




# Athletes who have already experienced an injury are more prone to adhere to an injury risk reduction approach than those who do not: an online survey of 7870 French athletics (track and field) athletes

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## ABSTRACT

**Objective** To compare the perception towards injury risk reduction approach between athletes who have already experienced an injury and those who have not.

**Methods** We conducted a cross-sectional study using a one-time online survey asking athletics athletes licensed at the French Federation of Athletics (<http://www.athle.fr>) about their perceptions regarding injuries and injury risk reduction behaviours. We statistically compared athletes who already experienced an injury and those who did not.

**Results** A total of 7870 athletes were included. 90% of athletes declared having experienced at least one injury. They (1) were proportionally more men than women, (2) had significantly more years of experience in athletics, (3) had a significant difference in disciplines (more hurdles, jumps and combined events and fewer sprint athletes), (4) had a significant difference in competition levels (more national and less departmental levels) and (5) reported significantly higher values or agreements in favour of injury risk reduction approach, compared with uninjured athletes. There were significantly more athletes declaring following injury risk reduction programmes among athletes who experienced at least one injury than those who did not.

**Conclusions** Athletes who experienced at least one injury during their lifetime were more prone to adhere to injury risk reduction strategies than athletes who have never experienced an injury. Their entourage (coaches and health professionals) should use this fertile ground to implement injury risk reduction strategies. In addition, their experience should be disseminated to uninjured athletes to help them adhere to injury risk reduction without injury experience.

## INTRODUCTION

Injuries are a negative consequence of athletics (track and field) activity.<sup>1</sup> Injuries physically affect athletes, potentially affecting musculoskeletal function, athletic performance<sup>2–4</sup> and athletic career<sup>5</sup> and resulting

## WHAT IS ALREADY KNOWN ON THIS TOPIC

- ⇒ About two-thirds of athletics athletes experience at least one injury per season.
- ⇒ Previous online surveys reported that the athletes and all stakeholders around them agreed about the relevance of the injury risk reduction approach in athletics.
- ⇒ Qualitative studies reported that there is a learning process regarding injury risk reduction throughout the athlete's career and that injury experiences take an important place in this.

## WHAT THIS STUDY ADDS

- ⇒ Almost all participating athletes (90.0%) declared having experienced at least one injury during their lifetime.
- ⇒ Athletes generally perceive that injury is part of the sport, that inappropriate injury management leads to higher injury risk and that there is interest in using injury risk reduction programmes.
- ⇒ Athletes who declared having experienced at least one injury during their lifetime reported significantly higher values or agreements in favour of injury risk reduction approach and behaviours than uninjured athletes.

in long-term sequelae.<sup>6,7</sup> The injury risk associated with athletics supports the need to continue developing and improving injury risk reduction strategies to allow healthy and sustainable athletics activity.<sup>1</sup> Previous online surveys reported that the athletes and all stakeholders around them agreed about the relevance of injury risk reduction in athletics.<sup>8,9</sup> In addition, qualitative studies reported a learning process regarding the injury risk reduction approach throughout the athlete's career and that injury experiences are important in this.<sup>10,11</sup> It has also

### HOW THIS STUDY MIGHT AFFECT RESEARCH, PRACTICE OR POLICY

⇒ The present results support the interest in using injury experience to help athletes and their teams reduce injury risk through, for instance, education, setting up preventative routines and improved communication. It could also be interesting that injured athletes share their experience and motivation to engage in injury risk reduction with other athletes. Peer learning is sometimes more efficient than when the information come from health professionals. More experienced athletes could be role models to share their experiences with younger athletes. Finally, reflecting on another view of injuries and their risk reduction could help to achieve a better life and cope with this risk.

been hypothesised that the injury experience could be an opportunity to engage athletes and their entourage in an injury risk reduction approach.<sup>12</sup> To support this hypothesis, it would be interesting to explore through a quantitative approach whether the perception regarding injury risk reduction differs between athletes who have already experienced an injury and those who have not. In addition, injuries lead to adverse psychological consequences, including negative emotions (stress, anxiety and fear of reinjury) and diminished mental health (depression and suicidal ideation)<sup>13</sup> or well-being,<sup>14</sup> underlined by a lack of motivation and low self-efficacy regarding recovery capabilities.<sup>15–17</sup> These adverse psychological consequences can play a role in the choice to continue athletics practice and adopt injury risk reduction strategies. There is a lack of athletics-specific knowledge regarding psychological consequences. Thus, it would be interesting to better understand these psychological consequences in athletics to manage athletes optimally.

