

Results Athletes reported a mean of 4.0 ± 4.9 symptoms (median=2, IQR=0–6) with an average severity score of 7.9 ± 12.3 (median=2, interquartile range=0–10). Most (71.8%) athletes reported never having sustained a concussion prior to testing; 17.5% reported one prior concussion (range=0–10 reported concussions). Mean scores \pm SD for major components of the SCAT5: 4.8 ± 0.53 for orientation, 20.7 ± 4.0 for immediate memory, 3.8 ± 1.3 for concentration, 4.0 ± 4.2 for balance, 6.9 ± 1.9 for delayed recall, and 12.4 ± 3.0 for Standardized Assessment of Concussion. No sex differences were observed for concussion history or the number and severity of current symptoms. Females scored higher than males in the immediate memory (21.7 vs. 19.8, $p < 0.001$), orientation (4.9 vs. 4.8, $p = 0.047$), and delayed recall tasks (7.3 vs. 6.5, $p = 0.001$).

Conclusions Normative values for baseline SCAT5 performance are presented for a population of healthy Olympic athletes. This information can be considered by clinicians interpreting SCAT5 results in athletes who do not have a known baseline score.

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CONCUSSIONS AMONG FEMALE ATHLETES IN ICELAND: STRESS, DEPRESSION, ANXIETY AND QUALITY OF LIFE

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Background Studies have shown mental distress in male athletes with self-reported concussions. Female athletes may have more persistent symptoms following concussions but studies on female mental outcomes are lacking.

Objective To examine the relationship between self-reported concussions and stress, depression, anxiety and quality of life among female athletes.

Design An online questionnaire was distributed through sports-related Facebook pages (snowball sampling) to females in high-concussion risk sports. Participants answered background questions and mental health questionnaires. They reported the total number of sustained concussions after reading a definition of a concussion. The study was approved by the National Bioethics Committee.

Setting The questionnaire was sent out by an academic research group (Reykjavik University) to former and current female athletes (18–45 years), in high-concussion risk sports.

Patients (or Participants) 508 Icelandic female athletes ($M = 26.9$, $SD = 7.1$) currently or previously training and competing in the two top leagues in basketball, soccer and handball, in the top league in ice-hockey and in national tournaments in martial arts. Participants signed an electronic informed consent.

Interventions (or assessment of risk factors) Independent variable: Number of self-reported concussions.

Main outcome measurements Perceived Stress scale (PSS), Patient Health Questionnaire (PHQ-9), General Anxiety Disorder Questionnaire (GAD-7), and Quality of Life Scale (QOLS).

Results Female athletes with a history of one or more concussions scored significantly higher on PHQ-9, PSS and GAD-7 than those reporting no concussions. The QOLS

did not differ between the groups. Concussed athletes were 3.9 times more likely to score above clinical cut-off on PHQ-9 and 2.3 times more likely to score above clinical cut-off on GAD-7 than those with no concussions. Number of concussions predicted scores on PSS, PHQ-9, GAD-7 and QOLS.

Conclusions Female athletes with a history of concussion have worse mental health than those with no history of concussion. The higher number of concussions sustained, the worse they feel.

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HOW DO WE DO BETTER? MANAGING COMMUNITY RUGBY CONCUSSIONS IN A PRIMARY CARE SETTING

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Background Concussions in rugby are of a global player welfare concern. To address this challenge New Zealand Rugby has employed a social ecological model to develop a concussion management pathway (CMP). Following a suspected concussion, the pathway encourages compliance and supports the relevant stakeholders (e.g. players, coaches, physiotherapists, doctors) throughout the recovery process.

Objective To examine (i) user uptake of technology that operationalises the CMP and (ii) stakeholder experiences.

Design Prospective mixed-methods multi-centre study.

Setting Community rugby in three New Zealand provincial unions.

Patients (or Participants) Community rugby male and female players ($n = 1893$) were invited to participate of which 1540 provided pre-season baseline data.

Interventions (or assessment of risk factors) Pre-season, players were baseline tested using a modified SCAT5. In season, suspected concussions were logged on an App, notifying relevant stakeholders and entering the player into the CMP. Players were referred to a doctor who assessed them for a concussion while comparing to the player's baseline assessment via a customized online portal. This information was also used by the doctor at the time of medical clearance. To gain a deeper understanding of the participants' experience with the CMP, 130 stakeholders were interviewed post-season.

Results Two-hundred suspected concussions were logged, of these 154 saw a doctor for a diagnosis, 171 obtained medical clearance following completion of GRTP, and 17 were referred on for further investigation/treatment by a doctor involved in the pilot.

Stakeholders agreed that having a clearly defined pathway facilitated an efficient and informed management process for concussions and encouraged compliance with seeking medical advice/clearance.

Conclusions The CMP provides an electronic platform for monitoring compliance with medical visits and the safe RTP while ensuring all stakeholders are aware of the player's status. The system provides controlled access to centrally stored baseline information to help inform medical decisions. Stakeholders supported the use of the CMP.