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The relationships between rugby union and health: a scoping review protocol

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ABSTRACT

Introduction Rugby union is played by over eight million people across the world and is considered a form of moderate-to-vigorous physical activity. Consequently, playing rugby may confer health benefits; however, to date, the principal focus of research has been on associated injuries and potential detrimental long-term health sequelae. This protocol outlines the methods behind studying any potential associations between rugby union and both physical and mental health.

Methods and analysis Best practice methodological frameworks (Arksey and O'Malley, Levac *et al* and the Joanna Briggs Institute) and previously published scoping review protocols in sport informs the methodology of this protocol. This protocol enables us to map the key concepts and evidence available, summarise and share existing research findings, and identify research gaps in the current literature. A three-step search strategy will identify reviews, original research, and published and grey literature. An initial search will identify suitable search terms, followed by a search using keyword and index terms. Two reviewers will independently screen identified studies for final inclusion.

Dissemination When publishing the scoping review, we will map key concepts and evidence both numerically and thematically, as well as identify key research priorities for further studies. The review will subsequently be disseminated to stakeholder groups, practitioners and policymakers through a variety of peer-reviewed and non-peer-reviewed publications, conferences and via multimedia platforms.

What is known and what this adds

- Scoping reviews provide a well-established framework to summarise information and map gaps in the evidence, as well as identify key priorities on broad topics.
- There is currently no 'big-picture' review looking into any potential associations between rugby union and both physical and mental health.

INTRODUCTION

Rugby union (referred to as rugby hereforth) is a sport played by over eight million people in over 120 countries.[1] It is traditionally a collision sport with 15 players in each team, with matches lasting 80 minutes. Non-collision forms of the game exist ('touch'/'tag'), while other formats of the game (eg, seven-a-side) are also played worldwide.

The WHO defines health as a 'a state of complete physical, mental and social well-being and not merely the absence of disease or infirmity'.[2] A number of primary research papers have studied the relationship with and effects of rugby on health. According to the 2011 Compendium of Physical Activities,[3] rugby can provide moderate-to-vigorous levels of physical activity,[4] and regular physical activity is linked to a wide range of health longevity, physical and mental health benefits.[5–8] Others have studied the effect of rugby as a physical activity intervention demonstrating associations with reduced adiposity, improved submaximal oxygen consumption[9] and improved metabolic risk factors.[10]

To date, the principal focus of research around rugby union has been based on injuries and acute health problems, and reviews have consistently reported higher rates of injuries, and concussion in particular, relative to other sports.[11 12] The majority of this research is performed in professional men's rugby, though data highlight similar patterns in community, women's and youth rugby.[13–17] Reported longer-term health outcomes of rugby include neurocognitive deficits post-retirement,[18] decreased neuropsychological performance[19] and increased rates of osteoarthritis,[20] though findings are not consistently adverse, with research also demonstrating no differences in mental health and social or work functioning after injury between retired international rugby players and controls.[21]

Whilst high-level evidence demonstrates a link between certain sports (such as football, tennis and golf) and improved health outcomes,[22] no study has investigated the potential relationships between rugby and physical and mental health. To make an informed choice about participation in any sport, the likely benefits and risks need to be

considered.[23] While a number of high-quality reviews target the latter,[17 24 25] the aim of this scoping review was to map the evidence concerning rugby and various health outcomes and to identify key research priorities that might influence the future direction of research and policies within the sport, as well as enable various stakeholders to make an informed choice about participating in the sport.

METHODS

Scoping reviews are broad in nature and, unlike systematic reviews, are focused more on mapping key concepts that underpin research areas. They are considered particularly useful to determine what range of evidence is available on a topic and to visually represent the current evidence and share an overview of the existing knowledge base in a meaningful way. A scoping review was the most appropriate methodological approach, given the broad nature of the research questions to be addressed, and could act as a valuable platform to identify topics for more focused systematic reviews and/or meta-analyses.

The methodological framework for this scoping review is based on best practice methodology and a previously published scoping review that investigated similar outcomes in golf.[26–30] The Arksey and O'Malley, the Levac *et al*[30] and the Joanna Briggs Institute frameworks[28–30] discuss the need for scoping reviews to be an iterative process, based on initial searches producing best results, and expert discussion. This scoping review will be based on a well-established five-stage process.[29]

