ORIGINAL PROF-1408

AGRICULTURAL MACHINES INJURIES;
INCIDENCE

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Article Citation:
Akram M, Gulzar MR, Nazim M, Iqbal J. Agricultural machines injuries; Incidence. Professional Med J Mar 2010; 17(1): 485-488.

ABSTRACT... Objectives: (1) To determine the extent of agricultural injuries in term of their site, severity, management and type of agriculture machine. (2) To determine the techniques that can decrease the morbidity and mortality caused by agricultural injuries. **Study design:** Descriptive study. **Setting:** This study was conducted in surgical department of Allied & DHQ hospital Faisalabad. **Period:** January 2007 to December 2007. **Material and Methods:** This descriptive study was performed in 40 consecutive patients in surgical department DHQ/Allied hospital Faisalabad during Jan.2007 to Dec.2007.All people who got agricultural injuries were included. People who got traumatic injuries other than agricultural machines were excluded. All injuries were noted with respect to the age and sex of the patient, site, size, and severity of injury, and type of agricultural machine. Management was done accordingly. **Result:** Out of 40 cases, 34 [85%] were male and 06[15%] were female. In 25 cases [67.5%] fodder cutter were involved. In 10 cases[25%]pinching machines [gears, belt, chain machines] were involved .03 cases [7.5%]run over by machine. 02 cases [05%]by harvesting machines In 30 cases[75%]upper limb was involved. In 05 [12.5%] cases scalp injuries were noted. In 02 cases [05%] genitalia were avulsed. In 03cases [7.5%] lower limb was involved. Injuries range from simple lacerations, degloving injuries, tendons &vessels injuries &finally amputations. **Conclusion:** Mostly young male population is involved in agricultural machine injuries. Morbidity of .agricultural machine injuries can be reduced by modifying design of agriculture machines, by training farm workers & by their proper treatment.

Key words: Agriculture machine injuries, degloving injuries, amputation, morbidity.

INTRODUCTION

Agriculture is one of the most hazardous occupations and rural adolescents are at significant risk of agricultural machine injuries[1]. Agricultural injuries are the leading cause of morbidity in our society. Fatal and non-fatal agricultural injuries are a major public health problem that needs to be addressed through comprehensive approaches that include further delineation of the extent of problem, particularly in children and older, adults, and identification of specific risk factors through analytic efforts. Only through such efforts appropriate prevention efforts can be developed[2].

Surveillance is a key element for assessing the magnitude of the traumatic agricultural machine injuries and identifying appropriate intervention strategies, based on quality risk factor information[2]. It is apparent that effective intervention is imperative in the alleviation of this major public health problem. Continued development of the relevant surveillance systems and implementation of appropriate intervention are the primary challenges for the decade.

Article received on: 23/09/2008
Accepted for Publication: 25/09/2009
Received after proof reading: 10/10/2009
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Pakistan is an agricultural country and Faisalabad is one of the biggest cities that has very vast agricultural area in its periphery. The population of Faisalabad division is about 7 million and 60% of the population belongs to agricultural work .Most people use agricultural machinery in their fields to fasten their work and sometime they are injured because of their carelessness and lack of knowledge about their machinery. They are referred to the government hospital with injuries to their limbs, genitalia, scalp and face. The injuries range from simple bruising, lacerations, degloving, tendon and vessels injuries and then ultimately to auto amputation. The problem of people being injured while living ,working, visiting agricultural work environments has been recognized for several decades[3]. There are more injuries among males than females[4]. Agricultural traumatic injuries are one of the commonest cause of hospital admission and can result in life long disabilities[5]. Children who reside on family farms are exposed to unique hazards. Young children may be present where work is being done and may wander in to areas where machines are operating or they may be passengers on these machines[6]. Most injuries occur in the spring season[7]. A study in United States indicate that the rate for fatal tractor run over of farm residence was highest among children aged less than five years[8]. A study in Wisconsin and Illinois indicated that moving machinery is the most common source of injury[8]. Usually the injuries are associated either by falling or being run over by machinery.

Advances in science and technology have greatly improved the safety of agriculture production in recent years[9]. Machines make farm operations faster and more efficient because of their speed and power, however, they can be dangerous to those who operate them or who happen to be nearby. Most agricultural machines such as tractors, threshers, fodder cutting machines account for 1/4th of all injuries[10].

Fodder cutter machines are used every day by farmers in Pakistan. More than 90% of patient's present with upper limb injuries ranging from simple bruising, lacerations, degloving injuries, partial or complete tendons and vessels injuries and then ultimately auto amputation.

Prevention of injuries and illness is important to equipment manufactures, dealers, farm managers and farm workers[11]. For any machine, the concern for safety must begin with the design phase and carry through to the use of machine in the work place. Top priority is given to eliminating safety hazards or risk from machine itself. Changing the design to remove hazards from a machine makes the machine safer to operate .Agricultural injuries can be prevented by eliminating hazards or risk, applying latest safety technology, using warning signs , by proper training and instructions and by prescribing personnel devices[12].

The aim of this study is to determine the magnitude of agricultural injuries in Faisalabad Division, to predict the possible complications of agricultural machine injuries and to plan for their better management.

MATERIALS AND METHODS

This descriptive study was performed in 40 consecutive patients in surgical unit DHQ/Allied hospital Faisalabad, during January 2007 to December 2007, All people who got agricultural injuries were included. People who got traumatic injuries other than agricultural machines were excluded. All patients having agricultural injuries were treated in emergency ward on emergency basis. All injuries were noted with respect to the age and sex of patients, the site, size and severity of injury and type of machine. Management was done accordingly.

