Farm accidents in children

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Abstract

Objective—To examine the problem of accidental injury to children on farms.

Design—Prospective county based study of children presenting to accident and emergency departments over 12 months with injuries sustained in a farm setting and nationwide review of fatal childhood farm accidents over the four years April 1986 to March 1990.

Setting—Accident and emergency departments in Aberystwyth, Carmarthen, Haverfordwest, and Llanelli and fatal accidents in England, Scotland, and Wales notified to the Health and Safety Executive register.

Subjects—Children aged under 16.

Main outcome measure—Death or injury after farm related accidents.

Results—65 accidents were recorded, including 18 fractures. Nine accidents necessitated admission to hospital for a mean of two (range one to four) days. 13 incidents were related to tractors and other machinery; 24 were due to falls. None of these incidents were reported under the statutory notification scheme. 33 deaths were notified, eight related

to tractors and allied machinery and 10 related to falling objects.

Conclusions—Although safety is improving, the farm remains a dangerous environment for children. Enforcement of existing safety legislation with significant penalties and targeting of safety education will help reduce accident rates further.

Introduction

Accidents are the leading cause of death in children over the age of 1 year.¹ An appreciable proportion of these deaths occur on farms, and between 1976 and 1988 a total of 167 children in England and Wales were killed as a result of accidents on farms, representing nearly 25% of all farm related deaths.² Children on farms are at particular risk of accidents as they have access to potentially dangerous machinery, substances, and livestock; furthermore, children under the age of 16 often work on farms, especially at times of peak activity in the farming year.

No reliable figures exist on the incidence and severity of non-fatal farm accidents in the United Kingdom, although there has been a report from

Fatal farm accidents in children 1986-90

Tractor and machinery injuries

Escaped from cab of stationary tractor and was crushed when tractor began to roll forward on a 5° incline (age 2)

Fell from moving trailer; crushed by wheels (age 6)

Became entangled in unguarded power take off shaft while tractor was being repaired (age 11)

Fell while riding as a passenger on combine harvester; run over by driving wheel (age 12)

Visitor to farm run over by reversing tractor driven by training scheme driver. Severe head injuries (age 13)

Fell from moving tractor, possibly while trying to urinate through door. Crushed by harrow (age 14)

Fell from turnip cutting cart on to unguarded power take off shaft. Arm torn off; multiple injuries (age 15)

Fell from tractor drawbar under combine bed trailer (age 15)

Falling objects

Was in tractor cab; put down as child was bored. Suffocated by collapsing manure heap. Picked up by father with tractor front loader and loaded into spreader before being found (age 2)

Climbed on to propped tractor wheel which fell and crushed her chest while visiting grandfather's farm (age 3)

Climbed on unstable gate which fell, crushing his neck (age 4)

Visiting farm; climbing on hopper which fell on him (age 4)

While helping fell trees sustained skull fracture due to late falling branch (age 5)

Slate gatepost fell on him while playing in farmyard (age 5)

While watching father stack bales, climbed on gate (leaning on wall) which fell and fractured his skull (age 6)

Climbed on propped gate which fell and crushed her (age 6)

Cut fertiliser sack, which caused sack to collapse on him (age 8)

Crushed while climbing on propped tractor wheel (age 8)

Drowning and asphyxia

Drowned in 38 cm deep trough while briefly unsupervised (age 1)

Son of itinerant worker wandered away from father and drowned in sheep dipper (age 4)

Drowned after falling into protected storage tank (age 4)

Playing in barn; hung himself with baler twine (age 5)

Trespassing on trout farm; drowned while fishing (age 9)

Night fishing on farm reservoir; drowned (age 14)

Entered grain store during cleaning operations; asphyxiated (age 15)

Burns

Trespassing on farm and caused fire in barn. Insufficient evidence to prove identity of remains (age 9)

Burnt to death while smoking in haystack (age 15)

Burnt to death while smoking in barn. Trespassing (age 15)

Burnt to death while smoking in barn. Trespassing (age 15)

Falls

One of four boys playing on roof; fell 19 feet through perspex skylight, died of multiple injuries (age 14)

Fell into grain silo; broken neck and asphyxiation (age 15)

Miscellaneous

Returning from shepherding with family; struck by train on open crossing (age 12)

Anaphylactic shock after multiple bee stings despite veil (age 13)

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Ireland, where demographic characteristics, agricultural practices, and health and safety legislation differ significantly from those in Britain.¹ In Britain there is a statutory obligation on employers to report serious injuries and accidents under the Reporting of Injuries, Diseases and Dangerous Occurrences Regulations (RIDDOR 1985), but fear of litigation and ignorance of the scheme may lead to underreporting. We reviewed the problem of farm accidents in children using a 12 month prospective study of child farm accidents in the county of Dyfed and by analysing details of all fatal farm accidents in Britain in the past four years for which figures were available.