This study's main objective was to compare the adherence to injury risk strategies between athletes who had previously sustained an injury and those who had not. The purpose of a secondary aim was to investigate how injured athletes perceived the psychological effects of their injuries.

## METHODS

### Study design and procedure

We conducted a cross-sectional study using a one-time online survey asking athletics athletes licensed at the French Federation of Athletics (FFA, <http://www.athle.fr>) about their perceptions regarding injuries and injury risk reduction approaches. The study was reviewed and approved by the Saint-Etienne University Hospital Ethical Committee (Institutional Review Board: IORG0007394, IRBN232020/CHUSTE).

### Population

Inclusion criteria were athletes (1) licensed at the FFA, (2) aged 18 years or older, (3) licensed as competing athletes (ie, practising athletics (track and field) in competition and not only as leisure) and (4) legally able to provide consent to participate in the present study.

### Patient and public involvement

There was no patient or public involvement. Athletes and the public were not involved in the trial design, development of the study questions, choice of outcome measures or conduct of the present study. However, these results should be considered patient/public involvement for further research or injury risk reduction development. A summary of the study results will be disseminated to the public.

### Equity, diversity and inclusion statement

All athletes licenced at the FFA aged older than 18 years and legally able to provide participating consent were eligible for this study without any restriction based on sex, race/ethnicity/culture, socioeconomic level or representation from marginalised groups. Athletes younger than 18 were not included in the present study because of the complexity of obtaining parental (or legal tutors) approval in an online survey. Apart from sex and age, no other sociodemographic data were collected from the participants and considered in the analysis and interpretation of results. The research team included one woman and four men, one junior researcher, one physician and three senior researchers, from various disciplines (sport medicine, sport psychology and sport science) and two different European countries.

### Data collection

The survey was developed by two sport medicine physicians from a public hospital (PE and MS), including one researcher in athletics injury prevention (PE), one researcher in sport psychology with clinical activities of athletes' follow-up (AR), one researcher experienced in sport science and injury prevention (EV) and one athletics coach and researcher in sport psychology (SM). After two review rounds, all co-authors approved the survey, which was then pilot-tested in February 2020 on three competitive athletics athletes practising high jump, combined events, and long-distance running. All coauthors performed the final validation of the survey.

The online survey was composed of four parts: (1) information on the athletes (sex, age, number of years of athletics practice experience, number years of practice in the main discipline, main athletics discipline<sup>18 19</sup> and competition level<sup>19</sup>), (2) history of injury (did the athlete experience any injury during their athletics lifetime? If so, how many?), (3) perceptions of psychological consequences regarding the most recent injury and (4) perception towards injury risk reduction approach and behaviours (online supplemental material). For parts 3 and 4, questions were developed by the coauthors after reading the literature on the topic and based on their clinical experience (clinical follow-up of athletics athletes as physicians or sport psychologists). We did not use a validated questionnaire to better match our personal questions on perceptions of psychological consequences because it did not exist on perception towards injury risk reduction approach. For parts 3 and 4, athletes had to

reply using a continuous scale from disagree (0) to agree (10). All questions were mandatory to avoid missing data. The survey is presented in supplementary material.

An injury was defined as pain, discomfort or damage to the musculoskeletal system occurring during sport practice (training or competition) and has resulted in consequences on sport practice (reduction in practice, adaptation or incomplete practice, or discontinuation of the practice), regardless of consultation by a health professional.<sup>19 20</sup> An exercise-based injury risk reduction programme was defined in the survey as a set of specific exercises related to their sport which aims to reduce the risk of injury, for example, muscle strengthening, stretching or balance exercises.<sup>19</sup> The survey provided these definitions to the athletes (online supplemental material).

The invitation to the survey was distributed via an email sent by the FFA to the registered email address of licensed competing athletes on 22 April 2020. No reminder was sent after the initial invitation. The survey was open for 6 months until 22 October 2020 to allow the maximum number of respondents to participate in this study. As this was an exploratory study, no sample size calculation was performed or needed.

### Statistical analyses

We performed a descriptive analysis using frequency with percentages for categorical variables and mean with standard deviations ( $\pm$  SD) for continuous variables. We calculated Cronbach's alpha for the questions regarding psychological perceptions and for the questions regarding the perceptions towards injury risk reduction.

