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ORIGINAL ARTICLE

Pattern of fodder chopper machine injury in Gujranwala, Punjab, Pakistan.

Farhan Tahir[1], Zohaib Hassan[2], Sultan Faisal Ijaz[3], Hafsa Ijaz[4], Faisal Shabbir[5], Imran Khokhar[6]

ABSTRACT… Objective: To find out the pattern of injury caused by toka / Fodder Chopper machine in Gujranwala Punjab. **Study Design:** Observational Retrospective Study. **Setting:** Department of Surgery, Gujranwala Teaching Hospital, Gujranwala. **Period:** April 2021 to March 2023. **Methods:** All the patients having fodder chopper machine injury were the part of study and their pattern of injury was studied. Age of patient, sex, side of injury and extent with severity were recorded. **Results:** Out of 100 patients, 82 (82.00%) were male and 18(18.00%) were female. Mean age was 17 years. Digits, palm and wrist, distal forearm, proximal forearm and arm had 53(53.00%), 20 (20.00%), 11 (11.00%), 9(9.00%) and 7 (7.00%) injuries, respectively. Right upper limb is more common presentation 81.00% than left upper limb 19.00%. **Conclusion:** Fodder Chopper machine injuries are one of most common cause of disability and are very common in our region especially in our rural area and mostly effected are children of younger age group under 14 years. This is due to inexperience and no training and design of Toka/ Fodder Chopper Machine.

Key words: Disability, Fodder Chopper Machine, Side of Injury.

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INTRODUCTION

Pakistan is a country of farmers and Gujranwala is a city of Punjab surrounded by agriculture lands. In rural areas, it is daily practice to use Toka/Fodder chopper for preparation of food for domestic animals. Mostly these machines are locally made for conversion of hay to smaller pieces. With the shift of manual machine to electric machine the chances of injuries have increased a lot.[1]

In surgical emergencies of almost every hospital in Pakistan, patients with these Toka injuries present regularly, but their diversity and impact warrant further investigation. Patients with different patterns of injuries from different age groups and genders frequently appear in surgical emergencies.[2] Commonly affected are young individuals, with digits, wrists, and hands being the most commonly injured parts. Victims are predominantly those lacking proper training or experience. Disability in the younger generation not only causes personal suffering but also represents a loss of future productive human resources for the country, contributing to an increased socioeconomic burden.[3]

Fodder chopper injuries, while underreported in national databases, follow a predictable pattern across Punjab and can be reasonably extrapolated to Gujranwala.[4] Young males dominate the affected demographic, with a notable number of children also suffering injuries—often while assisting adults or playing near operating machines. Females, particularly non-professional or casual laborers, are also at risk, likely due to limited training and lack of awareness about machine safety protocols.[5] These injuries primarily involve the upper limbs, especially the fingers and hands, with outcomes ranging from deep lacerations to partial or complete amputations. Some rare but serious cases involve scalp avulsion injuries when head coverings are caught in the rotating blades. The right upper limb is more frequently affected, possibly due to its dominant use during operation.[6]

The majority of these injuries occur during routine agricultural tasks. Poorly maintained or unsafe machine designs lacking protective guards, absence of formal operator training, and the use of machines by non-professionals are major contributing factors.[7]

1. MBBS, BSc, FCPS (General Surgery), Senior Registrar Surgery, Gujranwala Medical College Teaching Hospital, Gujranwala.
2. MBBS, FCPS (General Surgery), Senior Registrar Surgery, Gujranwala Teaching Hospital, Gujranwala.
3. MBBS, Postgraduate Resident Orthopedic Surgery, Gujranwala Medical College, Gujranwala.
4. MBBS, FCPS (General Surgery), Senior Registrar Surgery, Gujranwala Medical College Teaching Hospital, Gujranwala.
5. MBBS, MS (General Surgery), Associate Professor Surgery, Gujranwala Teaching Hospital, Gujranwala.
6. MBBS, FCPS (General Surgery), FACS, Professor Surgery, Gujranwala Medical College, Gujranwala.

