



Impact of the severity of trauma on early retirement



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ABSTRACT

Objective: To assess the association between Injury Severity Score (ISS) and subsequent risk of early retirement.

Design: Observational cohort study with follow-up based on prospectively collected data. Hospital-based data were linked to national register data on pension reception and vital status.

Setting: Level-one urban trauma centre.

Participants: Patients aged 18–64 years entering the trauma centre in Copenhagen during 1999–2007 who were alive after three days were followed until early retirement, death or emigration.

Main outcome measures: Primary outcome was early retirement, defined as receiving disability pension (unintentional) or voluntary early retirement pension (intentional) before the regular age of retirement (65 years). Relative risk of early retirement according to ISS (low, ISS 1–15 vs. high, ISS 16–75) was assessed using Cox proportional hazards regression, adjusted for age and gender.

Results: Of all 6687 patients admitted to the trauma centre, a total of 1722 trauma patients were included and followed for a median of 6.2 years (interquartile range (IQR) 3.7–9.1). Of these, 1305 (75.8%) were males, median age was 35.0 years (IQR 25.4–46.5), and median ISS was 16 (IQR 9–25). Three hundred and twenty-two patients retired during follow-up. Patients with high ISS, compared to patients with low ISS, had an increased risk of early retirement, adjusted hazard ratio was 2.60 (95% confidence interval (CI) 2.05–3.30; $p < 0.001$). Relative increase in retirement risk was 1.04 (95% CI 1.03–1.05) per ISS point and 1.03 (95% CI 1.03–1.04) per year older. Gender was not found to be a significant risk factor ($p = 0.69$). Five-year absolute risks of early retirement were 9.9% (95% CI 7.8–12.0%) for the low ISS group and 24.6% (95% CI 21.6–27.5%) for the high ISS group.

Conclusions: The risk of early retirement is 2.6 times higher in severely injured patients (ISS 16–75) than the risk in low to moderately injured patients (ISS 1–15) and they have a high absolute 5-year risk as well. Early, targeted interventions to assist with return to work might be able to reduce this risk.

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Introduction

Traumatic injuries are the leading cause of morbidity and mortality in young adults aged 15–44 [1,2]. The emergence of specific trauma care with an increased focus on pre-hospital care and trauma centres with highly specialised staff has improved survival-to-discharge of critically injured patients during the last 20 years [3,4].

As mortality plateaus, patient morbidity becomes more relevant and needs further investigation. Some of these patients will not be able to return to their jobs and will be disabled to a degree that will lead to early retirement. This leads to a reduced income for the individual and loss of potential productivity to society [5,6]. Earlier studies have primarily addressed shorter-term outcome up to a median of about 3 years [7–11] and focused on subgroups of patients with isolated injuries [6,12–15], and only few studies have assessed long-term consequences of injuries in persons with general trauma [16–18] but no studies have previously investigated early retirement as an outcome of trauma.

Injury Severity Score (ISS) classifies patients according to the degree of traumatic anatomical injuries and predicts subsequent risk of mortality [19]. We aimed to assess the association between ISS and the subsequent risk of early retirement.

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Methods

Ethics

The processing of personal follow-up data was approved by the Danish Data Protection Agency (Datatilsynet, Copenhagen, Denmark; journal number 2007-58-0015).

Study design

An observational cohort study based on prospectively collected data was conducted from the Trauma Center at Rigshospitalet (RHTC), Copenhagen, Denmark. RHTC is a level-1 trauma center and covers an uptake area in the eastern part of Denmark of approximately 2.4 million citizens. Furthermore, severely injured patients can be accepted for admission and transported by helicopter or ambulance from the entire country. RHTC is a referral centre that offers highly specialised treatment of any surgical or medical specialty.

Data sources

The Danish Civil Registration System (CRS)

CRS is a national registry of all Danish residents. It contains information on gender, date of birth, death, and migration. A 10-digit unique, personal identification number (Central Person Registry [CPR] number) is assigned at birth or immigration. The registry is updated within a week of a person's birth, death, or emigration. CRS was used to obtain information on death and emigration.