We then compared athletes who had already experienced an injury and those who did not using a  $\chi^2$  test for categorical and using Student's t-test for continuous variables. In addition, to take into account some potential confounding factors in the analyses, we also performed binomial logistic regressions with a history of injury (yes/no) as the dependent variable and each item of perception towards injury risk reduction approach and behaviours (online supplemental material) as the independent variable, adjusted for age, sex, number of years of athletics practice, main discipline, number of years of main discipline practice and competition level. OR and 95% CI were calculated.

Analyses were performed using Excel (Office, Microsoft, 2021), R (V.4.0.2, Copyright 2020, the Foundation for Statistical Computing (Comprehensive R Archive Network, <http://www.R-project.org>) or DATAtab (DATAtab Team (2024). DATAtab: Online Statistics Calculator. DATAtab e.U. Graz, Austria. URL <https://datatab.net>). Significance was accepted at  $p < 0.05$ .

## RESULTS

### Population

From a list of 75 575 competitive licensed athletes, a total of 9030 athletes replied to the invitation to participate in this study between 22 April 2020 and 22 October

2020, among which 7870 athletes (10.4%) met inclusion criteria, gave their informed consent to participate in the present study and were included in the analysis. We did not include in the analyses 1160 athletes because they refused to participate ( $n=41$ ), they were less than 18 years old ( $n=246$ ), they reported not practising athletics ( $n=693$ ) or they were not legally able to provide consent to participate in the present study ( $n=180$ ). The characteristics of the final sample are presented in [table 1](#).

### History of injuries

A total of 7081 (90.0%) athletes declared having experienced at least one injury during their lifetime. Among them, 1468 (20.7%) athletes reported 1 injury, 1693 (23.9%) athletes reported 2 injuries, 1267 (17.9%) reported 3 injuries, 743 (10.5%) reported 4 injuries, 623 (8.8%) reported 5 injuries, 286 (4.0%) reported 6 injuries, 126 (1.8%) reported 7 injuries, 108 (1.5%) reported 8 injuries, 42 (0.6%) reported 9 injuries and 725 (10.2%) reported 10 or more injuries.

[Figure 1](#) presents the proportion of athletes who declared having experienced at least one injury during their lifetime according to their years of athletics practice.

Athletes having experienced at least one injury during their lifetime (1) were proportionally more men than women; (2) had significantly more years of experience in athletics and their main discipline; (3) had a significant difference in discipline distribution with more athletes practising hurdles, jumps and combined events and fewer sprints; and (4) had a significant difference in competition level distribution with more national level and less departmental level athletes, compared with athletes who declared they had experienced no injury ([table 1](#)).

### Perception about injury risk reduction approach and behaviours

Perceptions regarding injury risk reduction approaches and strategies are reported in [table 2](#). For the questions regarding the perception of injury risk reduction, Cronbach's alpha was 0.63, considered questionable; 0.38 for the general perception of injury risk reduction, considered unacceptable; 0.48 for barriers and levers regarding injury risk reduction strategies, considered bad; and 0.78 for perceptions about injury risk reduction strategy behaviours, considered acceptable. Athletes generally perceive that injury is part of the sport, that inappropriate injury management leads to higher injury risk and that there is an interest in using exercise-based injury risk reduction programmes ([table 2](#)). They agreed highly with the proposed injury risk reduction strategies ([table 2](#)). Most reported scores were significantly higher in athletes who experienced at least one injury than those who did not ([table 2](#)). There were significantly more athletes declaring following injury risk reduction programmes among athletes who experienced at least one injury than those who did not ([table 2](#)). Athletes who experienced at least one injury had higher odds than those who did

