to intervention; however, studies in this area have been of low quality, and more robust interventions, using stronger research designs, are needed to inform policy and guide principles of best practice in mental health care in organized sports (11).

One way of increasing the quality of interventions is to intervene at multiple levels within a single setting. Such approaches are based on the socioecological approach to health promotion (19). Models of sports-based health promotion advocate for multilevel interventions because of the multiple, interdependent levels of influence that operate on one's health behaviors within the sport setting, including intrapersonal and interpersonal levels of influence, as well as influence from sports club administrators and the sports club setting itself (20,21). Interventions that have demonstrable efficacy and that may be considered best practice in sports-based mental health promotion have been multilevel in nature (e.g., intervening with athletes, coaches, parents [22]). Such interventions offer an evidence- and theory-based approach to mental health promotion in the organized sports setting.

The purpose of this study was to test the effectiveness of a sports-based program designed to promote early mental health intervention and help seeking for existing and developing mental health disorders, as well as psychological resilience among adolescent male sport participants (Ahead of the Game; AOTG). Using a community-based and community-matched, nonrandomized controlled design, adolescent male sports participants drawn from participating community sporting clubs were offered a multicomponent (e.g., mental health literacy, resilience), multilevel (e.g., programs for adolescents, coaches, and parents) program through their sport club. In this article, we report the results pertaining to athlete-level data, whereas coach and parent data are reported elsewhere. We hypothesized that, compared with adolescents from sports clubs in a control community, adolescents who participated in the intervention would show increases in the primary outcomes of mental health literacy, intentions to seek and provide help, resilience, and a decrease in stigmatizing attitudes (23). We also hypothesized increases among athletes in the intervention group for the secondary outcomes of perceived familial support and implicit beliefs regarding one's ability to deal with problems when compared with athletes in the control group.

## METHODS

### Study Design

The Community-Based Participatory Research (CBPR) framework (24) served as the conceptual framework for the development and evaluation of the AOTG intervention. CBPR is a collaborative approach to research that equitably involves all partners in the research process and recognizes the unique strengths that each brings. Our community engagement in the design and development of the AOTG program has been reported elsewhere (25–27). In line with the CBPR framework,

the multilevel, multicomponent AOTG program was tested at a community level. We purposively selected the intervention community in Eastern Australia based on the presence of urban and rural settings, club accessibility, and the proximity to the institution responsible for implementing the program. We chose a matched control community (another urban and regional area in Eastern Australia) based on its similarity to the intervention community in terms of location, size, socioeconomic status, and number of sporting clubs. In reporting this study, we have followed the Template for Intervention Description and Replication checklist (28) and, where applicable, the Consolidated Standards of Reporting Trials statement (29).

### Participants

Adolescent boys age 12–17 yr who participated in community-based nonelite organized sports clubs were recruited to an intervention group or community-matched control group. Parents/caregivers and coaches of adolescent participants were also recruited to the intervention group. All sports and clubs were eligible; however, the study was conducted during winter 2017 when the primary participatory sports in Australia for adolescent boys are soccer, Australian Rules football, rugby league, and basketball. Other sports operating during this time include swimming and rugby union. Eligible teams included those competing in the "under 13" through to "under 18" age groups.

### Procedure

The study protocol was registered in the Australian New Zealand Clinical Trials Registry (ACTRN12617000709347). Ethics approval was obtained from the Institutional Human Research Ethics Committee. All adolescent participants were recruited through participating sports clubs. Clubs were notified about the program before the start of the sporting season and invited to participate (via e-mail or letter directed to the club administrator) by the research team. Clubs were offered presentations about the program on an as-needed basis. Individual adolescent participants were contacted through their team and/or through club generated notices via e-mail or social media. Written informed consent was obtained from all participants, and parental consent was obtained for all participants 15 yr and younger. Subsequently, parents/caregivers and coaches of those adolescent participants were also invited to participate in the study. After the consent process, baseline measures were completed, and the first intervention component was scheduled. The questionnaire consisted of 135 items and took approximately 30 min to complete. Measures were completed using paper and pencil at the training ground or clubhouse of participating teams (intervention group), or at home and returned in a sealed envelope (control group). Follow-up measures were taken 1 month after completion of the program components (and approximately 6–8 wk after baseline measures) in the same way and location as the baseline measures. Data were collected at the sport club's training ground or at the local university campus. Participants were recruited between February and July 2017, and workshops were delivered between May and August 2017. We completed participant recruitment and workshop delivery in order to complete the study before end of the winter sporting season in Australia (September 2017). Strategies to improve all workshops and data collection processes, and to maximize fidelity of delivery and dose delivered are reported in detail elsewhere (30).