Preliminary literature searches and in-depth discussions with method experts with extensive rugby research experience helped inform the research questions, as well as the breadth of this review. The first decision was to limit the scope of the review to rugby union articles only given the inherently different rules, patterns of play and demands of rugby league. All formats of rugby union will be considered, given the broad nature of the research question, and at a practical level, any significant differences in the relationship between various forms of the game and 'health' will be of significant interest and value to various stakeholders involved in the game. A preliminary literature search with a search strategy based on a similar scoping review[26] clearly demonstrated that injury studies dominate the rugby union research landscape. One potential methodological approach considered was to exclude studies in which the outcome variables are injuries or other acute health problems (as per previously published systematic reviews[22]). However, given that preliminary literature searches (as well as discussions between the research team) highlighted potential gaps in the injury surveillance research in certain levels of the game and in certain populations, we decided that this approach might overlook a key concern that current and potential future stakeholders could have. As such, a decision was made to limit injury studies to systematic reviews. Therefore, the results of this scoping review may not cover all levels of evidence regarding the association between rugby and injuries/acute health problems. However, this methodological decision will enable us to present a balanced overview of any potential relationships between rugby and physical and mental health.

Stage 1: identify the research questions

The following broad research questions were proposed following preliminary literature searches and multidisciplinary discussions within the group. They reflect the population, context and content of the review, which are critical to identifying relevant studies and setting appropriate eligibility criteria.[28]

- What is known about the relationships between rugby and physical and mental health?
- What are the evidence gaps in the field?
- What are the main research priorities in the field?

Stage 2: identifying relevant studies

Eligibility criteria

The following a priori inclusion and exclusion criteria were determined based on multidisciplinary discussions and the experiences of another scoping review in golf.[26 27]

Inclusion criteria

- Research articles not limited by geographical location or setting.
- All abilities, age groups and both sexes of participants.
- Research that considers the general population, as well as specific population groups (with a specific physical or mental illness or condition).
- All forms of rugby union[31] (eg, seven-a-side/15-a-side/disability/touch/tag/beach/tens/veterans/Xrugby7s rugby).
- Sources of information, including primary research studies, reviews, systematic reviews, scoping reviews, meta-analyses, guidelines, as well as grey literature to include unpublished and ongoing trials, annual reports, dissertations and conference proceedings.
- Outcome variables must be health related in terms of physical activity, physiological demand, mortality, morbidity or disease risk factors and/or function related in terms of cardiorespiratory, neurological, metabolic or musculoskeletal fitness.
- Systematic reviews in which the outcome variables were injuries or other acute health problems.

Exclusion criteria

- Non-English language studies.
- Anthropometric/biomechanical studies or studies relating to performance, recovery or injury prevention.
- Opinion pieces/opinions, magazine and newspaper articles.
- Research articles that do not scientifically investigate measures of health, or directly relate to function, or fitness (or do not include data).
- Cadaver studies.
- Health and safety/occupational issues not related to playing or watching rugby union.
- Rugby league studies.

- Research articles in which the outcome variables were injuries or other acute health problems that are not systematic reviews or meta-analyses.

Search strategy

Step 1: an initial limited search

An initial limited search for review articles was performed on SPORTDiscus and Google Scholar searching all fields with a combination of the keywords rugby AND health AND review. The first 100 results of both searches were reviewed and 17 studies were identified as relevant. The reference lists of these relevant studies were also examined to identify further pertinent studies.

Step 2: identify key words and index terms

The relevant studies identified in the initial limited search informed the selection of keywords and index terms for the main searches. To maximise inclusivity it was decided that 'rugby*' (searched in title and abstract fields) and any rugby-specific index terms (not football) will be the only terms used on health databases (MEDLINE, PsycINFO, Embase and CINAHL). Secondary search terms (health*, illness*, injur*, fitness, mortalit*, morbidit*, well-being, well-being, function) will be combined with the Boolean operator OR and then combined with the rugby terms using AND to facilitate the retrieval of relevant studies on SPORTDiscus and Web of Science. Filters such as publication type will also be used to aid the exclusion of irrelevant search results.

A similar approach will be adopted for searching the grey literature. 'Rugby*' will be the sole search term used on the WHO International Clinical Trials Registry Platform. The same search terms used for SPORTDiscus and Web of Science will be applied in the title and abstract fields of ProQuest Dissertations and Theses Global, while for pragmatic reasons, these terms will be searched in the title field only on Google Scholar. The advanced Google search operator 'site:' will be used to search for other relevant literature on World Rugby (https://www.world.rugby).

Step 3: further searching of references and citations

The reference lists of relevant studies will be searched to identify further pertinent studies not picked up by the database searches. Authors of significant primary studies, scoping reviews and systematic reviews will also be contacted to locate any additional important sources of information.