**Table 1** Characteristics of the 7870 athletics (track and field) athletes included in the present study

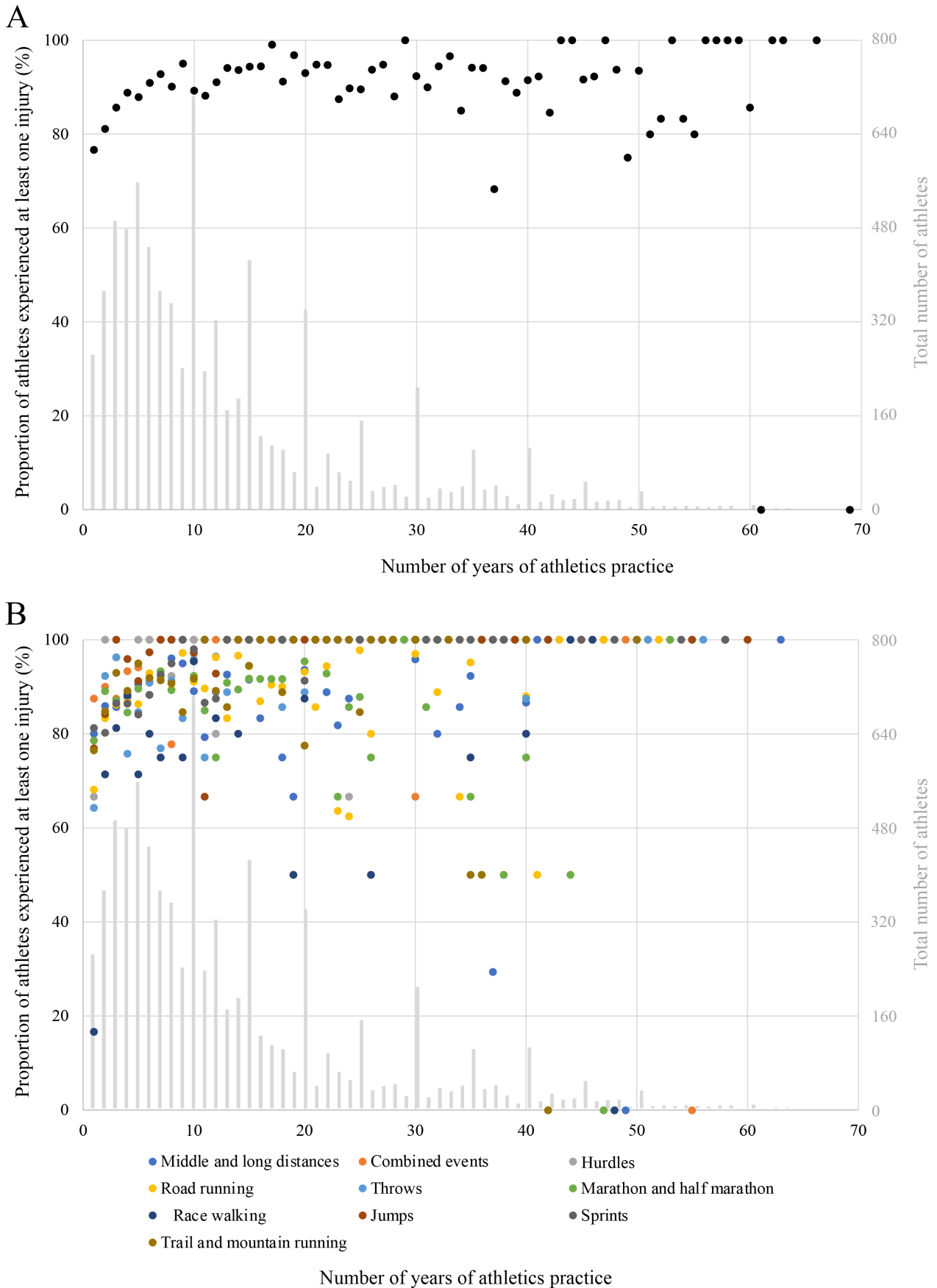
	Total		Athletes who experienced at least one injury during their lifetime		Athletes who did not experience any injury during their lifetime		P value
n (%)	7870	(100.0)	7081	(100.0)	789	(100.0)	
Sex (n (%))							0.019
Women	2940	(37.4)	2615	(36.9)	325	(41.2)	
Men	4930	(62.6)	4466	(63.1)	464	(58.8)	
Age (years) (mean SD)	37.9	±14.8	37.9	±14.7	37.8	±15.7	0.789
Number of years of athletics practice (mean±SD)	13.2	±11.2	13.4	±11.1	11.3	±11.3	<0.001
Number of years of main discipline practice (mean±SD)	10.3	±9.2	10.4	±9.2	9.0	±9.3	<0.001
Discipline (n (%))							<0.001
Sprints	847	(10.8)	751	(10.6)	96	(12.2)	
Hurdles	232	(2.9)	222	(3.1)	10	(1.3)	
Jumps	421	(5.3)	404	(5.7)	17	(2.2)	
Throws	302	(3.8)	268	(3.8)	34	(4.3)	
Combined events	154	(2.0)	144	(2.0)	10	(1.3)	
Middle and long distances	1591	(20.2)	1419	(20.0)	172	(21.8)	
Marathon and half marathon	1092	(13.9)	978	(13.8)	114	(14.4)	
Race walking	218	(2.8)	181	(2.6)	37	(4.7)	
Road running	1901	(24.2)	1708	(24.1)	193	(24.5)	
Trail and mountain running	1112	(14.1)	1006	(14.2)	106	(13.4)	
Competition level (n (%))							<0.001
International	460	(5.8)	413	(5.8)	47	(6.0)	
National	2260	(28.7)	2085	(29.4)	175	(22.2)	
Regional	3192	(40.6)	2863	(40.4)	329	(41.7)	
Departmental/local	1958	(24.9)	1720	(24.3)	238	(30.2)	

