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A study on Haddon matrix injury prevention: targeting kite flying hazards in community

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Abstract
Title: A study on Haddon matrix injury prevention: targeting kite flying hazards in community.
Objective: Kite flying injuries leads to mortality and life threatening injuries in the Community during the season of Uttarayan.
The aim of this study was to find out: 1) The awareness regarding primary prevention Practiced by the kite flyers;
2) To assess various direct/indirect modes responsible for injuries while kite-flying, in respondents treated at tertiary care centre affiliated to medical college of Ahmedabad, Gujarat.
Materials and methods: Two seventy six kite flying victims who were admitted for treatment at tertiary care hospital, they were interviewed using a questionnaire to evaluate various direct-indiret factors leading to their present injuries. Awareness regarding kite flying hazards was also determined and haddon matrix was developed as per the data available.
Results: All participants were between the ages of 12 to 55 years.
Majority (57%) of respondents belonged to above poverty line and below poverty Line population.
About 37.48 % of minors were totally unaware of the need of preventing tools for kite injuries.
As per analysis, (26.81%) were injured due to falls, (20.28%) due to minor accidents on roads, majority of victims (35.14%) admitted injuries from the kite strings and indirect injuries resulting from assault and brawl during kite flying were (11.95%).
Conclusion: This study revealed a need for strict laws and legislation is imperative to prevent the availability of harmful kite flying materials and lanterns. Initiation of the local IEC campaigns during festivals like uttarayan is crucial to prevent injuries. Wearing helmets while driving can help prevent road traffic accidents and mortality. Mandatory installation of curving rods on the two-wheelers and double scarf at neck to prevent throat injury must be emphasized in the community.

Keywords: Kite flying, haddon matrix, injury prevention.

Introduction

In Gujarat, the kite festival is strongly embedded in local culture and cuts across religious differences in arguably one of the most polarised states of India.[1] Kite flying is a popular game for children and adults all over the world. In India, Pakistan, and Bangladesh, people celebrate the arrival of spring by holding a kite festival. These kite festivals include a game of kite fighting, in which participants attempt to use their kite to cut the string of a rival kite. An abrasive material is often placed on the string of the kite to increase its ability to cut other kite strings. [2] Families usually spend their entire day on the terraces and rooftops. Kite flyers feel passionately about Uttarayan and eagerly await for 14-15 January. [1] On the day, many keep a leader board to keep a tally of their score and fly kites late into the night. [1] While one person died, a total of 2,789 cases of mishaps resulting from kite-flying were reported in the state as 'Uttarayan' was celebrated across Gujarat. [1] Last year, 2,631 cases of accident had been reported. Around 400 cases were reported in Ahmedabad and other states on 14-15 January. Majority of these cases pertained to injuries due to the maanjha, which is typically coated with glass powder to sharpen it. The injuries are caused by 'manja', the string used to fly kites. [1] Gummed and coated with powdered glass, the strings are made dangerously sharp to slash the thread of an opponent's kite mid-air during kite fights.[1] The cases of road accident due to the kite or the maanjha coming in the way too were on the rise,.Another typical mishap is falling off the terrace while flying the kite.[1]

Cases of brawl during the revelry were also on rise,.In Ahmedabad city, there were 76 road accidents, 22 cases of assault, 21 cases of throat-injuries due to maanjha and 38 cases of falling from the terrace during 14-15 january [1].

Materials and methodology

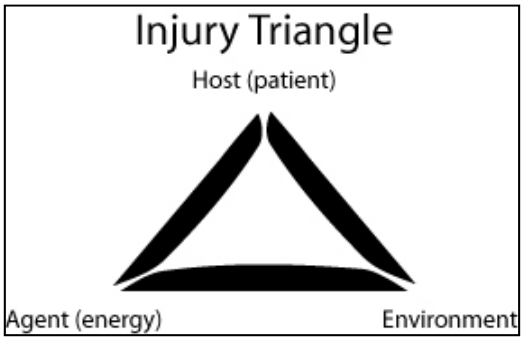
A cross sectional survey was carried out at a tertiary care centre affiliated to medical college of ahmedabad in the Gujarat state, India during the kite-flying period of December 2015-january 2016.Written consent was taken from the respondents. Interviews were conducted with the 276 victims of kite flying treated at hospital during the period. Epidemiological tool of Haddon matrix was applied to plan interventions for further kite-flying injuries at multiple levels. As per analysis, (26.81%) were injured due to falls, (20.28%) due to minor accidents on roads, majority of victims (35.14%) admitted injuries from the kite strings and indirect injuries resulting from assault and brawl during kite flying were (11.95%).

Results

Table 1: Demographic data

No.	variables (n = 276)	Percentage %
1.	Age group in years	
	<19	20(7.24%)
	20-30	105(38.04%)
	31-40	91(32.97%)
	41-50	40(14.49%)

	>51	20(7.24%)
2.	sex	
	male	223(80.79%)
	female	53(19.20%)
3.	religion	
	muslim	79(28.62%)
	hindu	152 (55.07%)
	other	45(16.30 %)
4.	occupation	
	service	103(37.31%)
	labourer	80 (28.98%)
	unemployed	93(33.69%)