### AOTG Program (Intervention)

The overall program and each intervention component are described in detail within the study protocol (23). Adolescents were invited to take part in a brief team-based, face-to-face mental health literacy workshop named "Help Out a Mate." The Help Out a Mate workshop was usually delivered after a routine scheduled practice and took approximately 45 min. This component focused on helping adolescents to recognize the signs of depression and anxiety, encourage help seeking and help provision, make an adult aware of potential mental health problems, and understand self-help behaviors. In addition, this component addressed the issue of how to ask for help if an adolescent felt that he needed it. Additional resources provided to adolescents included a business card that listed key steps on how to help a friend and provided a list of local mental health resources (based on concept testing from focus groups, we called this a "Man Card" for the purposes of the intervention to counteract the stigma young men feel when talking about mental health). All workshops were delivered by a member of the research team and a volunteer who was accredited with basic mental health training and received training to deliver the Help Out a Mate workshop. Workshops were delivered at the club's training ground or the local university campus.

Adolescents were also invited to take part in an Internet-supported resilience intervention named "Your Path to Success in Sport." The intervention targeted key psychological skills identified in sport-based resilience literature (e.g., Ref. [31]) and aimed to help adolescent boys cope with adversity through explicit sport-based examples. This component was delivered via a brief, team-based, face-to-face workshop (approximately 45 min) supported by six Internet-based (website/mobile application) modules lasting approximately 15 min each. The workshop was framed around expectations versus reality in the process of achieving one's goals (i.e., the "path to success") to identify inevitable adversities that adolescents are likely to face in and outside of sport. The workshop also allowed participants to sign up to the Internet-based modules and to complete the first module within the session, to enhance subsequent uptake and engagement. All workshops were delivered by a member of the research team or a registered sport psychology practitioner employed as a research assistant. The Internet-based modules addressed (i) problem solving, (ii) controlling the controllables, (iii) managing your thoughts, (iv) keeping your cool, (v) playing to your strengths, and (vi) appreciating your team. An additional recap module was also available to participants who completed all six preceding modules. Workshops were again delivered at the club's training ground or on the local university campus.

The parent component was designed to increase parent mental health literacy regarding adolescent mental health via a 1-h, face-to-face workshop. Specifically, the workshop aimed to raise parents' awareness of their role in promoting and supporting positive adolescent mental health, and to increase knowledge of common adolescent mental health disorders, positive mental health–promoting behaviors, and help-seeking options. This workshop also aimed to reduce stigma, promote constructive communication about mental health, and increase parental confidence to support adolescent mental health. The parent component was delivered at a club level rather than a team level (i.e., parents from multiple teams in each club attended the same session). All workshops were delivered by a member of the research team at the local university campus or at the sports club where facilities allowed.

Based on Keyes' Mental Health Continuum (MHC) model (32), the purpose of the coach education component was to facilitate higher levels of well-being among athlete participants by complimenting the focus on prevention and resilience regarding mental health problems in the other components. The coach education component was based on self-determination theory principles with content drawn largely from an intervention shown previously to decrease player burnout across a season (33). Self-determined motivation among young athletes has been shown to be negatively associated with levels of psychological distress and indicators of mental health problems, and positively associated with well-being and mental health (34–37). The coach intervention was designed to give coaches strategies to support their players' basic psychological needs, including 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 relatedness (feeling closely connected and cared for by others). This component used a blended delivery model, including two face-to-face workshops and two mentoring sessions delivered by a registered sport psychology practitioner, plus 11 self-paced online modules. All workshops were delivered on the local university campus in rooms fitted with a projector.

Lastly, the supplementary messaging campaign was based on a "Man Card" concept (e.g., "You wont't lose your Man Card for getting help"). The concept used a combination of humor, credible and relatable images, and relevant and positive mental health messages. Materials included posters and banners that were placed in visible areas around each club, as well as branded merchandise for adolescents and a campaign-specific website.

## Control Group

Participating clubs in the control group received usual practice (i.e., their standard sport programming without any intervention from the research team). All clubs were offered a mental health literacy program upon completion of the study. Data were provided by adolescents within each club, as well as their parents/caregivers and coaches. Only adolescent data are reported here.

## Outcome Measures

**Depression and anxiety literacy.** Thirteen items of the Depression Literacy Questionnaire (38) relevant to the AOTG program were used to measure depression literacy. Similarly, 13 items from the Anxiety Literacy Questionnaire were used to measure anxiety literacy (39). For both questionnaires, each item presents a statement about depression and respondents are asked to choose one from one of three options for each statement (true, false, or I don't know). Correct answers are scored with one point, whereas incorrect answers and responses of 'I don't know' are scored with a zero. The total score for each scale represents that total number of correct answers with a maximum score of 13. Example items include "Sleeping too much or too little may be a sign of depression" and "People with anxiety disorder often hear voices that are not there." Both the Depression Literacy Questionnaire ($\alpha = 0.78$) (38) and the Anxiety Literacy Questionnaire ($\alpha = 0.76$) (39) have acceptable internal consistency.

**Resilience.** The 10-item version of the Connor–Davison Resilience Scale (40) was used to measure resilience. Respondents are asked to indicate how much they agree with a set of statements as they apply to them over the last month. All items are rated on a Likert scale from 1 (not true at all) to 5 (true nearly all of the time). A total score is computed by summing the score on each item. An example item is "I am not easily discouraged by failure." The scale has good internal consistency ($\alpha = 0.85$) (40). Baseline internal consistency in the current study was excellent ($\alpha = 0.88$).

