

**Background** Para athletes may have specific mental health challenges that, together with the demands of high-level sports performance, could put them at risk for mental health disorders.

However, research in this population is limited.

**Objective** To investigate factors associated with mental health in South African para athletes.

**Design** Descriptive, cross-sectional survey.

**Setting** National to international level athletes competing in the 2019 National Championships.

**Patients (or Participants)** A total of 124 athletes (93 males; 31 females) with a mean age 26.7 ( $\pm 9.2$ ) were included in the study.

**Interventions (or Assessment of Risk Factors)** Demographic, medical history and sleep-related variables were included in bivariate analyses to assess their association with mental health. Between-group differences were analysed using the Mann-Whitney U or T-tests. Variables significantly associated in the bivariate analyses were included in multiple regression analyses for mental health.

**Main Outcome Measurements** Mental health was measured with the State/Trait Anxiety Inventory (STAI) and the Kessler Psychological Distress Scale (K-10 Questionnaire). Sleep quality, sleepiness and chronotype were measured with the Pittsburgh Sleep Quality Index (PSQI), the Epworth Sleepiness scale and Morningness-Eveningness Questionnaire (MEQ-SA).

**Results** The model explained 40% of the variance in mental health ( $F=12.04$ ,  $p<0.001$ ) in these athletes. Compared to athletes with 'good' sleep quality, K-10 and STAI scores were significantly higher (indicating poorer mental health) in athletes with 'poor' sleep quality ( $U=2.6$ ,  $p<0.001$ ;  $t(116.8)=-4.30$ ,  $p<0.001$ ). 'Poor' sleep quality (B:0.8; 95% CI 0.4 to 1.3), moderate to severe daytime sleepiness (B:4.2; 95% CI 1.1 to 7.3) intermediate (B:3.5 95% CI 0.4 to 6.6) and evening chronotypes (B:12.0 95% CI 5.0 to 19.1), the presence of allergies (B:3.9 95% CI 0.1 to 7.6) and male gender (B:3.3 95% CI 0.1 to 6.5) were most strongly associated with high STAI scores.

**Conclusions** This study has identified novel factors associated with poor mental health in elite para athletes. As some of these factors are modifiable, further research towards prevention strategies is warranted.

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#### SUICIDAL IDEATION AMONG ELITE ATHLETICS ATHLETES: CROSS-SECTIONAL STUDY OF ASSOCIATIONS WITH SEXUAL AND PHYSICAL ABUSE VICTIMIZATION AND PSYCHOLOGICAL RESOURCEFULNESS

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**Background** Physical and sexual abuse victimization have been connected with negative effects on health long after the abuse has stopped. When athletes encounter situations of defeat and entrapment, the likelihood that suicidal ideation will emerge is increased in situations when negative motivational elements are present, for instance, at low levels of social support.

**Objective** To examine associations between suicidal ideation and sexual and physical abuse among active and recently retired elite Athletics (track and field) athletes.

**Design** Cross-sectional study.

**Setting** Swedish elite Athletics.

**Participants** Athletes (n=402) who had been selected for a Swedish Athletics team for international competitions between 2011 and 2017.

**Assessment of Risk Factors** Lifetime experience of sexual and physical abuse, athlete personal and sociodemographic characteristics, Athletics participation, sense of coherence (SOC-13), and coping strategies (Brief Cope).

**Main Outcome Measurements** Suicidal ideation and 1-year period prevalence of non-sports injury.

**Results** 192 athletes (47.8%) returned complete data sets. The prevalence of suicidal ideation was 15.6% (males 17.4%; females 14.2%) and the non-sports injury prevalence was 8.0% (males 11.6%; females 5.7%). Suicidal ideation was among females (Nagelkerke  $R^2=0.33$ ) associated with sexual abuse victimization (Odds ratio (OR) 5.94, 95% Confidence interval (CI) 1.42–24.90;  $P=0.015$ ) and lower sense of coherence (OR 0.90, CI 0.85–0.96;  $P=0.001$ ). Among males ( $R^2=0.25$ ), suicidal ideation was only associated with use of behavioural disengagement for coping (OR 1.51, CI 1.18–1.95;  $P=0.001$ ). Non-sports injury prevalence was among females ( $R^2=0.23$ ) associated with sexual abuse victimization (OR 8.61, CI 0.02–0.90;  $P=0.039$ ) and participation in an endurance event (OR 7.37, CI 1.11–48.90;  $P=0.039$ ), while among males ( $R^2=0.11$ ) only having immigrant parents (OR, 5.67, CI 1.31–24.45;  $P=0.020$ ) was associated with having sustained an injury outside sports.

**Conclusions** Given that about one out of six athletics athletes had experienced suicidal ideation, the present results warrant and can be used in suicide prevention among elite athletes.

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#### ATHLETE HEALTH MONITORING IN PARALYMPIC ATHLETES: A 52-WEEK PROSPECTIVE STUDY

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**Background** Sports-related injuries and illnesses in Paralympic sport is a growing concern, but knowledge about the aetiology and risk factors is limited.

**Objective** To describe the annual incidence of injuries and illnesses among Paralympic athletes and to assess risk factors.

**Design** Prospective cohort study.

**Setting** Paralympic athletes

**Patients (or Participants)** 107 Swedish Paralympic elite athletes with vision, physical and intellectual impairments, active in 19 para sports.

**Interventions (or Assessment of Risk Factors)** The athletes were asked to weekly report over 52 weeks the annual incidence of injuries, illnesses and quality of health in an adapted eHealth application.