not of declaring that injury is part of the sport, risking injury is necessary to achieve peak performance, poor injury management can expose them to reinjury and exercise-based injury risk reduction programmes would decrease injury occurrence (table 2). Athletes who experienced at least one injury had higher odds of declaring levers regarding injury risk reduction and lower odds of declaring barriers towards injury risk reduction strategies than those who did not (table 2).

### Perceptions of psychological consequences of the most recent injury

The perceptions of psychological consequences (reported by the 7081 athletes who experienced at least one injury) regarding their most recent injury are presented in table 3. For the questions regarding

psychological perception, Cronbach's alpha was 0.74, which is considered acceptable. In general, they reported that their most recent injury led to negative emotions (eg, high mean score for the question 'My injury caused sadness, frustration or disgust' (7.3±2.7)) but did not affect their motivation to practice athletics (eg, middle score for the questions 'Following my injury, I changed my sporting goals' (4.8±3.7)) and self-confidence (eg, middle score for the questions 'Following my injury, I was worried about returning to practice my sport' (4.8±3.4)) or change their practices (eg, middle score for the questions 'Following my injury, I changed my lifestyle (sleep, diet, hydration, etc)' (4.4±3.3) or 'The injury motivated me to do an injury risk reduction programme' (3.4±3.4)) (table 3).



**Figure 1** Proportion of athletes who experienced at least one injury during their lifetime according to their number of years of athletics practice (A) and by disciplines according to their number of years of practice of the main discipline (B). Grey bars present the total number of athletes who responded by categories of the number of years of athletics practice.

**Table 2** Perception towards injury risk reduction

	Total		Athletes who experienced at least one injury during their lifetime		Athletes who did not experience any injury during their lifetime	P value	OR	(95% CI)	P value	
<b>General perception about injury risk reduction</b>										
Injury is part of sport	7.3	±2.6	7.4	±2.6	6.9	±2.9	<0.001	1.05	(1.02 to 1.08)	<0.001
Risking injury is necessary to achieve peak performance	4.0	±3.2	4.0	±3.2	3.6	±3.2	<0.001	1.03	(1.01 to 1.06)	0.016
I consider the risk of injury in my life choices (choices of school, work, etc)	5.3	±3.3	5.3	±3.3	5.5	±3.2	0.171	0.98	(0.99 to 1.00)	0.079
I only see the doctor when I am injured	6.0	±3.6	6.1	±3.5	5.0	±3.7	<0.001	1.09	(1.07 to 1.12)	<0.001
I see the physiotherapist only when I am injured	6.8	±3.6	6.9	±3.6	5.6	±3.9	<0.001	1.11	(1.09 to 1.13)	<0.001
If I manage an injury poorly, I expose myself to a higher risk of recurrence or reinjury	9.1	±1.6	9.2	±1.5	8.8	±1.9	<0.001	1.14	(1.09 to 1.18)	<0.001
I think an exercise-based injury risk reduction programme would decrease the occurrence of injuries	7.6	±2.2	7.7	±2.2	7.3	±2.3	<0.001	1.09	(1.05 to 1.12)	<0.001
<b>Use of exercise-based injury risk reduction programme</b>										
Have you followed an exercise-based injury risk reduction programme in your career? (n (%) of 'yes')	2338	(29.7)	2145	(30.3)	193	(24.5)	<0.001	1.22	(1.03 to 1.46)	0.025
Have you followed an exercise-based injury risk reduction programme during the current season? (n (%) of 'yes')	1825	(23.2)	1691	(23.9)	134	(17.0)	<0.001	1.43	(1.18 to 1.75)	<0.001
<b>Barriers and levers regarding injury risk reduction strategies</b>										