**Confidence to seek help.** A single item drawn from the Mental Health Literacy Scale (41)—"I am confident that I know where to seek information about mental illness"—was used to measure confidence to seek information regarding mental illness. The item is scored on a Likert scale from 1 (strongly disagree) to 5 (strongly agree).

**Help-seeking intentions.** The General Help Seeking Questionnaire (GHSQ) (42) is a flexible measure developed to assess help seeking intentions across a variety of contexts. The GHSQ was adapted for the sport context (i.e., by adding coach as an item) and used to measure intentions to seek help from formal and informal sources. Eleven items were used to assess intentions to seek help from formal (e.g., doctor) and informal sources (e.g., friend, parent, coach). Each item asks "If you were having a personal or emotional problem, how likely is it that you would seek help from the following people?" and is scored on a Likert scale from 1 (extremely unlikely) to 7 (extremely likely), with a "not applicable" option also available. Mean scores were calculated separately for formal and informal sources. Among adolescents, the GHSQ has adequate internal consistency ($\alpha = 0.70$) (42). In the current study, the internal consistency of the GHSQ at baseline among all participants was good ($\alpha = 0.83$).

**Stigmatizing attitudes.** The youth version of the Social Distance Scale (43) was used to measure stigmatizing attitudes, adapted for the current study. Five items were used to measure the respondents' self-reported willingness to have

contact with a person with mental illness. Items were rated on a Likert scale from 1 (definitely unwilling) to 5 (definitely willing). An example item is "How willing would you be to work on a project with someone with a mental illness?" Internal consistency of the Social Distance Scale at baseline among all participants in the current study was excellent ($\alpha = 0.91$).

**Implicit beliefs.** Implicit beliefs regarding one's ability to deal with problems were measured using three items adapted from previous research (44). The items include the following: "You have a certain way of dealing with problems and you really can't do much to change it," "You have very little control over the way that you deal with problems," and "Some people are just naturally better at dealing with problems than others." All items were scored on a Likert scale from 1 (strongly disagree) to 5 (strongly agree). Mean item score was calculated, with lower scores indicating more adaptive beliefs. Internal consistency of the three items at baseline and among all participants was low ($\alpha = 0.47$).

**Perceived familial support.** Perceived familial social support was measured using the four items of the parental support subscale of Multidimensional Scale of Perceived Social Support (45). An example item is as follows: "I get the emotional help and support I need from my family." All items were scored on a 7-point Likert scale from 1 (very strongly disagree) to 7 (very strongly agree). Mean item scores were calculated from all four items. Internal consistency for the four items among all participants at baseline was excellent ($\alpha = 0.91$).

**Psychological distress.** Psychological distress was measured using the Kessler-6 (K6) scale (46). The K6 is six-item screening tool that assesses the level of depressive and anxiety symptoms experienced within the past month. The K6 is scored on a 5-point Likert scale from 0 (none of the time) to 4 (all of the time). All items contain the stem "During the past 30 days, about how often did you feel." An example item is "hopeless?" The K6 has good internal reliability among a sample of adolescents ($\alpha = 0.84$) and among adolescent boys ($\alpha = 0.83$) (46). Internal consistency at baseline in this study was adequate ($\alpha = 0.74$).

**Well-being.** Well-being was measured using the 14-item version of Keyes' MHC adapted for adolescents (47). The MHC is a measure of an individual's emotional, psychological, and social well-being. The short form of the MHC has shown excellent internal consistency ($\alpha > 0.80$) and discriminant validity in nationally representative samples of adolescents (47). All items were summed to compute a total score. Internal consistency among all participants at baseline in this study was excellent ($\alpha = 0.92$).

**Covariates.** Neighborhood level socioeconomic position was determined according to the Socio-Economic Indexes for Areas Index of Relative Socio-Economic Disadvantage (48) using participants' home postcodes. Participants self-reported their age, indigenous status, and language spoken at home.

### Required Sample Size

Rather than power on outcomes, which were specific only to some program components (e.g., mental health literacy or resilience), we calculated the required sample size using the general indicator of psychological distress (K6). Based on pilot testing using two independent samples with a between-group difference of 1.2 (SD, 4.0), adjusting for clustering using a design effect of 1.35, we required 231 participants in each group (with an α of 0.05 and 80% power).

### Statistical Analyses

Independent-samples *t*-tests were used to examine baseline differences between the intervention and control groups, as well as differences between participants who completed the program per protocol and those who did not. Between-group mean differences on the primary and secondary outcomes were analyzed using linear mixed models in SPSS Version 25.0. Group (intervention vs control), time (baseline and 1-month follow-up), and the group–time interaction were included as fixed factors in the model. Participant age and socioeconomic status were entered as covariates. All models adjusted for clustering at the team and club levels. The linear mixed model uses all available data, and therefore, cases with missing values are included in the analysis. This model uses restricted maximum likelihood for parameter estimation from all available cases regardless of whether or not they contain missing data. Effectiveness of the AOTG program in increasing all primary and secondary outcomes was established via a change from baseline to postintervention in the intervention group relative to the control group, reflected in the group–time interaction at the $P < 0.05$ level.