Subjects and methods

All children under the age of 16 presenting to the four accident and emergency departments in Dyfed (Aberystwyth, Carmarthen, Haverfordwest, and Llanelli) with farm related accidents during March 1990-February 1991 were included. Dyfed has a population of 352 600, of whom about 12 000 are directly employed in agriculture; about 3500 children under the age of 16 live on farms.⁴ Cases were identified at reception and specially designed cards were completed by medical and nursing staff for each child, detailing the circumstances of the accidents, the nature of injuries sustained, and the subsequent management. Accident and emergency records (both computer and manual) and medical records were also examined. Farm accidents were defined as any accident occurring on a farm (that is, a commercial agricultural setting) other than those occurring within the home.

Details of agricultural deaths in children were obtained from the central register held by the Health and Safety Executive for England, Scotland, and Wales over the four years 1 April 1986 to 31 March 1990. Details on this register are compiled by Health and Safety Executive inspectors, who have a statutory obligation to investigate all such fatal accidents notified by coroners.

Results

PROSPECTIVE STUDY

A total of 69 accidents was recorded (Aberystwyth 22, Carmarthen 13, Haverfordwest 16, and Llanelli 18), four of which were excluded from the study because they related to purely domestic circumstances. There were 18 fractures, and nine children required admission to hospital (mean length of stay 2 (range 1-4) days). Farm bikes and all terrain vehicles accounted for five incidents. Table I gives the causes and nature of injuries, and table II provides details of accidents requiring admission to hospital. Forty seven of the children who sustained accidents lived on the farms concerned; eight of the accidents occurred to children working on the farm, and 18 occurred to children visiting the farm. Accidents mainly happened in the

TABLE I—Causes of farm accidents in children

	Dyfed 1990-1	National fatal accidents 1986-90
Self propelled machines	11	7
Other field machines	2	1
Chainsaw	1	
Falls	24	2
Falling objects	2	10
Livestock related	11	
Poisoning	5	
Drowning		5
Asphyxia		2
Fire		4
Miscellaneous	9	2
Total	65	33

TABLE II—Details of farm accidents in children resulting in admission to hospital

Case No	Age (years)	Type of accident	Injury	No of days admitted
1	13	Fell off bales	Fracture, radius and ulna	3
2	13	Farm bike fall	Fracture, humerus and L3 vertebra	4
3	6	Fell in yard	Fracture, nose; head injury	2
4	11	Tractor ran over neck	Head injury	2
5	5	Fell in inspection pit	Head injury	1
6	6	Fell off bales	Fracture, skull	2
7	10	Fell in yard	Head injury	1
8	11	Fell off pallets	Fracture, nose; head injury	2
9	12	Fell off bales	Fracture, skull	2

farmyard (32) and in the field (23). Thirty two (49%) children required follow up visits to the hospital after discharge. Forty four (67%) of the accidents occurred to boys, and most occurred in spring and early summer. The figure shows the age distribution of the children. During the study no notifications of child farm accidents in Dyfed were made under the RIDDOR scheme.

A total of 33 fatal accident notifications was obtained from the Health and Safety Executive register (box). The figure shows the age distribution of these children.

Age distribution of children who had non-fatal farm accidents in Dyfed 1990 and fatal accidents notified to Health and Safety Executive register in United Kingdom, 1986-90

Discussion

For most children farms are places of excitement and adventure; the farm may be the home or the place where holidays are taken. Watching and helping in farm work is a valuable and long remembered experience, often encouraged by parents. Although only a small proportion of children (about one in 40) attending casualty departments in a rural county such as Dyfed with accidents have sustained their injuries in a farm accident, farms clearly still have their dangers.

Apart from a notable decrease in agricultural deaths in both adults and children associated with the introduction of compulsory tractor safety cabs, the death rate for children has not fallen appreciably in recent years.⁵ Until now, the only figures relating to non-fatal farm accidents in Britain have been provided by the RIDDOR scheme; criteria for reporting of incidents include any accidents causing fractures or leading to hospital admission. However, during the study none of the accidents recorded in our survey had been reported; either farmers are not aware of the scheme or are afraid of prosecution by the Health and Safety Executive. Our study provides the first measure of the frequency and severity of non-fatal farm accidents in Britain.

