Farm Machinery Injuries

A Retrospective Analysis of Admissions at a Level I Trauma Center in North Dakota

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1 Background

Agriculture ranks among the most hazardous industries worldwide. However, agricultural injury (AI) rates are underrepresented due to a lack of a national reporting system. Also, machinery is consistently identified as the principal cause of fatal and nonfatal AI. However, few studies exist that examine the incidence and magnitude of injuries sustained from a variety of farm machinery, including augers, balers, and combines.

2 Objectives

To characterize the incidence, injury characteristics, and outcomes of patients who presented to a Level I adult trauma center in Fargo, North Dakota with farm machinery injuries (FMIs). This research contributes to the literature about machine-related fatal and non-fatal AI in the upper Midwest.

3 Methods

We performed a retrospective review of the trauma registry of Sanford Medical Center Fargo (SMCF) between January 2010 and December 2020. SMCF is the only Level I adult trauma center between Minneapolis, Seattle, Denver and Omaha, and it provides trauma care to North Dakota, Minnesota, South Dakota and Montana. FMI were identified through ICD-9 & ICD-10 codes and analysis of injury descriptions entered into a free text field unique to the SMCF registry. We compiled a final list of 106 FMI patients and manually categorized each incidence by the type of machinery associated with the injury. The 'other machinery' category includes farm machinery that are the cause of only one injury during this time period. Falls, including falling on or into machinery, ATVs, or animal handling were excluded from the analysis.