All participants were included in intention-to-treat analyses. We also conducted an exploratory per-protocol analysis in which we compared only those in the intervention group who had completed the program per protocol with all participants in the control group. For this analysis, we defined per protocol as attendance at the Help Out a Mate workshop, attendance at the Your Path to Success in Sport workshop, completion of the six online modules, and having at least one parent who attended the parent program. Given the low number of coaches completing the program, we did not include a per-protocol criterion for this component in the per-protocol analysis.

**Changes from trial registration.** Based on piloting and formative evaluation, some changes to the method reported in the trial registration were made. First, because of lack of uptake, the coach program was shortened from an 11-module program (delivered over 3 months) to a 6-module program (delivered in up to 4 wk). In line with this, the follow-up period was also shortened from 12 wk from baseline to 6–8 wk from baseline. More refined measures of anxiety and depression literacy were used, replacing the Mental Health Literacy Scale (41) because the items of the new scales provided greater overlap with intervention content and therefore a better measure of any potential intervention effect. One item from the Mental Health Literacy Scale (41) was retained to measure confidence to seek mental health information. Other measures related to athlete motivation, engagement and burnout, and parent- and coach-level data were collected in line with the

study protocol (23) and will be reported separately. Similarly, the qualitative components of the evaluation will also be reported separately (e.g., Ref. [49]). Finally, the sample size calculations reported here were updated from the trial registration based on data captured during formative evaluation. Calculations were updated before data being collected in the current study.

## RESULTS

### Descriptives

**Participants and their recruitment.** Initial contact was made with 28 sports clubs to participate in the intervention. Eighteen of those clubs expressed an interest in participating in the program, and formal letters of support to participate were received from nine clubs. One club who provided a letter of support to participate did not end up participating because of time constraints. In total, there were 22 distinct team units from eight clubs recruited to the intervention group. A total of 350 adolescent boys were recruited, with a mean (SD) age of 14.53 (1.19) yr. Most clubs ($n$ = 6/8; 75%) were soccer clubs, with one rugby league club ($n_{participants}$ = 16; 7%) and one swimming club ($n_{participants}$ = 11; 4.8%) also participating. The number of participants per team ranged from 8 to 20, with a mean (SD) of 13 (3.53). Seven (2%) participants spoke a language other than English at home, and four (1.1%) identified as Aboriginal or Torres Strait Islander.

Thirty-one clubs were invited to take part from the control community. A total of 14 clubs participated, which included 11 soccer clubs, 2 Australian football clubs, and 1 basketball club. A total of 466 participants were drawn from the 14 clubs over a total of 72 distinct teams. The number of participants per team ranged from 1 to 23, with a mean (SD) of 6.43 (4.76). The mean (SD) age of participants in the control group was 14.66 (1.39) yr. Ten (2.1%) participants spoke a language other than English at home, and 16 (3.1%) identified as Aboriginal or Torres Strait Islander.

In the intervention group, 180 parents, with a mean (SD) age of 47.70 (5.14) yr, took part in the parent workshop across all eight intervention clubs. Eight coaches ($M_{age}$ [SD] = 45.37 (SD), 10.58 yr) also took part in the coach education component. All coaches attended the first workshop and completed the first online module; however, only one coach completed all modules.

### Participation Numbers in the Intervention

**Adolescents.** In total, 283 (80.9%) adolescent participants attended at least one program. Of those, 271 (95.8%) attended the Help Out a Mate workshop, and 251 (88.7%) attended the Your Path to Success in Sport workshop. Of these, 91 (32.2%) completed all six online modules, with an average (SD) of 2.46 (2.96) online modules completed across all participants in the intervention group. A total of 85 (30.0%) participants completed all adolescent components of AOTG.

**Parents and coaches.** Parents or caregivers of 162 (57.2%) intervention participants attended parent workshops. A total of eight coaches attended the first coach workshop, representing a total of 57 (19.3%) adolescents.

**Adolescent per protocol.** The number of adolescent participants who completed all adolescent components and who had a parent attend a parent workshop was 45 (15.9%; in the per-protocol analyses, these participants were considered to have completed the intervention).

