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Athlete Psychological Resilience and Integration with Digital Mental Health Implementation Amid Covid-19

Luke Balcombe and Diego De Leo

Abstract

The current pandemic's effect on mental health is uncertain with reports of it being largely negative related to loneliness and unemployment. There are different responses to pandemic stress with regards to cultural differences and social environment. Athletes are special in their experience of psychological resilience – there is a trend of positive adjustment to adversity and stress. However, further systematic review is required to confirm these findings along with an athlete-specific psychological resilience instrument. Key themes in relationships include a dichotomous mental health state marked by maladjustment and subsequent resilience, biopsychosocial factors as well as an array of cultural, social and environmental support and demands marked by stressors within and outside of sport. Digital mental health implementation is a logical next step for advancing the construct of athlete psychological resilience towards complementing an effective prevention and early intervention. However, mental health practitioners are grappling with digital mental health in a hybrid model of care. There is a need for converging on methodologies due to the rapid development of digital technologies which have outpaced evaluation of rigorous digital mental health interventions. The functions and implications of human and machine interactions require explainable and responsible implementation for more certain and positive outcomes to arise.

Keywords: COVID-19, stress, cultural differences, social environment, athlete psychological resilience, digital mental health implementation, technology

1. Introduction

The COVID-19 pandemic has led to alteration in work and lifestyle factors [1]. The resultant uncertainty has contributed to a negative impact on adult mental health in the UK [2]. The indirect effects caused a significant increase in psychological distress among the German general population, with correlation to loneliness and higher unemployment [3]. Liu et al. recommended mental health services specifically targeting female, young, unemployed, and lonely people [3]. However, Australian studies proposed the disentanglement of individual, cultural, and environmental factors with regards to the increased mental health vulnerabilities of high-risk subpopulations (e.g., children, students, athletes, domestic violence

victims, frontline heath care workers, low socioeconomic groups, people with mental health disorders, and older people) [4, 5]. For example, high-level athletes showed resilience that helped them to positively adjust after a period of overwhelming stress during a COVID-19 lockdown period [5, 6]. This group were at high-risk for Adjustment Disorder but returned to baseline stress levels [5, 6]. Furthermore, remote Australian Aborigine communities were identified as at-risk because of their compromised health status, as well as historical, systemic, and cultural factors [7]. Cultural differences and social environment require further unraveling to understand the different behavioral responses to pandemic stress as well as the implications for mental health outcomes and resilience.

Digital mental health implementation in a hybrid model of care is boosted by the current pandemic situation because of the capability to provide real-time, automated screening, tracking and treatment [4]. Specialist use of digital platforms with explainable artificial intelligence apps offer good potential to enhance resilience and mental health practitioners' ability to guide the decisions that they make [8]. The issues around this approach (e.g., effectiveness, equity, ethics, and evaluation) calls for innovative methods to better serve general populations as well as considerations and initiatives for underserved and vulnerable subpopulations [4, 8]. The likely ineffectiveness of technology (e.g., machine learning) with severe cases of mental ill-health makes it more feasible and relevant to focus on positive mental health outcomes such as resilience in low to moderate cases [8–10]. Therefore, this chapter explores the athlete population – early evidence shows a positive impact on stress and resilience in this group [5, 6, 11]. Could the psychological screening and tracking of high-level athletes be effectively integrated with digital mental health implementation to provide a basis for increasing resilience and the early intervention of stress in at-risk and vulnerable populations amid COVID-19?

2. Methods

2.1 Integrative review

An integrative review is relevant as a methodology to critique and synthesize the literature on athlete psychological resilience and digital mental health implementation to reveal a new perspective and explore the convergence of the topics. Whittemore and Knafl [12] presented a modified framework for integrative reviews with incorporation of qualitative research strategies to complement empirical and theoretical sources. This method was amended (see **Table 1**) to combine experimental and non-experimental research in the review of evidence and to identify methodological issues of the topic. There is relevance because of the comprehensive account of complex concepts, theories, or healthcare problems. The research question facilitated the literature search, data evaluation, data analysis and presentation stages. An example of integrative review methods in application was provided by Boyle et al. [13] in their analysis of extant reviews of transitions to school literature resulting in identification of theoretical perspectives and recurrent perspective across these perspectives. The main challenge of this method was addressed through a strategy for an accurate synthesis of all data from primary sources.