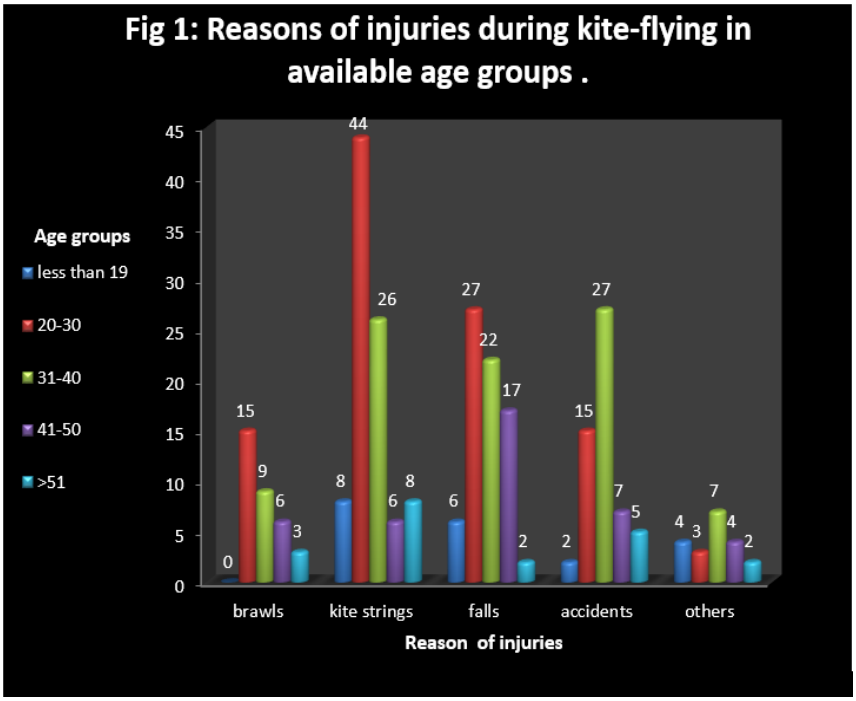


Table 2: Haddon matrix for prevention of kite injuries:

Injury phase:	host	agent	Physical/social environment
Pre-event	Anticipation, competition, Lack of supervision ,use of manga	Glass coated kite string. use of low quality material in kite preparation.	Distraction, extreme Sunlight, lack of space.
Event	Hand injury due to Kite strings	Profuse bleeding from the cut.	Pain intensified due to extra usage of damaged hand.
Post event	Application of herbal cream, Band-Aids, analgesic used.	Change of kite string. Wearing gloves.	Rehabilitation. Treatment at nearby health unit.

Discussion

Majority of our respondents admitted to using cheap string for kite flying as it is easily available at less cost. also, about 38 % admitted to being injured by sudden attack of fire crackers and rockets while kite flying .We have conducted interview by a pre-tested questionnaire format in 276 kite flying victims, to assess awareness and attitude to prevent injuries during kite flying. Also there was carelessness in seeking care during mild injuries as the patient didn't wanted to leave kite flying activity before night.

Also Chinese lanterns that were banned due to life threatening injuries reported during previous year were purchased illegally and first degree burns were experienced in a large number of adolescents due to reckless behaviour in lighting the lanterns. Kites are associated with various types of injuries, including accidents that occur during the preparation of the threads, electrical injuries from high tension currents, falls that occur during the game, or injuries caused to bystanders during kite flying, especially those riding motorcycles or bicycles.[2]In pedestrians with facial region and neck was the most commonly affected body part.

Homemade remedies were practiced to treat these wounds and approximately 13 % of these injuries show signs of infection. In our study, adverse health effects were seen in patients due to delay in seeking care as competition was given more importance compared to health. The supervision of parents and guardians was surely lacking in many childhood kite-flying victims. road traffic accidents were quite common even though less as compared to previous year due to awareness in vehicle drivers.62.14 % got fracture due to fall from balcony and terrace

in attempts to capture kites or deduce other kites from trees. About 187% of kite-flyers admitted not wearing gloves and finger protection pads while flying kites. Passive injuries were seen in family members of kite flyers due to kite strings from neighbourhood and holding glass embibed firkis. Approximately, 86 times ambulances services were contacted by many respondents, the time reaching hospital varied between 30-45 minutes.

Haddon matrix is the most commonly used epidemiological tool in the injury prevention field. Developed by William Haddon in 1970, the matrix looks at factors related to personal variables, vector or agent characters and environmental attributes before, during and after an injury .it can help in planning interventions and preventing injuries. In this context, primary prevention refers to interventions before the event, to prevent it completely (using safe kite flying strings), secondary prevention involves lessening the extent of injury given that an event occurs (e.g., flying kites without protection).Tertiary prevention limits the subsequent difficulties a person encounters given his injuries (rehabilitation, etc.).

Conclusion

The study reveals various hazards experienced by kite flyers during uttarayan .A need for strict laws and legislation is imperative to prevent the availability of harmful kite flying materials and lanterns. Helpline shall be activated during the month of December-january, set alo that victims can be given first aid instructions by medical/nursing staff. Most of the injuries were superficial and could be prevented or mitigated by either protective clothing or by use of protective devices on vehicles, which should be implemented to reduce the morbidity of such injuries in the future. [5] Awareness about Flying kites in open grounds, carefully dispose strings entangled in trees in your neighbourhood and use uncoated cotton threads must be made by health workers in their respective areas. Wearing helmets while driving can help prevent road traffic accidents and mortality. Mandatory installation of curving rods on the two-wheelers and double scarf at neck to prevent throat injury must be emphasized in the community. Supervision of parents is effective in preventing injuries to minors as many indirect injuries rampant among adolescents were result of capturing kite flying phenomena on potentially risky surfaces.

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