### Baseline Characteristics

Estimated marginal means and 95% confidence intervals of the intervention and control groups across all study variables at both time points are presented in Table 1. The baseline characteristics for all study variables of those participants in the

TABLE 1. Estimated marginal means, 95% confidence intervals, and group–time interaction for all outcome measures in intention-to-treat analyses.

| Variable | Time | Intervention Group (95% Confidence Intervals) | Control Group (95% Confidence Intervals) | Adjusted Mean Difference (95% Confidence Intervals) | *P* |
|---|---|---|---|---|---|
| Depression literacy | Baseline | 6.70 (6.24 to 7.16) | 5.92 (5.61 to 6.23) | −1.81 (−2.39 to −1.22) | <0.001 |
| | Follow-up | 7.42 (6.93 to 7.91) | 4.83 (4.44 to 5.22) | | |
| Anxiety literacy | Baseline | 5.48 (5.00 to 5.97) | 4.80 (4.66 to 5.30) | −2.04 (−2.63 to −1.45) | <0.001 |
| | Follow-up | 6.52 (6.01 to 7.04) | 3.98 (3.58 to 4.37) | | |
| Social distance | Baseline | 3.47 (3.33 to 3.60) | 3.49 (3.40 to 3.58) | −0.18 (−0.34 to −0.21) | 0.260 |
| | Follow-up | 3.62 (3.48 to 3.76) | 3.47 (3.35 to 3.58) | | |
| Help seeking, informal | Baseline | 4.58 (4.41 to 4.75) | 4.66 (4.54 to 4.78) | −0.11 (−0.34 to 0.13) | 0.363 |
| | Follow-up | 4.65 (4.47 to 4.84) | 4.62 (4.47 to 4.78) | | |
| Help seeking, formal | Baseline | 3.70 (3.44 to 3.96) | 3.70 (3.53 to 3.88) | −0.40 (−0.70 to −0.11) | 0.008 |
| | Follow-up | 4.07 (3.80 to 4.34) | 3.67 (3.46 to 3.88) | | |
| Confidence to seek info | Baseline | 4.07 (3.91 to 4.23) | 3.87 (3.77 to 3.98) | −0.23 (−0.44 to −0.03) | 0.026 |
| | Follow-up | 4.32 (4.15 to 4.49) | 3.89 (3.76 to 4.02) | | |
| Resilience | Baseline | 37.48 (36.36 to 38.60) | 37.11 (36.36 to 37.86) | −2.09 (−3.35 to −0.84) | 0.001 |
| | Follow-up | 39.71 (38.55 to 40.88) | 37.25 (36.33 to 38.17) | | |
| Implicit beliefs[a] | Baseline | 10.30 (9.82 to 10.77) | 10.29 (9.97 to 10.61) | 0.65 (−0.00 to 1.31) | 0.051 |
| | Follow-up | 9.93 (9.43 to 10.43) | 10.58 (10.17 to 10.99) | | |
| Perceived family support | Baseline | 5.98 (5.79 to 6.18) | 5.95 (5.82 to 6.08) | −0.22 (−0.45 to 0.01) | 0.60 |
| | Follow-up | 6.05 (5.85 to 6.26) | 5.80 (5.64 to 5.96) | | |
| Psychological distress[a] | Baseline | 5.12 (4.50 to 5.73) | 4.92 (4.52 to 5.33) | 0.36 (−0.30 to 1.01) | 0.289 |
| | Follow-up | 4.60 (3.96 to 5.24) | 4.76 (4.28 to 5.24) | | |
| Well-being | Baseline | 65.21 (62.82 to 67.61) | 66.43 (64.89 to 67.97) | −3.71 (−5.93 to −1.48) | 0.001 |
| | Follow-up | 67.94 (65.47 to 70.41) | 65.45 (63.65 to 67.25) | | |

[a]Decreases represent improvements over time.

TABLE 2. Baseline means, SD, and tests of baseline differences for all outcome measures between participants who completed the intervention per protocol and those who did not.

| | Completed Per Protocol ($n$ = 45) | | Completed Less Than Per Protocol ($n$ = 305) | | Test of Baseline Differences | | |
|---|---|---|---|---|---|---|---|
| Variable | Mean | SD | Mean | SD | $t$ | $df$ | $P$ |
| Depression literacy | 7.30 | 2.28 | 6.24 | 2.87 | –2.31 | 282 | 0.021 |
| Anxiety literacy | 5.95 | 2.16 | 5.12 | 2.62 | –2.00 | 283. | 0.046 |
| Social distance | 3.31 | 0.96 | 3.41 | 0.83 | 0.74 | 277 | 0.457 |
| Help seeking, informal | 4.61 | 1.20 | 4.58 | 1.25 | –0.15 | 285 | 0.878 |
| Help seeking, formal | 3.90 | 1.51 | 3.62 | 1.52 | –1.15 | 285 | 0.253 |
| Confidence to help | 4.20 | 0.89 | 4.01 | 0.85 | –1.37 | 275 | 0.171 |
| Resilience | 39.64 | 5.19 | 37.45 | 6.56 | –2.09 | 279 | 0.038 |
| Implicit beliefs | 9.87 | 2.94 | 10.39 | 2.97 | 1.09 | 276 | 0.278 |
| Perceived family support | 6.29 | 0.87 | 5.96 | 1.22 | –2.17[a] | 77 | 0.033 |
| Psychological distress | 4.39 | 2.83 | 4.93 | 3.26 | 1.04 | 285 | 0.297 |
| Well-being | 70.74 | 9.18 | 65.37 | 11.69 | –2.82 | 267 | 0.005 |

[a]Equal variances not assumed.

intervention group who completed the program per protocol and those who did not are given in Table 2, including tests of baseline differences between the groups.