A systematic search of literature was undertaken in February 2021 and updated until April 2021 from searches including Cross Ref, PubMed Central, Google Scholar, and Elsevier databases to obtain relevant peer-reviewed journal articles generally from 2011 to 2021. The specific focus of the literature search was the concept of the integration of athlete psychological resilience and digital mental health implementation. Extracted data included athlete psychological resilience and how

1. Problem identification
2. Literature search:
• Participant characteristics
• Reported outcomes
• Empirical or theoretical approach
3. Author views:
• Clinical effectiveness
• User impact (feasibility/accessibility)
• Social and cultural impact
• Readiness for clinic or digital solutions adoption
• Critical appraisal and evaluation
4. Determine rigor and contribution to data analysis
5. Synthesis of important foundations or conclusions into an integrated summation

Table 1.
5 step integrative review search method.

this was applied in mental health care, as well as digital mental health and how the technology solution was used (i.e., assessment, treatment, and monitoring). This was in addition to participant characteristics, reported outcomes and authors' views on clinical effectiveness, user impact (i.e., feasibility and acceptability), social and cultural impact, and readiness for clinic or digital solutions adoption. Dual author expertise in the topics provided for purposive selection of empirical and theoretical reports, critical appraisal and evaluation of the study quality or method with guidance from **Table 1** of Whittemore and Knafl [12] with regards to scoring the data relevance (high or low) to determine its rigor and contribution to the data analysis. The overall level of evidence was guided by the Oxford Centre for Evidence-Based Medicine: Levels of Evidence (March 2009). The qualitative analysis involved a synthesis of important foundations or conclusions of each subgroup into an integrated summation of the topic [12]. The conclusions have been drawn from a summary of empirical and theoretical literature to stimulate valid, reliable, and replicable research.

2.2 Social, cultural, and environmental contexts

This integrative review considered Furlong and Finnie's exploration of cultural and societal influences on mental health during the current pandemic [7]. The relationship between exposure to stress and resilience is of interest around the world for whether there are short and/or long-term psychological effects in association with other mitigating factors e.g., uncertainty, loss of control, loneliness and isolation. Culture is important to the investigation of athlete psychological resilience because of how this collective phenomenon is experienced among different sport branches. There are also different levels of athletes (e.g., adolescent – young adult athletes, student and college athletes, high-level athletes representing their state and/or national teams as well as elite athletes and champions). Overall, this defined and bounded group share values, attitudes, norms, symbols, and customs. Furlong and Finnie utilized Hofstede's multidimensional construct of culture and determined psychological and cultural factors that foster resilience [7]. After referring to holistic and analytic systems of thought (respective to Eastern and Western cultures), it was proposed that there is a comfort zone that people generally return to at times of

stress with less adaptation than usual. Athlete psychological resilience may provide another dimension to this construct with regards to their experience of stress and maladjustment.

This review aims to bring together social, cultural, environmental contexts from different domains and disciplines, levels of expertise and experience, and research methods. Moving away from a reductionist approach, Furst et al. recommended mental health ecosystems research for implementation sciences because evidence from the local context is needed in complex interventions and geographical variations in outcomes of care [14]. It involves an interactive system of data and knowledge, expert validation of the scenarios (describing plausible combinations and options of system elements) and models (translating scenarios into consequences for system functioning). This integrative review provides a systematic and rigorous approach allowing for findings from diverse methodologies to be applied to clinical practice and evidence-based practice initiatives [12]. A systematic knowledge base aims to provide a foundation for athlete psychological resilience research to be implemented by digital mental health practice. It provides a starting point for the ecosystem to develop. i.e., a high-level athlete subpopulation who experience a phenomenon (psychological resilience after stress) with attention provided to their culture, society, and environment to branch out health care complexity.

3. Results

3.1 Athlete psychological resilience

Psychological resilience is the positive adaptation when confronted with difficulties, adversity, or long-term stress [15]. Aburn et al. conducted an integrative review of empirical literature on psychological resilience from a nursing context [15]. No universal definition was found leading to the suggestion for further research to explore this construct. High-level athletes are a suitable group with whom to investigate psychological resilience because of developments with regards to their dichotomous state of wellbeing [5]. The generally shared viewpoint is that athletes have significantly higher levels of distress than non-athlete counterparts but comparable levels of high-prevalence disorders (e.g., anxiety and depression) [16, 17]. However, valid comparisons with the general population have yet to be established [17]. A call for an early intervention framework [18] stemmed from the opportunity created from increased awareness of the issues. A range of consensus and position statements [19–24] formed a foundation for high-level athletes being proposed as fertile ground for digital mental health implementation with a focus on maladjustment and resilience [5]. Valid athlete psychological screening instruments e.g. the Athlete Psychological Strain Questionnaire (APSQ) [25] provide a path for expansion and/or complementary approaches.

The athlete psychological resilience construct evolved from studies pertaining to experimental designs from a performance perspective centered on the thoughts and beliefs of athletes who overcame adversity [26]. In a review of the literature, Galli and Gonzalez recommended the development of a sport-specific resilience measure and the use of more sophisticated qualitative approaches and advanced statistical modelling procedures [26]. There is an array of qualitative and quantitative studies, but these findings continue to be limited by the lack of a sport-specific resilience measure. The question remains effectively unanswered since the commentary of Sarkar and Fletcher asked how athletes should be measured for psychological resilience [27]. The construct has not yet been evaluated despite a call in 2016 by Fletcher and Sarkar for a holistic and systematic approach [28]. Various approaches

were developed to provide purpose and guidance e.g., the Athlete Rational Resilience Credo by Turner [29]. It was proposed in a narrative review by Sarkar that a complete understanding of psychological resilience in elite athletes is required (separate from mental toughness, hardiness, or coping literatures) and emphasized the need to focus on the context of the stress process with careful attention to environmental demands [30].