Correspondence Address:
Dr. Farhan Tahir
Department of Surgery, Gujranwala Medical College Teaching Hospital, Gujranwala.
farhantahir367@yahoo.com

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Understanding these patterns can help guide preventative measures, including safer machine engineering, rural education campaigns, and targeted operator training, thereby reducing the incidence of such life-altering injuries in this vulnerable population.[8]

METHODS

This was observational retrospective study was carried out at Gujranwala Teaching Hospital Gujranwala Surgery department from April 2021 to March 2023, after the approval from the CPSP and Institutional Review Board (Letter No: No.Admn.182/GMC, Dated: 29/02/2021 in the name of Dr. Farhan Tahir) All the patients having fodder chopper machine injury were the part of study and their pattern of injury was studied. Age of patient, sex, side of injury and extent with severity were recorded. All the injuries other than than Toka/ Fodder Chopper Machine Injury were excluded so that exact extent of injuries by Toka Machine.

All the patients presented in Trauma Surgical of our Hospital either came directly or referred from Primary and Secondary Health center were managed initially according to ATLS guidelines. After initial resuscitation in Emergency patients were shifted to Operation Theatre for definitive Management and Plastic Surgeons, Pediatric Surgeons, Orthopedic Surgeons and Neurosurgeons were also included in the management plan.

All the detail of patient was recorded on file of ward that was studied and data collected from that which includes demographic details, site of injury, extent and pattern of injuries and what management done to patients. Mostly Right upper limb was involved with injuries ranging from amputations of distal phalanx hand Arm and forearm amputations.

FIGURE-I

Photograph of machine injury

RESULTS

There were 13(13.00%) male and 7 (7.00%) female patients between the ages of 1-10 years, between the ages 11-20 years there were 14(14.00%) male and 6(6.00%) female patients of fodder chopper/ Toka machine injuries were presented. Between the ages of 21-30 years 15(15.00%) male and 2 (2.00%) female patients, between 31-40 years 15(15.00%) male and 1 (1.00%) female patients, between 41-50 years 11(11.00%) male and 2 (2.00%) female patients, between the ages of 51-60 years 9(9.00%) male and 1 (1.00%) female patients, patients with ages 61 above 5(5.00%) male and 0 (0.00%) female patients were presented. Majority of patients were from 1 to 20 years of ages, as these ages are future of our generation and are not trained of these machines as depicted in Table-I.

In our study the frequency of fodder chopper machine injury according to site were right digits 37(37.00%) male and 7 (7.00%) female patients, left digits 8(8.00%) male and 2(2.00%) female patients, right palm and wrist 13 (13.00%) male and 3(3.00%) female patients, left palm and wrist 3 (3.00%) male and 1 (1.00%) female, right distal forearm 7 (7.00%) male and 2 (2.00%) female, left distal forearm 1 (1.00%) male and 1 (1.00%) female patients, right proximal Forearm 6 (6.00%) male and 1 (1.00%) female, left proximal Forearm 2 (2.00%) male and 0 (0.00%) female, right arm 5 (5.00%) male and 1 (1.00%) female, left arm 1 (1.00%) male and 0 (0.00%) female present. The occurrence of fodder chopper machine injuries were maximum of right digits as shown in Table-II.

There is a statistically significant association between age group and gender ($p < 0.05$). Younger females (1–20 years) are proportionately more affected than older females. No significant association between gender and injury site ($p > 0.05$). The pattern of injury by site is similar across genders.

TABLE-I

Age distribution according to gender (n=100)

Age in Years	Male	Female	Total
1-10	13(13.00%)	7(7.00%)	20(20.00%)
11-20	14(14.00%)	6(6.00%)	20(20.00%)
21-30	15(15.00%)	2(2.00%)	17(17.00%)
31-40	15(15.00%)	1(1.00%)	16(16.00%)
41-50	11(11.00%)	2(2.00%)	13(13.00%)
51-60	9(9.00%)	1(1.00%)	10(10.00%)
61 and above	5(5.00%)	0(0.00%)	5(5.00%)

TABLE-II

Distribution of injuries according to site of body (n=100)

Site of Injury	Male	Female	Total
Right Digits	37 (37.00%)	7 (7.00%)	43 (43.00%)
Left Digits	8	2	10
Right Palm and Wrist	13	3	16
Left Palm and Wrist	3	1	4
Right distal Forearm	7	2	9
Left distal Forearm	1	1	2
Right proximal Forearm	6	1	7
Left proximal Forearm	2	0	2
Right Arm	5	1	6
Left Arm	1	0	1

DISCUSSION

In Pakistan 65 % people live in rural area and is country in which agriculture is main profession of majority of people and therefore depend on farming for food. Cattle farming need toka/fodder chopper machine for cutting of food for cattle.