**Intervention effects: Intention-to-treat.** Estimated marginal means and 95% confidence intervals by group and time, as well as significance values for all group–time interactions for all outcome variables are given in Table 1. Significant group–time interactions were present for the primary outcomes of depression literacy ($F_{1,\ 466.68} = 36.94$, $P < 0.001$) and anxiety literacy ($F_{1,\ 457.39} = 46.54$, $P < 0.001$), as well as intentions to seek help from formal sources ($F_{1,\ 467.55} = 7.17$, $P = 0.008$), confidence to seek mental health information ($F_{1,\ 450.31} = 5.00$, $P = 0.026$), and resilience ($F_{1,\ 423.77} = 10.71$, $P = 0.001$). There was also a significant group–time interaction for the secondary outcome of well-being ($F_{1,\ 425.87} = 10.73$, $P = 0.001$). For all outcomes where a significant group–time interaction was found, adolescents in the intervention group reported significantly greater increases at follow-up compared with adolescents in the control group. There were no significant group–time interactions for social distance (stigma), intentions to seek help from informal sources, implicit beliefs, perceived familial support, or psychological distress. No negative effects of the intervention were reported.

**Intervention effects: per-protocol.** Estimated marginal means and 95% confidence intervals by group (those who completed the intervention per protocol and those in the intervention group who completed less than per protocol) and time, as well as significance values for all group–time interactions for all outcome variables are given in Table 3. The pattern of results for the per-protocol analyses largely mirrored those of the intention-to-treat analyses. However, those who completed the AOTG program per protocol reported decreases in social distance ($F_{1,\ 264.98} = 6.51$, $P = 0.011$) and implicit beliefs ($F_{1,\ 299.24} = 13.77$, $P < 0.001$), both of which represent more adaptive outcomes after the intervention. Furthermore, there was no group–time interaction for confidence to seek mental health information ($F_{1,\ 274.73} = 0.178$, $P = 0.673$) or intentions to seek help from formal sources ($F_{1,\ 264.98} = 6.51$, $P = 0.196$) for per-protocol analyses, whereas positive intervention effects were evident for these outcomes in the intention-to-treat analyses.

## DISCUSSION

Using a nonrandomized, community-matched design, we tested the effectiveness of a sports-based program designed to promote early mental health intervention and help seeking for existing and developing mental health disorders, as well as psychological resilience among adolescent male sport participants. As hypothesized, the AOTG intervention showed significant benefits on depression literacy, anxiety literacy, intentions to seek help from formal sources, confidence to seek mental health information, resilience, and well-being. No significant effects were found for social distance (stigma), intentions to seek help from

TABLE 3. Estimated marginal means, 95% confidence intervals, and group–time interaction for all outcome measures in per-protocol analyses.

| Variable | Time | Intervention Group: Per Protocol (95% Confidence Intervals) [$n$ = 45] | Control Group (95% Confidence Intervals) [$n$ = 466] | Adjusted Mean Difference (95% Confidence Intervals) | $P$ |
|---|---|---|---|---|---|
| Depression literacy | Baseline | 7.45 (6.41 to 8.49) | 5.89 (5.60 to 6.17) | –1.77 (–2.92 to –0.63) | 0.003 |
| | Follow-up | 8.13 (7.04 to 9.23) | 4.80 (4.43 to 5.17) | | |
| Anxiety literacy | Baseline | 6.00 (4.88 to 7.11) | 4.96 (4.65 to 5.28) | –2.35 (–3.54 to –1.17) | <0.001 |
| | Follow-up | 7.34 (6.18 to 8.50) | 3.95 (2.56 to 4.35) | | |
| Social distance | Baseline | 3.47 (3.17 to 3.76) | 3.48 (3.39 to 3.56) | –0.39 (–0.70 to –0.09) | 0.011 |
| | Follow-up | 3.84 (3.52 to 4.15) | 3.45 (3.35 to 3.56) | | |
| Help seeking, informal | Baseline | 4.60 (4.15 to 5.04) | 4.66 (4.54 to 4.78) | –0.13 (–0.57 to 0.31) | 0.561 |
| | Follow-up | 4.69 (4.22 to 5.15) | 4.62 (4.46 to 4.77) | | |
| Help seeking, formal | Baseline | 3.92 (3.31 to 4.54) | 3.70 (3.53 to 3.88) | –0.37 (–0.94 to 0.19) | 0.196 |
| | Follow-up | 4.26 (3.63 to 4.90) | 3.67 (3.45 to 3.88) | | |
| Confidence to seek info | Baseline | 4.30 (3.92 to 4.69) | 3.88 (3.77 to 3.99) | 0.09 (–0.32 to 0.50) | 0.673 |
| | Follow-up | 4.23 (3.83 to 4.64) | 3.89 (3.75 to 4.03) | | |
| Resilience | Baseline | 39.36 (36.97 to 41.75) | 37.18 (36.51 to 37.85) | –3.77 (–6.24 to –1.31) | 0.003 |
| | Follow-up | 43.33 (40.81 to 45.84) | 37.37 (36.51 to 38.23) | | |
| Implicit beliefs[a] | Baseline | 9.74 (8.70 to 10.77) | 10.33 (10.04 to 10.63) | 2.48 (1.16 to 3.79) | <0.001 |
| | Follow-up | 7.54 (6.43 to 8.64) | 10.60 (10.22 to 10.99) | | |
| Perceived family support | Baseline | 6.19 (5.73 to 6.65) | 5.96 (5.83 to 6.09) | –0.18 (–0.64 to 0.28) | 0.438 |
| | Follow-up | 6.22 (5.74 to 6.70) | 5.81 (5.65 to 5.97) | | |
| Psychological distress[a] | Baseline | 4.35 (3.00 to 5.69) | 4.94 (4.56 to 5.32) | 1.29 (–0.05 to 2.62) | 0.059 |
| | Follow-up | 2.88 (1.48 to 4.28) | 4.76 (4.30 to 5.22) | | |
| Well-being | Baseline | 69.14 (63.90 to 74.39) | 66.41 (64.92 to 67.89) | –6.21 (–10.69 to –1.74) | 0.007 |
| | Follow-up | 74.40 (68.99 to 79.80) | 65.45 (63.67 to 67.23) | | |