Stage 3: study selection

Titles and abstracts identified by the search strategy will be evaluated against the eligibility criteria by the lead author (SAG), and another author (NKPP) will complete the same process on a random sample of 20% of titles and abstracts, using the same inclusion and exclusion criteria. The reviewers will meet to discuss the eligibility criteria in-depth, and then proceed to assess the title and abstracts independently. If the reviewers disagree on the eligibility of a study, it will be discussed with a third reviewer (KAS/SPTK/JHMB). If a consensus is not reached, the study will be included in the scoping review. If the same inclusion/exclusion decision is taken by both reviewers for over 95% of the studies assessed, then SAG will review the titles and abstracts of all other papers. If concordance is less than 95%, then all titles and abstracts will be assessed by both reviewers. Following this, the full text will be sourced for all articles meeting the inclusion criteria.

Stage 4: charting the data

Data will be extracted and assimilated as per best practice methodology.[28] Two of the paper's authors (SAG and NKPP) will be responsible for data extraction, using a data extraction form with the headings as detailed below.[28] Initially, two researchers (SAG and NKPP) will meet to trial the data extraction form on five randomly selected studies, and then independently extract data from the first 10 studies using the data-charting form to determine whether their approach to data extraction is consistent with the research question and purpose. Subsequently, the first author (SAG) will extract data from 90% of included studies and the second author (NKPP) will extract data from 10% of studies. The data will be cross-checked for accuracy, where NKPP will check 10% of SAG's data extractions for accuracy and vice versa. Any disagreements over extracted data will be discussed between the authors of the review. If significant differences exist, all papers will have data extracted by the two reviewers (SAG and NKPP).

1. Author(s).
2. Year of publication.
3. Country of origin.
4. Aims/purpose.
5. Study population and sample size (if applicable).
6. Form of rugby.
7. Methodology.
8. Intervention type, comparator and details of these (eg, duration of the intervention) (if applicable).
9. Concept.
10. Duration of the intervention (if applicable).
11. Outcomes and details of these (eg, how measured) (if applicable).
12. Key findings that relate to the scoping review research questions.

If unforeseen useful data can be charted, then further categories may be added, or table headings updated on the data extraction form. Where full papers cannot be obtained, efforts to obtain the full paper via hard or electronic copy via the university library will be made. When the paper cannot be found, the corresponding author will be contacted to request a copy. If the full paper cannot be found, the study will be excluded.

Stage 5: collating, summarising and reporting the results

The results will be presented in two ways:

1. Numerically. Studies identified and included will be reported, and the description of the search decision process will be mapped alongside a search decision

flowchart.[28] Further, a numerical analysis will map the data in tabular and diagrammatic form, showing distribution of studies by theme, period of publication, country of origin and study method. It should be noted that charting the results is based on an iterative approach, and further categories may be added if deemed appropriate to the research questions.

2. Thematically. A descriptive analysis pertaining to themes and key concepts relevant to the research questions.

DISSEMINATION AND COMMUNICATION OF RESULTS

Given the novel nature of this scoping review, it will provide an overview of any potential associations between rugby in its various forms and physical and mental health. It will also clarify key research priorities and inform a wide range of stakeholders in the sport, including policymakers and governing bodies.

The findings will be presented in a variety of formats. They will be summarised and sent for external peer review and publication in an open-access sport and exercise medicine journal. In order to enhance the knowledge translation of the findings, as per published advice,[32] a number of multimedia resources (podcasts, infographics and videos) will be created with the aim of subsequent dissemination via different outlets (social media platforms/media/conferences). The results will be reported through these mechanisms regardless of whether negative or positive relationships are reported. Key stakeholders outside of the authors (such as World Rugby/British Association of Sport and Exercise Medicine) will also be engaged early to support a deeper understanding of context[30] and the subsequent dissemination of materials.

CONCLUSION

Scoping reviews provide a useful framework to address broad research questions and to identify key research priorities. This protocol, based on best-practice methodology, provides the basis and rigour for us to address the key research questions identified, map the evidence concerning rugby and various health outcomes, and identify key research priorities that would enable various stakeholders to make a more informed choice about participating in the sport.

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Contributors SAG proposed the review. SAG, AM, KAS and SPTK identified the method and identified the framework for the review. SAG, NKPP and CH proposed the search strategy. All authors contributed to the development of the research questions and the study design. All authors developed the first and subsequent drafts of the manuscript, and also reviewed and approved the manuscript.

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Competing interests SAG receives remuneration for clinical work in professional rugby. AM receives remuneration from Scottish Rugby Union for clinical work. SPTK is employed by the Rugby Football Union as medical services director. JHMB is a current member of the England Professional Rugby Injury Surveillance Project Steering Group and is remunerated for clinical and research work in professional rugby. KAS is employed by the Rugby Football Union as medical research lead. NKPP and CH declare no competing interests.

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