

Epidemiological Study with One Health Policy Implications Incidence, Severity, and Characteristics of Injuries in Youth Soccer: A Retrospective Epidemiological Study with One Health Policy Implications

Bruno Magno Silva Grave* Bruno Magno Silva Grave

Universidade da Beira Interior, Portugal

*Corresponding author: Bruno Magno Silva Grave, Universidade da Beira Interior, Portugal.

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Abstract

This study examined the incidence, severity, and characteristics of injuries in youth soccer players aged 12–18 years within a One Health and public health policy framework. A retrospective observational study was conducted among 154 male players from a Portuguese professional club academy during the 2011/2012 season. Injury data were collected using a FIFA F-MARC–based questionnaire, and incidence was calculated per 1000 hours of exposure. A total of 165 injuries were recorded, with 74.7% of players sustaining at least one injury. Injury incidence increased with age and was higher during matches than training sessions. Lower-limb injuries were most prevalent. These findings highlight the importance of injury surveillance and age-specific prevention strategies, contributing to safer youth sport participation and informing One Health–oriented public health policies.

Objective: This study aimed to analyse the incidence, severity, and characteristics of injuries in youth soccer players aged 12–18 years and to examine their epidemiological relevance within a One Health and public health policy framework.

Methods: A retrospective, cross-sectional observational study was conducted involving 154 male youth soccer players from a Portuguese professional club academy during the 2011/2012 season. Injury data were collected using a structured questionnaire adapted from the FIFA Medical Assessment and Research Centre (F-MARC) protocol. Only injuries sustained during training sessions or official matches were included. Injury incidence was calculated per 1000 hours of exposure.

Results: A total of 165 injuries were recorded during the season, with 74.7% of players sustaining at least one injury. Injury incidence increased progressively with age, with the highest rates observed in the Under-17 and Under-18 age groups. Injuries predominantly affected the lower limbs, particularly the thigh, knee, foot, and ankle. When adjusted for exposure time, injury incidence was substantially higher during matches compared with training sessions, indicating a significantly increased risk during competitive play.

Conclusion: Youth soccer players are exposed to a considerable risk of injury, particularly at older ages and during competitive matches. These findings highlight the importance of structured injury surveillance and age-specific prevention programmes. From a One Health perspective, systematic monitoring of injury patterns in youth populations contributes to broader public health resilience, supports evidence-based policy development, and reinforces integrated approaches to community health and injury prevention.

Introduction

Youth soccer is one of the most widely practised sports globally and plays a central role in physical development, social integration, and community engagement. However, increasing training loads, competitive intensity, and early specialisation have been associated with a higher risk of injury among adolescent athletes. While injury epidemiology has been extensively investigated in professional soccer, data focusing on youth populations remain limited.

Injury surveillance in youth sports is relevant not only from a performance perspective but also from a public health standpoint. Within the One Health framework, human health outcomes—including non-communicable conditions such as sports injuries—are increasingly recognised as integral to community health systems and policy planning. Understanding injury patterns in youth athletes may inform preventive strategies that contribute to safer sporting environments and long-term population health. The aim of this study was to characterise injury incidence, severity, and distribution in youth soccer players and to explore its relevance within an epidemiological and One Health policy context.

Materials and Methods

A retrospective, cross-sectional observational study was conducted during the 2011/2012 competitive season. The sample consisted of 154 male youth soccer players aged 12–18 years (Under-13 to Under-18) from the academy of a Portuguese professional club. Injury data were collected using a structured questionnaire adapted from the FIFA Medical Assessment and Research Centre (F-MARC) protocol. An injury was defined as any physical complaint sustained during training or official matches that resulted in the inability to fully participate in subsequent activities. Exposure time was recorded for both training sessions and matches. Injury incidence was calculated as the number of injuries per 1000 hours of exposure.

Results

Throughout the season, 165 injuries were recorded, corresponding to an average of 1.07 injuries per player. Overall, 74.7% of the athletes sustained at least one injury. Injury incidence increased progressively with age, with the highest values observed in the Under-17 and Under-18 age groups. The majority of injuries affected the lower limbs, particularly the thigh, knee, foot, and ankle. When adjusted for exposure time, match-related injury incidence was markedly higher than training-related incidence, highlighting the increased risk associated with competitive play.

Discussion

The findings confirm that youth soccer presents a substantial risk of injury, particularly in older age groups and during matches.

These results are consistent with previous epidemiological studies and may be explained by higher physical demands, greater match intensity, and maturational factors. From a One Health perspective, injury surveillance in youth sports represents an important component of community health monitoring. Although not directly related to zoonotic disease transmission, systematic injury prevention contributes to reduced healthcare burden, improved youth well-being, and safer participation in organised sport. Integrating injury epidemiology into broader health policy frameworks supports interdisciplinary approaches to health promotion and prevention.

Conclusion

Youth soccer players are exposed to a relevant risk of injury that increases with age and competitive exposure. Injuries predominantly affect the lower limbs and occur more frequently during matches than training sessions. These findings support the implementation of structured, age-specific injury prevention programmes and highlight the value of epidemiological surveillance in informing One Health-oriented public health policies.

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