[a]Decreases represent improvements over time.

informal sources, implicit beliefs, perceived familial support, or psychological distress. No negative effects were evident for psychological distress. Results were similar for those participants who completed the program per protocol when compared with those who did not. As such, the AOTG program was largely successful in achieving its key aims and equipping young men who participate in organized sports with the knowledge, intentions, confidence, and psychosocial resources necessary to promote mental health and support better identification of and response to mental health problems.

The current study is the first to provide evidence that a mental health intervention in organized sport can be effective for a sample of nonelite, adolescent male sport participants. A recent systematic review of sports-based mental health interventions has shown that a range of positive mental health outcomes can be facilitated through interventions (11). However, the quality of the 10 studies in that review was generally poor, with small sample sizes and a lack of control group the most common problems (11). In a noncontrolled intervention study among selected players, parents, and coaches within junior Australian football clubs, brief mental health literacy training was associated with increases in knowledge of mental health disorders, confidence in helping someone with a mental health disorder, and more positive attitudes toward people with mental illness (50). Our study extends these findings in a similar context using a similar spread of participants and with the additional strength of causal attributions owing to the controlled nature of the current study. Similarly, participation in a 12-h mental health first aid program by club leaders of Australian football clubs in rural Australia showed some associated increases in leaders' ability to recognize mental health disorders and increased confidence to respond to mental health difficulties in others (51). However, the benefits of training club leaders did not filter down to the athlete level where no attitudinal change was evident. The key difference between these programs and the AOTG program was intervention at multiple levels, most notably among athletes.

Several key features of the AOTG program may explain its effectiveness. To our knowledge, this is the first sport-based intervention to combine both resilience-focused and mental health literacy–focused programming. Consistent with Keyes' model of mental health (32), this combination may have a cumulative effect in the promotion of one's current mental health and well-being. Specifically, cumulative benefits may be derived by equipping participants with the skills to recognize the warning signs of mental health problems (mental health literacy), as well as the skills to deal with any problems that they may face in the future (resilience). Second, the blended delivery model used in the current study (face-to-face workshops upplemented with online modules) was also likely to be beneficial. The combination of face-to-face and online components has been recommended within interventions for adolescents (52) and may be more effective than face-to-face delivery alone (53).

Third, we adopted a CBPR framework (24) for the design and implementation of the AOTG program (30). This included a large amount of formative research with end-users to ensure that their needs were met regarding the content and delivery of the program (25–27). Community end-users within Australian community sporting clubs have emphasized that the implementation of programs within such clubs should be planned to reflect the real-world context within which the clubs operate. This includes the volunteer-driven nature of community sports clubs and the subsequent resource challenges, which include human resources, operational difficulties, and financial burdens (54). Given the time constraints of those working in organized sports (25,26), the combination of resilience and mental health literacy components delivered via a blended model and designed in conjunction with end-users may be ideally suited to sports contexts to maximize engagement, feasibility, and effectiveness. The limitation to the CBPR approach is that the generalizability of the intervention is unknown because the design and implementation of the intervention are dictated by the community-based end-users. It is therefore unclear how acceptable and engaging the concepts used in this study such as a "Man Card" would be when deployed outside of the defined community.