4 Results

The age range for FMI patients was 10 to 86 years (m=48). Tractor injuries (n=18) were the most severe. About 91% of tractor injury patients were male and 53% were 65 years and over. Five males between 65 and 82 years died while operating tractors. The 'other machinery' category was the second most common FMI (n=26) and accounted for 50% of all female patients. Auger injuries (n=24) are the third most common FMI. Additionally, 24% of FMI are related to machine maintenance, most of which are tractor-related maintenance. All patients with machine maintenance FMI were male and 36% were 65 years or older. Between 2018 and 2020, the number of tractor and auger injuries doubled.
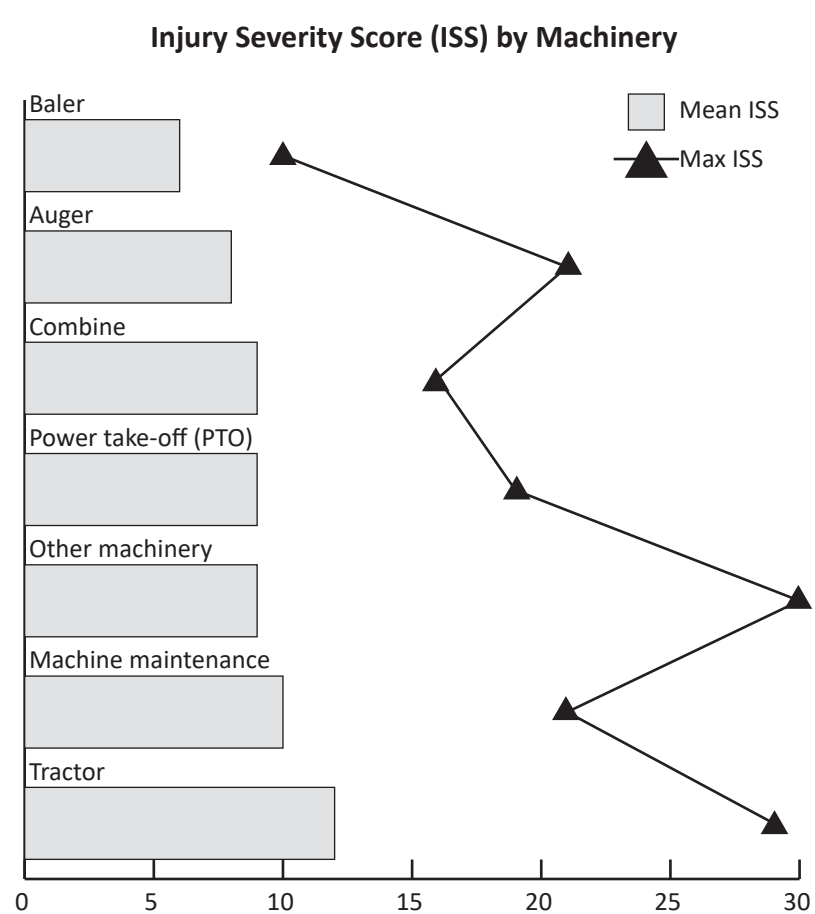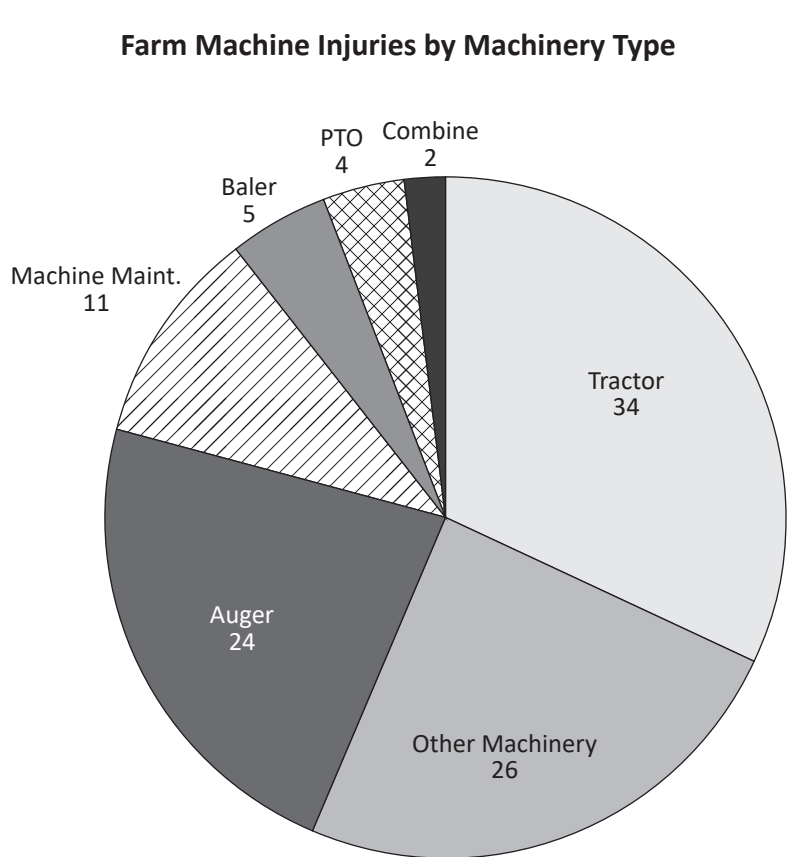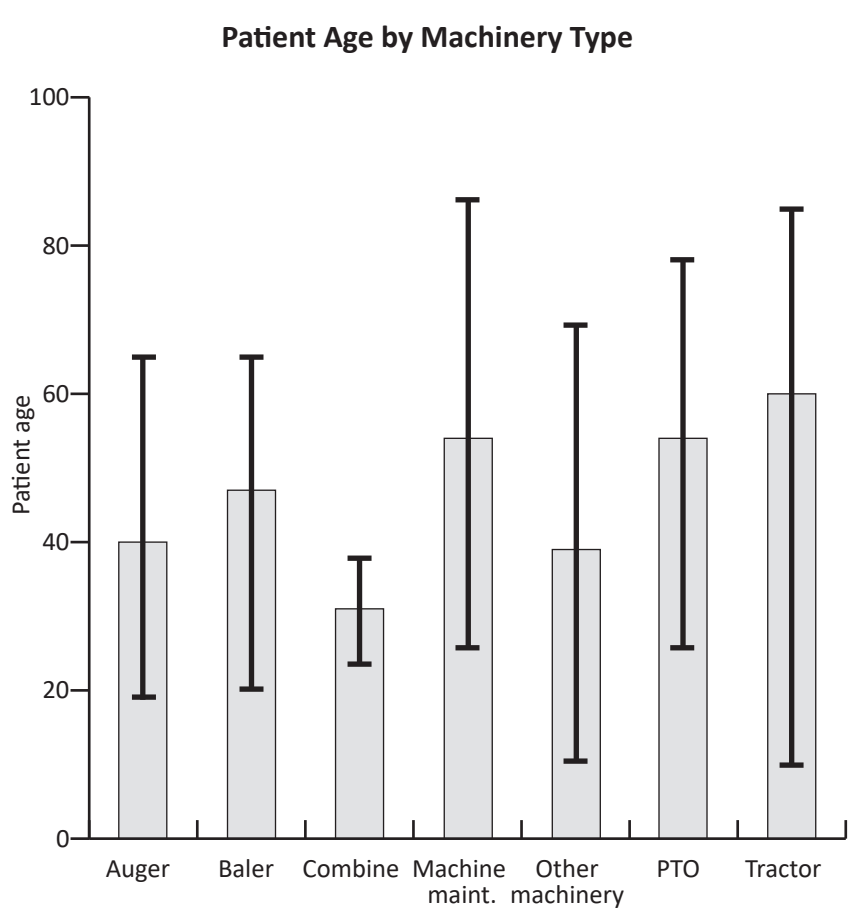
5 Practical Application

The leading cause of fatal and non-fatal FMI in the upper Midwest are tractors. Safety education for older adult machine operators should include the relearning of the safe operation and maintenance of tractors and augers. The programs should include methods that increase the likelihood of the machine operator making safe decisions or taking actions when required. Additionally, early intervention safety programs should target farmers at younger ages so appropriate safety practices can be integrated at the start of their careers.