Continued

Table 2 Continued

	Total		Athletes who experienced at least one injury during their lifetime		Athletes who did not experience any injury during their lifetime		P value	OR	(95% CI)	P value
It is difficult to integrate an exercise-based injury risk reduction programme because it takes time	4.4	±3.0	4.4	±3.0	4.5	±3.0	0.587	0.99	(0.97 to 1.02)	0.578
It is useless to carry out risk reduction exercises when an injury is linked to an unmodifiable cause (such as a morphological anomaly, an uncontrolled external event, etc)	2.7	±2.7	2.6	±2.7	3.1	±2.9	<0.001	0.94	(0.92 to 0.97)	<0.001
An avoidable injury (which would not have occurred with the modification of injury risk factors, in particular with preventive exercises such as muscle strengthening, stretching and balance) leads to even more sadness, frustration or disgust	7.5	±2.5	7.6	±2.5	7.3	±2.6	0.006	1.04	(1.01 to 1.07)	0.004
The reason that could make me follow an injury risk reduction programme is an injury that lasts a long time	7.4	±2.7	7.5	±2.7	7.1	±2.8	<0.001	1.06	(1.03 to 1.09)	<0.001
The reasons that might make me follow an exercise-based injury risk reduction programme are the consequences of an injury, particularly on sport performance and the ability to participate in competitions	7.8	±2.3	7.9	±2.3	7.4	±2.4	<0.001	1.09	(1.06 to 1.12)	<0.001

Continued

Table 2 Continued

	Total		Athletes who experienced at least one injury during their lifetime		Athletes who did not experience any injury during their lifetime		P value	OR	(95% CI)	P value
The reasons that might make me follow an exercise-based injury risk reduction programme are an injury that could have been avoided by adopting an exercise-based injury risk reduction programme	8.0	±2.1	8.0	±2.1	7.6	±2.3	<0.001	1.09	(1.05 to 1.12)	<0.001
I am not sure that such an exercise-based injury risk reduction programme is effective for me	2.7	±2.7	2.6	±2.6	3.3	±2.8	<0.001	0.91	(0.89 to 0.94)	<0.001
<b>Perceptions about injury risk reduction strategy behaviours</b>										
Lifestyle habits (sleep, diet, hydration, etc) have a vital role in preventing injuries	9.1	±1.3	9.1	±1.3	9.0	±1.5	0.179	1.03	(0.97 to 1.08)	0.352
Listening to your body and its pain helps prevent injuries	9.1	±1.2	9.1	±1.2	9.1	±1.4	0.447	1.02	(0.96 to 1.08)	0.550
Listening to your fatigue helps prevent injuries	9.1	±1.2	9.1	±1.2	9.1	±1.4	0.551	1.01	(0.95 to 1.07)	0.696
I talk to my coach about any pain or fatigue	7.4	±2.7	7.3	±2.7	7.5	±2.8	0.042	0.97	(0.94 to 0.99)	0.017
My coach adapts my training if I feel pain or am tired	8.1	±2.4	8.0	±2.4	8.2	±2.3	0.026	0.97	(0.92 to 0.99)	0.008
I adapt the training load in case of pain or fatigue	8.2	±2.1	8.1	±2.1	8.4	±2.1	<0.001	0.92	(0.89 to 0.96)	<0.001
Feeling unwell or low morale can lead to injury	8.1	±2.2	8.1	±2.2	7.9	±2.4	0.005	1.04	(1.01 to 1.07)	0.014
Expressing my emotions and feelings helps prevent injuries	6.9	±2.7	6.9	±2.7	7.2	±2.7	0.002	0.95	(0.92 to 0.98)	<0.001

Continued



**Table 2** Continued

	Total		Athletes who experienced at least one injury during their lifetime		Athletes who did not experience any injury during their lifetime		P value	OR	(95% CI)	P value
Having knowledge about the functioning of the human body and health, as well as the value of injury risk reduction, would help me implement risk reduction measures	8.7	±1.6	8.7	±1.6	8.6	±1.8	0.208	1.02	(0.98 to 1.07)	0.342
Being involved in creating an injury risk reduction exercise programme would help me implement risk reduction measures	7.8	±2.3	7.8	±2.3	7.6	±2.4	0.05	1.03	(1.00 to 1.06)	0.080

The scores from 0 to 10 reported by athletes are presented with mean±SD and categorical variables with n (%).