Given the brief nature of the program, it is unsurprising that those who completed the program per protocol reported some extra benefit: decreases in stigmatizing attitudes and more adaptive implicit beliefs regarding one's ability to deal with problems. In contrast, there was no effect among these participants for intentions to seek help from formal sources or confidence to seek mental health information. This may be due to ceiling effects being present at baseline in this subsample of high adherents (means of 4.65/5 for formal help seeking and 4.07/5 for confidence to seek information). Differences in intentions to seek help may also be explained by participants who completed more of the protocol feeling more capable of managing mental health problems on their own, particularly where the resilience program was completed in full (55). This may also be true for those whose parents also participated because they may be more sensitive to the needs of their adolescent and may provide additional support, reducing the perceived need to seek help (56). Although multicomponent programs are promising in this area (55), they require investments of time from multiple people. It is important to find a balance between feasibility and effectiveness whereby positive outcomes are maximized through the optimal combination of the two.

The AOTG program was implemented at multiple levels of influence, in line with the settings approach to sports-based health promotion (20) and the sports setting matrix for implementation of community sports-based interventions (21). This is in contrast to previous noncontrolled studies within junior sporting clubs that have used similar content to intervene only at the administrator and club leadership level (50,51). The settings approach specifies three distinct levels of influence, which each has reciprocal relationships with the individual. These levels include the microlevel (e.g., actions of practitioners such as coaches), mesolevel (e.g., actions of club administrators), and macrolevel (e.g., club policies) (20). According to this model, the AOTG program was aimed at the microlevel (e.g., intrapersonal and interpersonal influences) and the mesolevel (i.e., club-based promotional campaign). Similarly,

the implementation matrix for community sports specifies a number of levels of influence including the individual, team, club, regional association, and governing bodies (21). According to this model, the AOTG program was implemented at the individual, team (i.e., team-level delivery of intervention components), and club levels. To the extent that the AOTG intervention was successful, this may have been due to the multilevel nature of the intervention, which is likely to enhance the effectiveness of sports-based health interventions. However, greater change may be facilitated by intervention at all levels of influence. For example, a similar mental health literacy program run in similar Australian junior sports contexts showed no benefit at the athlete level when intervening with club leaders alone (51).

No effect of the intervention—across intention-to-treat or per-protocol analyses—was found for intentions to seek help from informal sources, perceived familial support, or psychological distress. Intentions to seek help from informal sources such as friends was relatively high at baseline among both groups (4.58/5 for the intervention group and 4.66/5 for the control group, respectively), which may limit any potential effect of the intervention due to ceiling effects. This may be a typical pattern among Australian adolescents (42). It may also be that self-selection biases meant that parents who already provided high levels of support were more likely to attend the parent program and thereby also limit any potential effect of the intervention. For example, those adolescents who completed the program per protocol had higher levels of familial support at baseline when compared with those adolescents who did not complete the program (Table 2). This is typical of family-level interventions (57), particularly where fathers are involved (58). Finally, the reduction of psychological distress may not be a short-term outcome of this program given the aim of the program to promote early intervention, help seeking, and resilience. It is possible that reduction in psychological distress may be evident over time as a result of increases in well-being and resilience; however, we did not measure longer-term outcomes. It is also noteworthy that no increase in psychological distress was evident as a result of the program. These results are consistent with a classroom-based mental health literacy programs for adolescents (59).

Given the typically low quality of mental health interventions in sport (11), this study has some important strengths, most notably, the large sample size and controlled nature of the study. However, the community-matched control design increases the risk of bias from potential confounding effects such as local media coverage on mental health or school-based initiatives being run within the selected communities. Furthermore, we have not accounted for the effect of variations in implementation of the AOTG program, which may have a meaningful effect on program outcomes and recommendations for scalability of the program to a broader context. Our design did not allow for us to assess which component of the intervention may have the highest leverage. Future research testing stand-alone components of the program would allow for researchers to identify the active ingredients of the program. Finally, the 1-month postintervention follow-up period does not give an indication as to the long-term outcomes of the program, and increases the likelihood of positive outcomes when compared with longer follow-up periods. Randomized controlled trials with longer follow-up periods would give a stronger indication as to the sustained effects of the program and its components on all outcomes including help-seeking behaviors and long-term mental health outcomes. Finally, our measure of implicit beliefs about one's ability to handle adversity in life had poor internal consistency, and results pertaining to this item should be interpreted with some caution.

In this study, we tested the effectiveness of a multicomponent sports-based program to promote early mental health intervention and help seeking for existing and developing mental health disorders, as well as psychological resilience among adolescent male sport participants. Results demonstrate that the program was largely successful, with positive and significant outcomes for participants who received the AOTG program. Given high rates of sport participation worldwide (6) and the engaging nature of organized sports that lends itself to mental health intervention (27), translation and dissemination of the AOTG program to other youth populations and communities may be beneficial. With over 40% of adolescents participating in sport around the world (6), there is meaningful potential to improve the mental health of adolescent boys globally through sports-based intervention. However, given the community-based design used in this study, additional formative research to support translation and dissemination of the program to other communities is necessary. Nevertheless, multicomponent, multilevel, blended interventions may provide avenues for promoting resilience among adolescent boys in a way that is both effective and scalable.

Dr Vella and Dr Swann currently consult to the Movember Foundation on related projects.

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