Athlete psychological resilience studies have extended from a theoretical approach. Fletcher and Sarkar provided a grounded theory on the topic after interviews with Olympic champions determined that there are various mental processes and behavior that promote positive adaptations to stress and protection from negative stress [31]. These authors built upon a resilience model by Galli and Vealey [32] which presented a continuum of interactions between adversity, sociocultural influences, and personal resources. Stressors (e.g., injury or retirement) may be mediated by social support and cultural factors as well as a self-determined positive response that results in resilience. A narrative review of athletes' stressors and protective factors provided a basis for psychological resilience in this group [33]. Stressors were categorized into competitive, organizational, and personal. Research by the authors into psychological resilience in Olympic champions found 5 main concepts (i.e., positive personality, motivation, confidence, focus, perceived social support) that have a protective effect upon stressors. The theoretical and evidence-based research called for analysis of the processes underlying psychological resilience in high-level athletes.

The sport psychology consensus that mental and physical health should be considered together with biopsychosocial studies of mental health [19] has also emerged in athlete psychological resilience studies. Fletcher established that there are various biopsychosocial factors (i.e., personality, motivation, confidence, focus, challenge, support, environment) that interact to contribute to the development of athlete psychological resilience [34]. Hill et al. proposed the dynamical system approach to promote athlete resilience studies that result in assisting practitioners with understanding the sequalae of performance slumps for optimal intervention times. Fletcher reiterated that there is yet to be effective understanding of the numerous adverse personal and situational factors that eventuate in adjustment to stress and superior performance [35]. The performance-focus of these studies with the world's best athletes is underpinned by athletes' ability to adapt or withstand environmental demands in their attaining and sustaining of success at the highest level.

It is not yet known what makes elite athletes unique in their ability to make benefit from adversity. Studies that compare baseline comparisons of stress, trauma and/or maladjustment with higher levels of functioning are required to operationalize a measure of the "transitional process" which Fletcher described as involving holistic growth [36]. Fletcher's integrative synthesis of psychological resilience and adversarial growth supports future research into holistic aspects of the athlete's life, especially to examine the aspects of development and performance that detriment on their mental health and relationships [36].

The lack of rigorous evidence-based studies that analyze psychological resilience processes in high-level athlete studies has limited its effectiveness and clinical adoption. However, feasible outcomes emerged in an assortment of athlete studies including the role of social support and associated development of psychological resilience as well as intervention at times of significant stress (e.g., via significant other/coach inclusion). High levels of resilience were correlated with the highest quality of life in a replication study with 87 (80 men, 7 women) wheelchair rugby athletes with various disabilities [37]. Those with grit, resilience, hardiness, and social support were the most engaged with their sport. A mixed methods

investigation of 8 gymnasts found that psychological resilience and social support play significant roles in the process of injury rehabilitation [38]. Future studies were recommended to investigate the direct relationships between stress and resilience. The evidence-based research was limited by a small sample size.

Qualitative studies have enriched understanding of the relationships surrounding athlete psychological resilience. A case study explored the underpinning psychosocial processes of athlete resilience from a rugby team perspective [39]. There have been further studies that included the coach perspective. Another study investigated gymnastics coach and athlete perceptions - athletic practice was found to be conducive to the development of resilience, but the implications of coaching influence were not yet established [40]. A further study that involved semi-structured interviews with 4 elite athletes, 4 elite-level coaches, and 2 sport psychologists found proactive strategies to combat stressors were effective when there were good interpersonal skills in a coach−athlete relationship and an individualized approach which involved fostering motivation, mental preparation, and promoting life balance as well as evaluating setbacks, promoting a positive mindset, and implementing lessons [41].

Evidence-based studies with junior/student athletes (centered on the relationship with the coach) investigated the underlying processes of psychological resilience in athletes. In a conjunctive moderation study with 218 student-athletes, Lu et al. found that coaches' social support fosters athletes' resilience to prevent stress-induced burnout in athletes [42]. A study with 547 semi-professional athletes aged 16–19 years analyzed the influence of coaches on emotional intelligence and on levels of anxiety, motivation, self-esteem, and resilience [43]. Trigueros et al. found self-esteem to positively predict self-determined motivation, however, anxiety had a negative effect on it. Athletes who were independently regulated (self-determined motivation) are more likely to be resilient. The social aspects of being an adolescent – young adult athlete, especially with regards to the relationship with the coach, were proposed in preliminary empirical evidence of the psychological construct of interrelations during competition and the effect upon athlete psychological well-being. Trigueros et al. found the need for further studies to confirm that self-determined motivation positively predicts athlete resilience [43].