## DISCUSSION

The main findings of the present study were that athletes who experienced at least one injury during their lifetime reported (1) significantly higher scores of agreement

and in favour of doing injury risk reduction strategies than athletes who never experienced an injury and (2) several negative perceived psychological consequences related to their most recent injury.

**Table 3** Psychological perceptions regarding their most recent injury reported by the 7081 athletes who experienced at least one injury

	Mean	SD
My injury caused sadness, frustration or disgust	7.3	±2.7
Following my injury, I no longer had confidence in myself	3.7	±3.2
After my injury, I was concerned about hurting myself again in the same place	7.0	±2.9
Following my injury, I was worried about returning to practice my sport	4.8	±3.4
My injury increased my motivation to come back better	6.4	±2.9
Following my injury, I changed my sporting goals	4.8	±3.7
Following my injury, I changed my lifestyle (sleep, diet, hydration, etc)	4.4	±3.3
Following my injury, I modified my sporting practice (warmup, training volume, training content, etc)	6.4	±3.1
Following my injury, I modified my annual schedule (number of competitions, time between two competitions, rest period, etc)	4.8	±3.6
The injury motivated me to do an injury risk reduction programme	3.4	±3.4
Following my injury, I changed my discipline within athletics (n (%))	385	(5.4)
Following my injury, I gave up athletics (n (%))	98	(1.4)

The mean±SD of the score from 0 to 10 reported by athletes and categorical variables with n (%).

## Injuries are one factor making athletes adhere to an injury risk reduction approach

Our results show that athletes who experienced an injury had higher scores regarding agreement and motivation towards injury risk reduction strategies. Ruffault *et al* also reported that athletes who experienced an injury were more likely to adopt exercise-based injury risk reduction programmes than those who did not.<sup>19</sup> These quantitative results support results from qualitative studies and hypotheses about the potential impact of injury experience to make athletes adhere to an injury risk reduction approach.<sup>10–12</sup> We agree with Edouard *et al*'s suggestions that the negative experience of injury should be considered as a lesson and could be used to help athletes and their teams engage in an injury risk reduction approach towards long-term sustainable sport practice.<sup>12</sup> However, a prospective study should confirm these results, as our present study design cannot allow us to conclude causality.

Our results also showed an important interindividual variability in the perceptions of injury preventive behaviours. As reported by Edouard *et al*, this can be explained by the difference in age, experience, athletic discipline, culture, background, role, mission, opinion between individuals or lack of high-level scientific studies specifically in athletics on injury risk reduction.<sup>9</sup>

## Injury is part of athletics

Previous studies reporting epidemiological data highlighted the high prevalence and burden of injuries in athletics.<sup>1 20–28</sup> In summary, about two-thirds of athletes had at least one injury during the whole athletics season, and about 100 injuries per 1000 registered athletes have been reported during international athletics championships.<sup>1 20–28</sup> We report in the present study that almost all participating athletes (90%) reported experiencing at least one injury. In addition, the proportion of athletes declaring 10 or more injuries was higher than that of athletes declaring 5–9 injuries. The cumulative number of years of athletics practice could be an explanation. Thus, as in other sports, injuries appear to be part of athletics.<sup>10</sup> This was also the perception of elite athletes, coaches, health professionals and team leaders participating in the 2022 European Athletics championships through an online survey.<sup>9</sup> Recent qualitative studies reported, through interviews with athletes and health professionals, that injuries are important in the athlete's career.<sup>10 11</sup> The present study represents an additional piece from a very important cohort of almost 8000 athletics athletes with different disciplines and ages, which matches the results of previous studies that injury is part of this sport (athletics). Therefore, injury risk reduction strategies should be developed and adequately implemented to reduce this risk. In addition, it is also important to improve the strategies to live and deal with injuries. Injury may be an integral part of sports. It may be impossible to eliminate sport injuries, and injury risk reduction may be an unattainable Holy Grail.<sup>29</sup> If injury

represents, as Sisyphus' rock, a form of fatality, changing our view of injuries and injury risk reduction would perhaps be relevant.<sup>29</sup> There is probably an interest in adopting a more positive view of injuries and their risk reduction.<sup>29 30</sup>