The study by Mehmood et al. (2015) highlights the significant burden of agricultural machinery-related injuries in rural Pakistan, with fodder cutter (Toka) machines identified as the most common cause, accounting for over 50% of the cases reviewed. Traumatic amputations of the upper limb were the predominant injury pattern, seen in nearly 58% of patients, typically resulting from direct hand entrapment during the manual feeding of fodder. The majority of affected individuals were young males, although female involvement was also noted, reflecting the shared responsibilities in agricultural labor. Complications such as wound infection were common, while rare but fatal outcomes like tetanus and Fournier's gangrene were also reported. The

study emphasized that most of these injuries are preventable and recommended safety campaigns, improved machine design, and timely access to specialized care, including the potential for re-implantation and revascularization in suitable cases. These findings underline the occupational hazards faced by rural populations and reinforce the need for preventive and policy-level interventions to reduce disability and mortality associated with agricultural machinery use.[9]

In Pakistan this Fodder chopper is mainly used as an agricultural tool. Since the use of automatic Fodder Chopper machine has increased the severity of injuries has also increased substantially. Injuries by these machines are usually non-fatal. A study of farm-related injuries in children under 16 reported 65 non-fatal accidents in one year and 33 deaths over four years. Machinery and falls were common causes. Despite safety improvements, farms remain dangerous. Better enforcement of safety laws and targeted education are needed to reduce these preventable injuries.[10]

In our country like Pakistan in which agriculture is a main profession have these Fodder chopper machine injuries a major cause of disability and injury, people of younger age groups were involved mostly due to active involvement.[11,12]

A national review (1990–2001) of fatal agricultural injuries among Canadian children aged 1–6 found a higher fatality rate (14.9 per 100,000) than the general unintentional injury rate (8.7 per 100,000). Most deaths occurred on farms, mainly from being run over by machinery, falling off equipment, or drowning. Boys were at greater risk. Common causes included crush injuries and asphyxia. The study recommends keeping young children away from farm worksites and urges rural health professionals to educate families about these risks.[13] In other studies there were equal involvement of both genders but contrary to this in our study male were mostly affected as compare to females.[14,15] In our study as compare to other international studies have mostly affected right hand having amputation of different areas of right upper limb.[16]

This study highlights the distinct injury patterns associated with fodder chopper (Toka) machines in the rural region of Gujranwala. The data revealed that males constituted the majority of victims (82%), with a significant proportion falling in the younger age group of 1 to 20 years. This reflects a high level of vulnerability among youth involved in agricultural labor without formal training or protective supervision. The most common injuries involved the right upper limb, particularly the fingers (43%), followed by the palm, wrist, forearm, and upper arm. The dominance of right-sided injuries (81%) is likely attributed to the frequent use of the dominant hand during machine operation. Many of these cases resulted in amputations, leading to permanent disability and a considerable functional and socioeconomic burden on affected individuals and their families.

Recommendations include redesigning fodder chopper machines to include protective shields over blades and expanding the fodder feeding area to prevent direct hand contact. It is also advised to prohibit the operation of these machines by untrained individuals, particularly children and the elderly. Community-level awareness campaigns and formal training programs should be introduced to promote safe usage practices. The expected outcomes of these interventions include a marked decrease in upper limb injuries and amputations, reduced disability burden on affected families, and improved occupational safety in agricultural communities across Gujranwala and similar rural settings.

CONCLUSION

Generally recognizable variables incorporate inexperience, kind of fodder chopper machines, administrator's age and perspective. Anticipation of Fodder Chopper Machine injuries is only solution to stop these deaths and disabilities in young and productive age groups.

RECOMMENDATIONS

1. Adjustment of hardware plan by use of shield over the blades of Fodder Chopper Machine.
2. Expansion of grain taking care of passage will forestall direct contact with edges and diminishing chances of injury.
3. Precluding non-trained clients will likewise

decline number of wounds in old and youngsters.
4. Proper awareness should be done at rural level.
5. Proper training should be provided by the Government to the people dealing with Fodder Chopper Machines.

CONFLICT OF INTEREST

The authors declare no conflict of interest.

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AUTHORSHIP AND CONTRIBUTION DECLARATION	
1	**Faryal Rasheed:** Research proposal, data collection.
2	**Falak Naz Baloch:** Data analysis, manuscript writing.
3	**Rumsha Mallick:** Data collection.
4	**Atrooba Ismail:** Data collection.
5	**Zakir Ali Punar:** Data analysis, final editing.