**Main Outcome Measurements** Time to event, incidence rate (IR) and incidence proportion (IP) and risk factors.

**Results** The median number of completed weekly reports was 45 (IQR 25–52). The annual IP for injury was 68% and for illness 77%. The injury IR was 6.9/1000 hours and the illness IR 9.3/1000 hours. The median time to injury was 19 weeks (95% CI: 10.5–27.4) and to illness 9 weeks (95% CI: 1.4–16.6). Most injuries occurred during training and 34% were classified as severe ( $\geq 21$  days of time loss). An increased injury risk was observed among athletes in team sports (HR 1.88; 95% CI: 1.19–2.99), athletes with a previous severe injury (HR 2.37; 95% CI: 1.47–3.83) and male athletes (HR 1.76; 95% CI: 1.06–2.93). The most common illness type was infection (84%). Athletes in team sports (HR 1.64; 95% CI: 1.05–2.54) had a higher illness risk. One third of the athletes (34%; 95% CI 32.0–35.2) reported weekly that they felt anxious/depressed and 48% (95% CI 45.7–50.1) reported moderate or extreme pain every week.

**Conclusions** Paralympic athletes report a considerably high incidence of injuries and illnesses as well as pain and psychological complaints. This emphasizes the need to develop preventive strategies and optimize medical services for this heterogeneous athlete population.

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#### THE IMPORTANCE OF HEALTH MONITORING IN COMPETITIVE PARA ATHLETES: RESULTS OF THE GERMAN INJURY AND ILLNESS SURVEILLANCE SYSTEM

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**Background** Injury profiles during Paralympic Games have been extensively studied, whereas longitudinal monitoring data of para-athletes are still sparse.

**Objective** Implementation of an injury and illness surveillance system in high-level Paralympic athletes.

**Design** Longitudinal monitoring of injuries and illnesses within the German National Paralympic Team.

**Setting** In preparation for the Paralympic Games in Rio de Janeiro 2016, all German elite athletes (n=178) were invited to take part in the weekly monitoring program using the Oslo Sports Trauma Research Center Questionnaire. The prevalence data on injury and illness were extracted and analysed with regard to age, sexes, impairment, sports and training volume. Acceptance of the program was evaluated at the end.

**Patients (or Participants)** 58 athletes comprised the final cohort (32 male, 26 female; main sports: paracycling (n=18), wheelchair basketball (n=12), swimming (n= 8). Main disabilities: SCI (n=19), limb pathologies (n=15), neurological impairments (n=17).

**Interventions (or Assessment of Risk Factors)** Prospective cohort study.

**Main Outcome Measurements** Weekly prevalence of injuries and illnesses, injury rate per 1000 athlete-days.

**Results** With a weekly response rate of  $92.4 \pm 8.5\%$ , 10.927 athlete-days were recorded with 306 (199) training-days being lost due to illnesses (injuries). The weekly prevalence of all health problems was 26% (95% CI 23% - 29%). Female

athletes had a higher prevalence (30.6%) compared to males (22.4%). The number of substantial complaints did not change over time, whereas the overall prevalence declined. Wheelchair athletes had higher incidence rates for gastroenterological problems, urinary tract infections and neurological complaints as well as higher rates of shoulder and elbow injuries. The participating athletes reported a high satisfaction with the weekly monitoring program.

**Conclusions** The weekly prevalence of overuse injuries and illnesses in Paralympic athletes is high, even early in the season, and varies substantially between handicaps and disciplines. Illnesses seem to be even more important than injuries.

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#### INJURY RISK IN SCHOOL CHILDREN WITH PROBABLE DEVELOPMENTAL COORDINATION DISORDER OR ATTENTION DEFICIT HYPERACTIVITY DISORDER

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**Background** Sport and recreation-related (S&R) injury burden is high in adolescents (ages 13–19; incidence proportions (IP) ranging 29.4–40.2 injuries/100 students/year). There is a paucity of S&R injury data in children (<13 years). Individuals with Developmental Coordination Disorder (DCD) and/or Attention Deficit Hyperactivity Disorder (ADHD) may have a higher risk of injury; however, the focus has not been S&R injury or children in these studies.

**Objective** To examine S&R injury risk in school children, comparing typically developing children to those screening positive for probable (p) DCD and/or ADHD.

**Design** Cross-sectional study.

**Setting** Elementary schools in Calgary, Canada.

**Patients (or Participants)** In total, 681 students (grades 4–6; ages 8–13) from 33 randomly selected schools were recruited.

**Interventions (or Assessment of Risk Factors)** Children were screened for pDCD and/or pADHD through the DCD Questionnaire (DCDQ'07) and the Vanderbilt ADHD Rating Scale (VADPRS), respectively.

**Main Outcome Measurements** S&R participation and one-year injury history (medical attention and time loss) were child/parent/guardian reported on a survey.

**Results** The overall S&R IP was 28.2 injuries/100 participations (95%CI: 24.8–31.6). The injury rate (IR) was 2.43 injuries/1000-participation hours (95%CI: 2.06–2.85), with no significant differences between typically developing children and those screening positive for pDCD and/or pADHD. The IR for typically developing children was 2.2 injuries/1000-hours (95%CI: 1.79–2.68), 3.13 (95%CI: 2.21–4.42) for pDCD, 2.82 (95%CI: 1.29–5.34) for pADHD, and 2.93 (95% CI: 1.52–5.12) for children with pDCD and ADHD. Compared to typically developing children, children with pDCD [adjusted odds ratio (OR) = 1.08; 95%CI: 0.64–1.84], pADHD (OR = 1.14; 95%CI: 0.53–2.45), and pDCD/ADHD (OR = 1.24; 95%CI: 0.58–2.65) were at no greater risk for S&R injuries.