## Perceptions of psychological consequences of injuries

In the present study, the psychological consequences that were reported as the highest were negative emotions and fear of reinjury, in line with previous investigations of psychological consequences of sports injuries.<sup>15 31</sup> Despite negative consequences, participants highly reported increased motivation to perform better when they returned to the sport and moderated intention to change their habits in preparing their training sessions (volume, content and warmup). Recent investigations showed that adverse events (eg, injuries) can lead athletes to grow and benefit from such events, rethinking and reorganising their preparation and training.<sup>32</sup> Athletes can benefit from their injuries by changing their habits to reach their goals of performing better. Even if it may be impossible to remove an injury from athletics, entourage members of the athletes (eg, coaches, peers, health professionals and other staff members) could turn the experience of an injury into a positive one, thus helping the athletes to engage in injury risk reduction, by, for instance, educating injured athletes about how their bodies work, how to improve their bodily awareness and how to know their capabilities and limits or by (re)engaging athletes and their teams in a common goal and improving communication between team members.<sup>12</sup> This could allow for a more sustainable practice of athletics.<sup>14 29 30</sup> On the other hand, the increased motivation to perform better following an injury could also explain why athletes experiencing at least one injury were more prone to adhere to an injury risk reduction approach than athletes who have never experienced an injury. However, it is surprising that these athletes declared moderate or low scores for motivation to adopt an injury risk reduction programme.

## Methodological considerations

As a strength, we report the important cohort of almost 8000 athletes, which provides statistical power for the analyses and allows athletes' representativeness.

However, as a limitation, we have to report the study design (cross-sectional) and data collection (retrospective), which can lead to athletes' selection bias<sup>19</sup> and recall bias. It is possible that athletes who already experienced an injury preferentially participated in this survey and thus could be over-represented compared with the general population of FFA-licensed athletes. We must also report using a self-made questionnaire and not a validated instrument. The coauthors developed the questionnaire to reply to the study's aim, and there was no analysis of the validity and reliability of the questionnaire. In addition, although we defined the exercise-based injury risk reduction programme, no details regarding different exercise-based injury risk reduction programme

practices and experiences were collected from participating athletes.<sup>19</sup> We must acknowledge that this study might have been overpowered given the number of included athletes; although significant, some differences could be considered clinically negligible. We also must acknowledge that some potential confounding factors were not explored in the present study (eg, occupation, culture, background, role, mission and opinion) that represent perspective for future studies. In addition, the sample of participants was only competitive athletics athletes licensed at the FFA who were older than 18 years old, which presents a limitation of the present study in terms of the sample's representativeness. Hence, the study findings relate only to the present sample, and future studies are needed on other populations (eg, younger athletes in other countries). Then, we have to acknowledge some weaknesses in the equity, diversity and inclusion approach. Apart from sex and age, no other characteristics were collected from the participants and were thus considered in the analysis and interpretation of results. The author team only included one woman. Finally, it was impossible to analyse non-responders to determine how well the study sample represented the 75575 eligible athletes.<sup>19</sup>

### Practical implications

Our present results support the call for action from Edouard *et al* to use injury experience to help athletes and their teams reduce injury risk through, for instance, education, setting up preventative routines and improved communication.<sup>12</sup> Injuries are one of the causes of early athletic career endings.<sup>5,6</sup> Therefore, it could also be interesting that younger athletes benefit from the learnings from more experienced athletes who already sustained injuries.<sup>11</sup> Indeed, since some athletes stop their career after an injury,<sup>5</sup> it is not always relevant/possible to wait for them to gain from their own experience of injuries to engage them in an injury risk reduction approach.<sup>6</sup> It could also be interesting that injured athletes shared their experience and motivation to engage in injury risk reduction with other athletes by, for instance, presenting their story/experience with injuries, their lessons learnt<sup>33</sup> and how they would have made it different. Peer learning is sometimes more efficient than when the information comes from health professionals. More experienced athletes could be role models to share their experiences with younger athletes. In addition, the education of athletes and their parents about injury should be considered, as a randomised controlled trial reported the efficacy of a digital health platform to reduce injury incidence in youth athletes (aged 12–15 years) during a 4-month outdoor season.<sup>34</sup> Finally, reflecting on another view of injuries and their risk reduction could help a better life and cope with this risk.<sup>29,30</sup>

### CONCLUSIONS

Athletes who experienced at least one injury during their lifetime were more prone to adhere to injury risk

reduction than athletes who have never experienced an injury. Their entourage (coaches and health professionals) should use this fertile ground to implement injury risk reduction strategies. In addition, their experience should be disseminated to uninjured athletes to help them adhere to injury risk reduction without injury experience.

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