Detailed history and physical examination was carried out. Data collected on the basis of their age, sex, site of injury, type of injury, severity of injury, type of agricultural machines. All patients were managed accordingly. All information were written in a tabulated form.

Statistical analysis of data was carried out using SPSS version 14 and EpiInfo 2000 Extended Mental-Haenszel Chi-square test was used to determine the value between different age groups, and type of machines involved; between different age groups and site of injury: between different age groups and severity of injury

RESULTS

Out of 40 cases,34 [85%] were male and 06 [15%] were female.20 cases[50%] were of age group 30-50 years and 15 [37.5%]were of age group 15-30 years and 05 cases below 10 years of age. In 25 cases [67.5%] fodder cutter was involved. In 10 cases [25%] pinching machine was involved, 03 cases [7.5%] run over by machine and 02 cases [05%]by saw machines.

In 30 cases [75%] upper limb was involved.In05 [12.5%]

cases scalp injuries were noted. In 02 cases [05%] genitalia were avulsed. In 03cases [7.5%] lower limb was involved. In 20 cases[50%] simple degloving injuries were noted and patients discharged after primary debridement and dressing. In 05[12.5%] cases tendons injuries were noted which were primary repaired and back slab was applied. In 02 [05%]cases there was complete vessels and tendon injuries that were repaired.03 [7.5%]cases were fractured bone that was managed conservatively. 10[25%]cases were of autoamputations, out of which, 06[15%] cases were with amputation of fingers of hand and 04 [10%]cases with auto amputation of hand at wrist joint.

Table-I.

Type of injury	Management
Simple degloving injury (50%)	Debridement & dressing (50%)
Tendon injuries (12.5%)	Primary repair (12.5%)
Tendon and vessels injuries (05%)	Primary repair (05%)
Bone fracture (7.5%)	Close reduction 7 back slab (7.5%)
Auto amputation of fingers (15%)	Stump formation (15%)
Auto amputation of hand (10%)	Stump formation (10%)

Table II Shows relation between age of patients and type of machine. This shows that the patient age group 30-50 years was mostly injured by fodder cutter machine and the patient's age group between 15-30 years was mostly injured by pinching and threshers machine.

Table-II.

Age of patients	Type of machines
30-50 years (50%)	Fodder cutter machine (65%)
15-30 years (37.5%)	Pinching & threshers (25%)
<15 years (12.5%)	Fall or run over by tractors (10%)

Table III Shows relation between age of patients and site of injuries. It shows age group 15-30 years were mostly having upper limbs involvement. The people over 30 years had mostly genitalia and lower limb injuries.

Table-III.

Age of patient	Site of injury
30-50 years (50%)	Genitalia and lower limb (12.5%)
15-30 years (37.5%)	Upper limb (75%)
<15 years (12.5%)	Both upper, lower limb & genitalia (12.5%)

Table-I Shows the severity of agricultural machine injuries and their management

DISCUSSION

The main intention of this study was to know about type, severity, & site of agricultural injuries along with their causative agricultural machinery. Faisalabad division as it has very vast agricultural periphery ,multiple cases of agricultural injuries are reported every year in the emergency department of DHQ & Allied hospital. Most injuries are caused by fodder cutter machines, gears, and belts. Tractors and fodder cutter machines account for one fourth of all injuries[13].

As shown in the results, most of the injuries occur in the age group between 15-30 years and in 75% cases upper limb was involved and injuries range from simple degloving injuries to autoamputations. Most of these injuries were caused by fodder cutter machines. This result is same as in a case study from north India, department of orthopaedics, St. Stephen's hospital Delhi, India 29 march 2003[12].

Agricultural Injuries are more common in men as compared to women. This result is also same as in a study done in Iran from 1993 to 1994[14].

Prevention of agricultural injuries is important to farm workers. For any machine the concern of safety must begin with the design phase & carry through, to the use of machine in the work place. Top priority is given to eliminating safety hazard or risk from machine itself. Proper designing of agricultural machine & proper education of operator can reduce injuries. There are several methods to protect agricultural workers from agricultural injuries such as safety glasses to protect

eyes from flying particles, specific gloves, clothes, shoes that can protect against crushing, chemicals and other hazards[15].

Fingers, toes & hand can easily be pinched in gears, belts & chain machines resulting in cuts, bruises, fractures & even amputations. Reducing exposure to pinch point hazards by keeping all guards and shields in place can prevent such injuries. The people who reside on family farms are exposed to unique hazard .I also agree with this statement that the most of fatalities occurred in the spring & fall [time of plantation and harvesting], as during these season people are mostly exposed to these agricultural machines.

Advances in sciences and technology have greatly improved the safety of agricultural production in recent years .Agricultural injuries can be prevented by proper designing of agriculture machines& proper counseling of agricultural workers. The agricultural safety specialist, farm machinery manufacturers & organizations serving form families should warn people about the hazards of agricultural machines[16].

In hospitals, trained specialist micro vascular & general surgeons should be available 24 hours for emergency micro vascular and general surgery. All medical facilities should be available. The morbidity rate of agricultural injuries can be reduced by the mutual cooperation of agricultural safety specialist, farm machinery manufacturers & doctors.

CONCLUSION

Agricultural injuries affect male young population in which mostly upper limb is involved. Injuries range from simple bruising, lacerations, degloving injuries, tendons &vessels injuries &finally amputations. Morbidity of agricultural injuries can be reduced by modifying design of agriculture machines, introducing protective devices, by training people & their proper and prompt treatment.

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