The relationship of athlete psychological resilience and burnout has been investigated in different evidence-based approaches. A moderated regression model was applied in a study with 1372 athletes with findings that psychological resilience moderates the potential negative effect of organizational stressors on burnout [44]. In an examination of the coach-athlete working alliance in a sample of 670, Raanes et al. found psychological resilience and perceived stress to be correlated with burnout among junior athletes [45]. The cross-sectional correlation design builds upon theory but was acknowledged by the authors as limited in providing a causal pathway for the relationships. There is no empirical evidence of the intrapersonal protective factors of athlete resilience.

Valid comparisons with ethnically diverse and gender-balanced representation in studies with various high-level athletes and non-athletes are required. A structural equation model applied with 641 female football and basketball players found athletes' resilience is positive for sport engagement - it boosts satisfaction and inhibits spoiling of basic psychological needs [46]. A social justice-oriented cross-sectional study of professional and college athletes found that the stress control mindset and mental toughness constructs should be further investigated in athlete psychological resilience [47]. Scheadler et al. found a positive relationship between these constructs which led to the inference that they are important moderators if not indicators of resilience in this group. Although weak to moderate findings were reported in this correlation, these authors referred to the agreement in findings

between Fletcher and Sarkar [30] and Brown et al. [48] that metacognitive skills and reappraisal strategies are central to resilience in sport arising from the challenge to overcome performance slumps. Scheadler et al. noted a lack of diversity in the random sample as a limitation and suggested future research to include athletic identity and perceived stress as moderating variables.

A descriptive screening model [49] investigated the psychological resilience levels of 147 elite athletes from football, basketball, volleyball, and gymnastics (79 males and 68 females aged 17–21) with the Psychological Resilience Scale. The cross-sectional correlational study [49] investigated resilience along with differences with gender, doping use, branch of sport, and doing self-talk before competition. Resilience was found to be at the moderate level and below the moderate level in different branches. Özdemir found gender and sport branch differences with males and footballers being more resilient [49]. The psychological resilience process was presented with various stressors inside and outside of sport being dealt with by low or high resilience. The high resilience path included individual and environmental support, as well as internal and external protective factors that proceed to high motivation and onwards to high performance. The low resilience path led to self-confidence problems and high anxiety which were followed by low motivation and low performance. The empirical approach applied an adaptation of the Psychological Resilience Scale for the Turkish context. The study acknowledged the lack of a qualitative component. More broadly, the lack of a sport-specific resilience scale, differences in sport branches as well stressors and protective factors restricts international comparison and evaluation of screening and training programs.

The Conner and Davidson Resilience Scale (CD-RISC) was applied in two Iranian correlational studies. Firstly with 139 student athletes (96 males, 43 females), in addition to measurement of the athletes' achievement according to a rating by their coach [50]. Hosseini and Besharat found resilience and mental health were positively associated with sport achievement [50]. The second correlational study with student athletes demonstrated the importance of psychological hardiness and resiliency in protecting this group from stress, in effect maintaining and improving mental health [11]. Sadeghi and Einaky found an inverse relationship of resilience to mental ill-health. An increase in resilience in this group found a decrease in physical symptoms, anxiety symptoms, social dysfunction, and depression symptoms. Those higher in resilience and hardiness were found to have overall better mental health. The CD-RISC was applied in a random sample (n = 155 from 1400) in 3 consecutive weeks with adaptability and reliability demonstrated. The narrow sampling timeframe limits the study's findings to contributing to a theoretical perspective such as how logical decisions, ethical judgments and athletic experiences can manifest into life outside of sport. Longitudinal studies are required to confirm these findings and thus be considered empirical evidence for clinic adoption.

A longitudinal cross-sectional correlational study with 29 Australian high-level athletes provided preliminary evidence for Adjustment Disorder and resilience being considered together. Simons et al. focused on the experience of stressors and maladjustment (i.e., relocation, being away from home for long periods of time/ being on tour, or injury) [6]. The study was adapted during a COVID-19 lockdown period to investigate 5 main stressors among 15 of these athletes: uncertainty about the future, decreased income, changed university teaching methods, training facilities unavailable, and season/competition cancelled. The findings led to the suggestion that psychological resilience may result from the successful implementation of coping strategies and self-guided interventions which helped athletes to positively adjust after a period of overwhelming stress in a COVID-19 lockdown period [5, 6]. Due to the small number of participants, further consideration of

stress and adjustments in brief digital screening and tracking tools was recommended to validate this finding on athlete resilience and explore the potential for effective treatments [5] e.g., mindfulness, re-framing of the events, and goal setting [6]. International comparison is necessary as it instils understanding of cultural and environmental factors for mental health and care [51].