Trauma Audit & Research Network (TARN)

TARN is the largest trauma database in Europe [20]. TARN records extensive data on trauma patients admitted to RHTC since

1999. Patients are included in the registry if one or more of the following criteria are met: the patient is hospitalised for three days or more, admitted to an intensive care unit, referred from another hospital, or dies in-hospital [21]. Patients who are discharged within 0–2 days after admission without need for intensive care are assumed to have suffered only mild trauma and are therefore not included. TARN was used to obtain information on demographics and ISS.

Danish Register-based Evaluation of Marginalisation (DREAM)

The DREAM database contains information on weekly social transfer payments since 1991 on Danish residents who have received governmental transfer payments of any kind, including disability pension and voluntary early retirement pension [22]. DREAM was used to obtain information regarding early retirement, which is the primary outcome for this study.

Data in the CRS and DREAM databases are collected prospectively on a routine basis for administrative utility independent of specific research purposes. The CPR number was used to link data between CRS, TARN, and DREAM.

Outcome

Primary outcome was early retirement, defined as receiving either *disability pension* (unintentional) or *voluntary early retirement pension* (intentional) before the regular age of retirement, which is 65 years in Denmark.

Municipal authorities grant disability pension to people aged 18–64 years who have permanently lost their ability to maintain a self-supporting job, defined by law as being unable to work for more than 18.5 h per week (equivalent to 50% reduced work capacity). A person is eligible for disability pension, which is financed by state treasury and municipal authorities, regardless of pre-injury working status. Thus, disability pension is granted

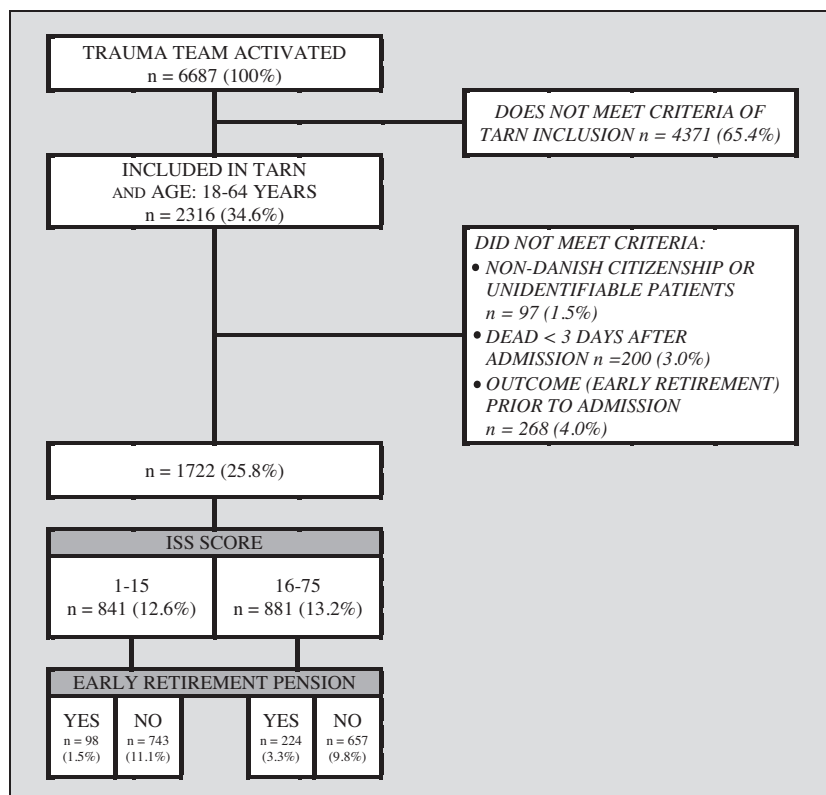


Fig. 1. Flow-chart on patients included in this study.

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