A study in the Republic of Ireland reported a comparable number of attendances at accident and emergency departments but a higher rate of admissions and serious injuries, with tractors and related machinery as a dominant cause of accidents.³ In the United States about 300 children die each year in farm accidents,^{6,7}

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and the problem has been described as being of "epidemic" proportions.⁸ In the 50 years between 1930 and 1980, deaths from farm machinery accidents have increased by 44%, whereas deaths from non-farm machinery accidents have fallen by 79%.⁹

In all these studies there was a preponderance of accidents to boys and the peak months for accidents were during the summer when children are not at school and when farms are busiest. Two peak ages for farm accidents were observed—namely, the toddler age range and during early teenage years. Toddlers have a great propensity for explorative play without an appreciation of potential dangers, and teenagers are likely to help with farm work without adequate supervision. Our findings are in line with these observations.

PREVENTING ACCIDENTS

The details of fatal accidents show that many were preventable. The two largest categories were those relating to tractors and allied machinery and to falling (often poorly secured) objects. Tractors are well recognised as being likely to cause multiple organ injuries.⁶ Legislation to prohibit children under the age of 13 from driving tractors and to prohibit anybody riding as a passenger on tractors, trailers, or other machinery has been in place for many years but is regularly ignored. Children should not be allowed to play in, on, or around tractors except under the most scrupulous supervision; a readiness to prosecute and heavy fines for offenders may be necessary to lessen these injuries.

Too many children are killed while climbing on unsecured gates and tractor wheels; proper storage is already regulated and must be a priority in farm safety education. Falls on farms were common in our prospective study; the most serious of these were related to children climbing in barns and outbuildings. Measures to restrict the access of children to such areas—by locking barn doors, for example—are easy to implement and should be encouraged.

The increasing popularity of all terrain vehicles, which may be used off the road without crash helmets, led to several serious injuries. They are at present not subject to safety regulations, but there must be a strong case for this to be considered. Many farms are now involved in the holiday and leisure industry; children who visit farms are at special risk because of ignorance of the dangers, and careful supervision is necessary.

Other areas are less amenable to prevention. Four children died probably while smoking in haystacks; trespassing on farms was associated with at least three

deaths, and three children drowned in open water.

Several important initiatives in safety education have been instituted recently. *Agricultural Black Spot*, detailed the farming fatalities over the four years 1981-4, clearly presenting the major risk areas in farming⁷; however, few farmers are likely to have read this report. An approved code of practice with excellent recommendations has been produced by the Health and Safety Commission but, again, is likely to have had a small readership.¹⁰ The Agricultural Training Board includes safety measures in many courses and has a certificate scheme for attenders, although most farm workers have not attended such courses.

Farm safety education should be targeted at schools, youth training programmes, and farming organisations such as young farmers' clubs. Schools in rural areas should have regular presentations tailored to those age groups most at risk—namely, teenagers and early school ages. Video material dealing with farm safety should be produced for use in schools and also in young farmers' groups, where parents of young children may be reached. Further potent opportunities for safety education exist in television and radio farming programmes and in the farming press, which reach a large proportion of the farming community; regular safety features should be encouraged.

Though results are encouraging compared with those of previous studies, there is still considerable scope for preventive measures if needless child deaths and injuries on farms are to be reduced.

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Farm accidents in adults

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Agriculture is the largest primary industry in Britain. It employs 2.6% of the working population, amounting to a total workforce of 527 000 in England, Scotland, and Wales.¹ The fatal accident rate for agriculture in Britain is 8.3/100 000 employees a year and ranks second behind that of the construction industry (9.4/100 000); the rate of serious injury is 160/100 000 employees.² Statistics for non-fatal accidents are based on a statutory obligation to report serious injuries (including those causing fractures other than of hand or foot and those leading to hospital admission or incapacity to work for three or more days) under the Reporting of Injuries, Deaths and Dangerous Occurrences Regulations (RIDDOR 1985). Concern exists

that ignorance of the requirements of the regulations, or fear of litigation, leads to underreporting of non-fatal injuries. We performed a prospective study of farming accidents presenting to a rural accident and emergency department over 12 months.

Patients, methods, and results

All adults aged over 16 years presenting with farm related accidents to the accident and emergency department at West Wales Hospital over 12 months during 1990-1 were identified at reception; circumstances of the accident and the nature of the injuries sustained were recorded. We inspected the local RIDDOR notifications over the same period to ascertain the rate of reporting of incidents.

A total of 175 accidents were recorded, including 32 fractures. There were 15 admissions with a mean duration of stay of 6.8 (range 1-17) days (table). Most accidents occurred to men (79%). Accidents related to