3.2 Digital mental health implementation for athlete psychological resilience

The focus on athlete psychological resilience extends from recent reviews [4, 5, 8] by this chapter's authors. There was combined emphasis on the need for an effective, valid, and quality assured response to demand outstripping supply for mental health care amid the COVID-19 pandemic. It was recommended to develop digital mental health service guidelines, consensus and expert statements for digital platforms as part of a hybrid model of care for assisting community members with stress and transitioning to new ways of living and working [4]. The recommendation to focus on screening and tracking (with real-time automation and machine learning) was further explored in the mini review [5] to show dichotomous relationships between athlete mental health problems and resilience. There was a key finding that a subgroup of high-level athletes was resilient after a period of intense stress during a COVID-19 lockdown period [5, 6]. It was recommended to modify valid screening tools with athlete-specific versions to account for their unique stress, adjustment, and resilience. However, there is difficulty with using predictive technologies among severe cases of mental ill health especially risk assessment tools for suicidal ideation and attempts because some scales end up being counterproductive [8]. Therefore, technology-enabled services are most likely to be effective when specialists apply it with subsyndromal or low-moderate mental ill health populations. It is proposed that more equitable public health outcomes will emerge after subpopulation efficacy and international comparisons are established.

Investigations in the athlete subpopulation may potentially broaden understanding of positive psychological functioning, the sequalae of mental ill health as well as symptom and disorder interpretation [5]. The development and evaluation of eminent digital mental health platforms and associated apps tailored to athletes was proposed to address mental health disengagement among the group (e.g., stigma, underrecognition of the issues, underutilization of helpful resources and false reporting with questionnaires). The recent development and validation of the APSQ [25] provided an example of how this subpopulation is suitable to be applied as an education concept for mental health awareness as well as a pivotal group for testing of the psychological impact of the current pandemic and beyond. However, online questionnaires remain the major digital tools being used in research [5, 6, 52]. Digital technologies generally have not awaited evaluation before going on the market leaving a gap to fill for rigorous digital mental health interventions [5]. There is a lack of practical strategy and collaboration between developers and end users for how technology may be applied in the development of research and its evaluation. Integration of methodologies is required for faster evaluation and accurate preventive strategies and interventions.

The current pandemic presents the opportunity to develop well-known products and services for faster and better screening, tracking and treatment including algorithms and skillsets to use and maintain systems [5]. However, this largely depends on the nous of researchers, end users and developers to effectively address the ethical and evaluation challenges that have persisted for the past decade. Digital platforms and connected apps are currently the most used digital solutions in complement to telehealth and face-to-face consultations [8]. Explainable Artificial

Intelligence (XAI) is extending from a theoretical approach for accountability in systems that generate predictions (e.g., machine learning) through facilitating a 3-way conversation between a patient, health care practitioner, and the machine [8]. XAI is worthwhile for testing in evidence-based studies to assist with ease of understanding and responsibility in complex human-computer interactions e.g., Internet of Things, digital phenotyping, immersive virtual therapeutic interventions (e.g., virtual reality - VR) and digital tools via web-based interventions (e.g., chatbots). The safety, security and engaged retention of users are important considerations in strategies to enhance resilience. Therefore, co-design should include consider up-to-date ethics and data security checklists with input from users, mental health care practitioners as well as care providers.

4. Conclusions

COVID-19 has unsettled long-held assumptions about resilience and adaptation. It has also created new uncertainties about health and technology which are further complicated by other issues e.g., politics and the economy. This integrative review systematically investigated a niche subpopulation (athletes) for their psychological resilience and found consensus that this group is special with regards to their experience of resilience because of how they adjust to adversity and stress. However, higher levels of evidence and reduction of heterogeneity is required – identified studies were marked by individual or homogenous case–control, correlational/ cohort studies, low quality randomized controlled studies (e.g., <80% follow-up), and not yet validated in different populations. Theoretical, experimental and qualitative designs, narrative reviews and commentaries provided various cultural and social perspectives in conjunction with an array of models to moderate, describe and structure the issues. Further systematic review and a valid instrument that assesses diverse aspects of athlete psychological resilience are required for efficacy in the analysis of the underlying processes. It is recommended to focus on biopsychosocial factors and holistic stressors via screening of life within and outside of sport e.g., intrapersonal characteristics, potentially stressful events/challenges, behaviors, and representations of adversity). Major relationship themes include maladjustment, as well as social, cultural and environmental support and demands.

There is a good potential that development of an athlete-specific psychological resilience instrument may complement validated psychological screening tools (e.g., APSQ) especially with high-level and elite athletes. As resilience is a transitional process it is recommended for associated tracking tools to be implemented in holistic longitudinal studies to compare baseline levels of stress, trauma and/or maladjustment with higher levels of functioning. It is possible to integrate athlete psychological resilience with digital mental health implementation. As digital health is exponentially growing – it largely depends on how well researchers and end users can collaborate with developers and technology experts and responsibly assist each other. There is an array of issues to navigate such as ethics, safety, security, human-computer interaction, XAI, external evaluation, intellectual property rights, fees, and funding. However, such issues are manageable if there is clear direction for and co-design of an eminent product/service. It is envisioned that high-level and elite athlete psychological resilience studies will provide an education for increasing resilience and the early intervention of stress in at-risk and vulnerable populations amid COVID-19 and beyond. There is a good potential for furthering understanding of the sequalae of dichotomous mental health with interesting implications for preventive and intervention programs.

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Conflict of interest

The authors declare no conflict of interest.

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References

[1] Ratten, V. (2020) Coronavirus (COVID-19) and entrepreneurship: changing life and work landscape, *Journal of Small Business & Entrepreneurship,* 32:5, 503-516, DOI: 10.1080/08276331.2020.1790167

[2] Chandola, T., Kumari, M., Booker, C. L., & Benzeval, M. J. (2020). The mental health impact of COVID-19 and lockdown related stressors among adults in the UK. *Psychological Medicine*, 1-29. doi:10.1017/s0033291720005048

[3] Liu, S., Heinzel, S., Haucke, M. N., & Heinz, A. (2021). Increased Psychological Distress, Loneliness, and Unemployment in the Spread of COVID-19 over 6 Months in Germany. *Medicina*, 57(1), 53. doi:10.3390/medicina57010053

[4] Balcombe, L., & De Leo, D. (2020). An integrated blueprint for digital mental health services amidst Covid-19. *JMIR Mental Health*, 7(7), e21718. doi:10.2196/21718

[5] Balcombe, L., & De Leo, D. (2020). Psychological screening and tracking of athletes and digital mental health solutions in a hybrid model of care: mini review. *JMIR Formative Research*, 4(12), e22755. doi:10.2196/22755

[6] Simons, C., Martin, L. A., Balcombe, L., Dunn, P. K., & Clark, R. A. (2020). Mental health impact on at-risk high-level athletes during COVID-19 lockdown: A pre-, during and post-lockdown longitudinal cohort study of adjustment disorder. *Journal of Science and Medicine in Sport*. doi:10.1016/j.jsams.2020.12.012

[7] Furlong, Y., & Finnie, T. (2020). Culture counts: The diverse effects of culture and society on mental health amidst COVID-19 outbreak in Australia. *Irish Journal of Psychological Medicine*, 37(3), 237-242. doi:10.1017/ipm.2020.37

[8] Balcombe, L., & De Leo, D. (2021). Digital Mental Health Challenges and the Horizon Ahead for Solutions. *JMIR Mental Health*, 8(3), e26811. doi:10.2196/26811

[9] Shatte, A., Hutchinson, D., & Teague, S. (2018). Machine learning in mental health: A systematic scoping review of methods and applications. *Psychol Med,* 2019 Jul;49(9):1426-1448. doi:10.31219/osf.io/hjrw8

[10] Vinkers, C. H., van Amelsvoort, T., Bisson, J. I., Branchi, I., Cryan, J. F., Domschke, K., ... van der Wee, N. J. A. (2020). Stress resilience during the coronavirus pandemic. *European Neuropsychopharmacology*, 35, 12-16. doi:10.1016/j.euroneuro.2020.05.003

[11] Sadeghi, A. and Einaky, S. (2021) Relationship between Psychological Hardiness and Resilience with Mental Health in Athlete Students in the Guilan Unit of University of Applied Science and Technology. *Sociology Mind*, 11, 10-24. doi: 10.4236/sm.2021.111002

[12] Whittemore, R., & Knafl, K. (2005). The integrative review: updated methodology. *Journal of Advanced Nursing*, 52(5), 546-553. doi:10.1111/j.1365-2648.2005.03621.x

[13] Boyle, T., Grieshaber, S., & Petriwskyj, A. (2018). An integrative review of transitions to school literature. *Educational Research Review*, 24, 170-180. doi:10.1016/j.edurev.2018.05.001

[14] Furst, M. A., Bagheri, N., & Salvador-Carulla, L. (2020). An ecosystems approach to mental health services research. *BJPsych International*, 1-3. doi:10.1192/bji.2020.24

[15] Aburn, G., Gott, M., & Hoare, K. (2016). What is resilience? An Integrative Review of the empirical

literature. *Journal of Advanced Nursing, 72*(5), 980-1000. doi:10.1111/jan.12888

[16] Gouttebarge, V., Castaldelli-Maia, J., Gorczynski, P., Hainline, B., Hitchcock, M., Kerkhoffs, G., Rice, S., & Reardon, C. (2019). Occurrence of mental health symptoms and disorders in current and former elite athletes: a systematic review and meta-analysis. *British Journal of Sports Medicine*, 53(11), 700-706. URL: https://doi.org/10.1136/bjsports-2019-100671

[17] Purcell, R., Rice, S., Butterworth, M., & Clements, M. (2020). Rates and Correlates of Mental Health Symptoms in Currently Competing Elite Athletes from the Australian National High-Performance Sports System. *Sports Medicine*. doi:10.1007/s40279-020-01266-z

[18] Purcell, R., Gwyther, K., & Rice, S. (2019). Mental Health In Elite Athletes: Increased Awareness Requires An Early Intervention Framework to Respond to Athlete Needs. *Sports Medicine - Open*, 5(1), 1-8. URL: https://doi.org/10.1186/s40798-019-0220-1

[19] Reardon, C., Hainline, B., Aron, C., Baron, D., Baum, A., Bindra, A., Budgett, R., Campriani, N., Castaldelli-Maia, J., Currie, A., Derevensky, J., Glick, I., Gorczynski, P., Gouttebarge, V., Grandner, M., Han, D., Mcduff, D., Mountjoy, M., Polat, A., ... Engebretsen, L. (2019). Mental health in elite athletes: International Olympic Committee consensus statement (2019). *British Journal of Sports Medicine*, 53(11), 667-699. URL: https://doi.org/10.1136/bjsports-2019-100715

[20] Breslin, G., Smith, A., Donohue, B., Donnelly, P., Shannon, S., Haughey, T., Vella, S., Swann, C., Cotterill, S., Macintyre, T., Rogers, T., & Leavey, G. (2019). International consensus statement on the psychosocial and policy-related approaches to mental health awareness programmes in sport.

BMJ Open Sport & Exercise Medicine, 5(1), e000585. URL: https://doi.org/10.1136/bmjsem-2019-000585

[21] Gorczynski, P., Gibson, K., Thelwell, R., Papathomas, A., Harwood, C., & Kinnafick, F. (2019). The BASES expert statement on mental health literacy in elite sport. *The Sport and Exercise Scientist*, 59,6-7. URL: https://www.bases.org.uk/imgs/7879_bas_expert_statement__pages_735.pdf

[22] Henriksen, K., Schinke, R., Moesch, K., McCann, S., Parham, W. D., Larsen, C. H., & Terry, P. (2019). Consensus statement on improving the mental health of high performance athletes. *International Journal of Sport and Exercise Psychology*,1-8. doi:10.1080/1612197X.2019. 1570473

[23] Schinke, R., Stambulova, N., Si, G., & Moore, Z. (2018). International society of sport psychology position stand: Athletes' mental health, performance, and development. *International Journal of Sport and Exercise Psychology*, 16(6), 622-639. URL: https://doi.org/10.1080/16121 97X.2017.1295557

[24] Van Slingerland, K., Durand-Bush, N., Bradley, L., Goldfield, G., Archambault, R., Smith, D., Edwards, C., Delenardo, S., Taylor, S., Werthner, P., & Kenttä, G. (2019). Canadian Centre for Mental Health and Sport (CCMHS) Position Statement: Principles of Mental Health in Competitive and High-Performance Sport. *Clinical Journal of Sport Medicine: Official Journal of the Canadian Academy of Sport Medicine*, 29(3), 173-180. URL: https://doi.org/10.1097/JSM.0000000000000665

[25] Rice, S. M., Parker, A. G., Mawren, D., Clifton, P., Harcourt, P., Lloyd, M., Kountouris, A., Smith, B., McGorry, P. D., & Purcell, R. (2020). Preliminary psychometric validation of a brief screening tool for athlete mental health among male elite athletes: the athlete

psychological strain questionnaire. *International Journal of Sport and Exercise Psychology*, 18(6), 850-865. https://doi.org/https://doi.org/10.1080/1612197x.2019.1611900

[26] Galli, N., & Gonzalez, S. P. (2014). Psychological resilience in sport: A review of the literature and implications for research and practice. *International Journal of Sport and Exercise Psychology*, 13(3), 243-257. doi:10.1080/161197x.2014.946947

[27] Sarkar, M., & Fletcher, D. (2013). How Should We Measure Psychological Resilience in Sport Performers? *Measurement in Physical Education and Exercise Science*, 17(4), 264-280. doi:10.1080/1091367x.2013.805141

[28] Fletcher, D., & Sarkar, M. (2016). Mental fortitude training: An evidence-based approach to developing psychological resilience for sustained success. *Journal of Sport Psychology in Action*, 7(3), 135-157. doi:10.1080/21520704.2016.1255496

[29] Turner, M. J. (2016). Proposing a rational resilience credo for use with athletes. *Journal of Sport Psychology in Action*, 7(3), 170-181. doi:10.1080/21520704.2016.1236051

[30] Sarkar, M. (2017). Psychological resilience: Definitional advancement and research developments in elite sport. *International Journal of Stress Prevention and Wellbeing*, 1(3), 1-4.

[31] Fletcher, D., & Sarkar, M. (2012). A grounded theory of psychological resilience in Olympic champions. *Psychology of Sport and Exercise*, 13(5), 669-678. doi:10.1016/j.psychsport.2012.04.007

[32] Galli, N., & Vealey, R. S. (2008). "Bouncing Back" from Adversity: Athletes' Experiences of Resilience. *The Sport Psychologist*, 22(3), 316-335. doi:10.1123/tsp.22.3.316

[33] Sarkar, M., & Fletcher, D. (2014). Psychological resilience in sport performers: a review of stressors and protective factors. *Journal of Sports Sciences*, 1-16. doi:10.1080/02640414.2014.901551

[34] Fletcher, D. (2018). Psychological Resilience and Adversarial Growth in Sport and Performance. *Oxford Research Encyclopedia of Psychology*. doi:10.1093/acrefore/9780190236557.013.158

[35] Hill, Y., Den Hartigh, R. J. R., Meijer, R. R., De Jonge, P., & Van Yperen, N. W. (2018). Resilience in sports from a dynamical perspective. *Sport, Exercise, and Performance Psychology*, 7(4), 333-341. doi:10.1037/spy0000118

[36] Fletcher, D. (2021). Stress-Related Growth and Resilience. *Stress, Well-Being, and Performance in Sport*, 191-221. doi:10.4324/9780429295874-13

[37] Atkinson, F., & Martin, J. (2020). Gritty, hardy, resilient, and socially supported: A replication study. *Disability and Health Journal*, 13(1), 100839. doi:10.1016/j.dhjo.2019.100839

[38] Codonhato, R., Rubio, V., Oliveira, P. M. P., Resende, C. F., Rosa, B. A. M., Pujals, C., & Fiorese, L. (2018). Resilience, stress and injuries in the context of the Brazilian elite rhythmic gymnastics. *PLOS ONE*, 13(12), e0210174. doi:10.1371/journal.pone.0210174

[39] Morgan, P.B.C., Fletcher, D. & Sarkar, M. (2015). Understanding team resilience in the world's best athletes: A case study of a rugby union World Cup winning team. *Psychology of Sport and Exercise*, 16, (1), 91-100. doi.org/10.1016/j.psychsport.2014.08.007.

[40] White, R. L., & Bennie, A. (2015). Resilience in Youth Sport: A Qualitative Investigation of Gymnastics Coach and Athlete Perceptions. *International Journal of Sports Science & Coaching*,

10(2-3), 379-393. doi:10.1260/ 1747-9541.10.2-3.379

[41] Kegelaers, J., & Wylleman, P. (2019). Exploring the coach's role in fostering resilience in elite athletes. *Sport, Exercise, and Performance Psychology,* 8(3), 239-254. doi:10.1037/ spy0000151

[42] Lu, J-H. (2016). Interaction of athletes' resilience and coaches' social support on the stress-burnout relationship: A conjunctive moderation perspective. *Psychology of Sport and Exercise*. 22, 202-209. doi: 10.1016/j. psychsport.2015.08.005.

[43] Trigueros, R., Aguilar-Parra, J. M., Álvarez, J. F., González-Bernal, J. J., & López-Liria, R. (2019). Emotion, Psychological Well-Being and Their Influence on Resilience. A Study with Semi-Professional Athletes. *International Journal of Environmental Research and Public Health*, 16(21), 4192. doi:10.3390/ijerph16214192

[44] Wagstaff, C., Hings, R., Larner, R., & Fletcher, D. (2018). Psychological Resilience's Moderation of the Relationship Between the Frequency of Organizational Stressors and Burnout in Athletes and Coaches. *The Sport Psychologist*, 32(3), 178-188. doi:10.1123/ tsp.2016-0068

[45] Raanes, E. F. W., Hrozanova, M., & Moen, F. (2019). Identifying Unique Contributions of the Coach–Athlete Working Alliance, Psychological Resilience and Perceived Stress on Athlete Burnout among Norwegian Junior Athletes. *Sports*, 7(9), 212. doi:10.3390/sports7090212

[46] González, L., Castillo, I., & Balaguer, I. (2019). Exploring the Role of Resilience and Basic Psychological Needs as Antecedents of Enjoyment and Boredom in Female Sports. *Revista de Psicodidáctica* (English Ed.), 24(2), 131-137. doi:10.1016/j.psicoe.2019.02.001

[47] Scheadler, T., Reese, R., & Cormier, M. (2021). Relationships Between Athlete Activist Identities and Resilience in College Athletes. *Journal of Athlete Development and Experience*, 3(1). doi:10.25035/jade.03.01.03

[48] Brown, C. J., Butt, J., & Sarkar, M. (2020). Overcoming performance slumps: Psychological resilience in expert cricket batsmen. *Journal of Applied Sport Psychology,* 32(3), 277-296. doi: 10.1080/10413200.2018.1545709

[49] Özdemir, N. (2019). The Investigation of Elite Athletes' Psychological Resilience. *Journal of Education and Training Studies*, 7(10), 47. doi:10.11114/jets.v7i10.4323

[50] Hosseini, S. A., & Besharat, M. A. (2010). Relation of resilience with sport achievement and mental health in a sample of athletes. *Procedia - Social and Behavioral Sciences*, 5, 633-638. doi:10.1016/j.sbspro.2010.07.156

[51] Gorczynski, P., Currie, A., Gibson, K., Gouttebarge, V., Hainline, B., Castaldelli-Maia, J. M., ... Swartz, L. (2020). Developing mental health literacy and cultural competence in elite sport. *Journal of Applied Sport Psychology*, 1-15. doi:10.1080/10413200.2 020.172004

[52] Pillay, L., Janse van Rensburg, D. C. C., Jansen van Rensburg, A., Ramagole, D. A., Holtzhausen, L., Dijkstra, H. P., & Cronje, T. (2020). Nowhere to hide: The significant impact of coronavirus disease 2019 (COVID-19) measures on elite and semi-elite South African athletes. *Journal of Science and Medicine in Sport,* 23(7), 670-679. doi:10.1016/j. jsams.2020.05.016