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Short Communication

Does the number of injuries among elderly people in Kazakhstan increase during Ramadan?



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Introduction

Injuries are a major public health problem associated with substantial healthcare expenditure, particularly in developing countries. Elderly people are at higher risk of trauma due to impaired motor and cognitive functions, and the increasing demands of modern society.¹

Fasting during the holy month of Ramadan is one of the pillars of Islam, and more than 20% of the world's population fast during Ramadan every year. Previous studies have reported that fasting affects body physiology and daytime activities, and may increase the incidence of injuries.² An increased number of traffic accidents during the holy month has been reported in Arab countries^{3,4} and the UK.⁵ However,

other studies have found no association.^{6,7} Controversial findings may reflect true variations between the settings, warranting further research in other countries. No studies have been published on this topic from predominantly Muslim republics of the former Soviet Union.

Kazakhstan became an independent state in 1991. The mortality rate from external causes is considerably higher in Kazakhstan compared with Europe, at 102.5 deaths per 100,000 in 2011.⁸ Moreover, Kazakhstan has the highest mortality rate from traffic injuries in the world (30.6 per 100,000; for comparison, the rate in Norway is 5.0 per 100,000).⁹ The proportion of Muslim inhabitants in Kazakhstan has recently exceeded 70%, and this—in combination with a rapidly ageing population and high incidence of injuries—makes Kazakhstan a unique setting for studying health consequences of cultural and demographic transition.

This study assessed the effect of Ramadan on the daily injury count among elderly people in Kazakhstan, the largest country in Central Asia with a rapidly growing Muslim population.

Methods

This population-based ecological study was performed in the city of Semey, East Kazakhstan. Semey (former Semipalatinsk) is an industrial city known for being a test site for Soviet

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nuclear weapons until the early 1990s. The population of Semey was 335,400 in 2013. Daily injury counts for all injuries (International Classification of Disease codes S00–T98 and V01–Y98) in individuals aged ≥ 60 years that occurred between 1 January 2010 to 31 December 2012 and required medical attention were obtained from the medical records in all the clinics of Semey. The age group of ≥ 60 years was selected because of the low life expectancy in Kazakhstan, particularly among men.⁸ Separate analyses were performed for the most common injuries: falls (W00–W19), exposure to inanimate mechanical forces (W20–W24), exposure to animate mechanical forces (W50–W64), contact with heat and hot substances (X10–X19), and road traffic injuries (V00–V99). These represent more than 98% of all injuries in the study setting.¹⁰ The daily injury counts from the studied causes were used as dependent variables. Based on the exploratory analysis using a ‘countfit’ estimation program, autocorrelations and partial autocorrelations of the dependent variables, a negative binomial regression model was selected for assessment of the associations between Ramadan and daily injury counts. Month, year and public holidays were included in the model as binary variables. Results are presented as relative risks with 95% confidence intervals calculated using robust standard errors to allow for heterogeneity in the data. All analyses were performed separately for men and women using Stata Version 13 (Stata Corp., TX, USA). The study was approved by the Ethical Committee of Semey State Medical University.

Results

In total, there were 6065 injuries during the study period (33% among men). The median age of injured subjects was 68 years for men and 71 years for women. Most injuries resulted from falls (82.2%), followed by exposure to inanimate (7.7%) and animate (4.6%) mechanical forces. Injuries from road traffic accidents and burns comprised 2.3% and 1.6% of all injuries, respectively. Sex-specific incidence rates by year, location and cause of trauma are presented in detail elsewhere.¹⁰

A crude analysis suggests that men were more likely to experience injuries classified as exposure to animate

mechanical forces during Ramadan than at other times of year. Similar associations were observed for exposure to inanimate mechanical forces among women. However, after adjustment for all other variables, Ramadan was not associated with increased risk for any of the injuries or all injuries combined. At the same time, women were more than three times more likely to suffer injuries from road traffic accidents during Ramadan, although this association did not reach significance. The results are summarized in Table 1.

Discussion

To the best of the authors' knowledge, this is the first study to assess whether the number of injuries increases during Ramadan in Central Asia. Several types of injuries were studied aside from those resulting from road traffic accidents.

The results suggest that after adjustment for year, month, day of the week and public holidays, the number of injuries during Ramadan is not significantly different from the corresponding numbers for other times of year. Point estimates suggest an increased number of injuries as a result of road traffic accidents among women, but this may be a chance finding due to the low number of cases and broad confidence intervals. Studies in larger cities in Kazakhstan are warranted to corroborate these findings. Studies that revealed a greater number of accidents during Ramadan hypothesized that their findings might be explained, in part, by general fatigue during fasting, lower sense of well-being, non-compliance with prescribed treatment, worsening health conditions in general, and impairment of cognitive functions.⁵ Khammash and Al-Shoula⁷ suggested that ‘the religious and spiritual atmosphere that embraces fasting people during the holy month of Ramadan causes neutralization of the adverse effects of increased nervousness and high temper of the fasting people’.

The main strength of this study is the use of all registered injuries among elderly people in one city over 3 years. Although the total number of injuries studied was 6065, the number of injuries in each category except falls was small. As such, this preliminary evidence needs to be replicated in

Table 1 – Absolute numbers and relative risks of injuries during Ramadan compared with other times of year, 2010–2012, Semey, Kazakhstan.

Type of injury	Sex	n	Crude RR	95% CI	Adjusted RR ^a	95% CI
All injuries	Male	2000	1.09	0.94–1.27	0.90	0.70–1.18
	Female	4065	1.03	0.93–1.16	0.97	0.82–1.16
Falls (W00–W19)	Male	1515	1.01	0.83–1.22	0.93	0.69–1.26
	Female	3473	0.98	0.87–1.11	0.93	0.77–1.13
Exposure to inanimate mechanical forces (W20–W24)	Male	219	1.22	0.77–1.93	0.70	0.36–1.37
	Female	246	1.70	1.17–2.48	1.13	0.67–1.93
Exposure to animate mechanical forces (W50–W64)	Male	123	2.49	1.51–4.08	1.69	0.90–3.16
	Female	156	1.59	0.94–2.67	1.05	0.60–1.85
Road traffic accidents (V00–V89)	Male	53	0.93	0.28–3.17	0.45	0.07–2.66
	Female	88	1.81	0.90–3.65	3.82	0.82–17.8
Contact with heat and hot substances (X10–X19)	Male	42	0.87	0.27–2.80	0.50	0.16–1.61
	Female	52	1.21	0.50–2.99	0.97	0.24–3.98

RR, relative risk; CI, confidence interval.

^a Adjusted for month, year, day of the week and public holidays.

larger studies. The data on falls and the total number of injuries suggest a decrease rather than an increase in the number of injuries in Semey. Kazakhstan has a high prevalence of hazardous alcohol consumption, particularly among men,⁸ and this may be reduced considerably during Ramadan. However, a study is needed to investigate if this is the case.

The use of medical records ensures sufficient validity of the data, but may underestimate the total number of injuries, particularly minor injuries. However, this underestimation is likely to be small. Thus, results should be limited to injuries that require medical attention. Another limitation of the study is its ecologic design and use of aggregated data. Information on patients' religious convictions is not available; therefore, the results should be interpreted as evidence that fasting during Ramadan has no effect on the risk of injuries at the individual level. The results suggest that public health authorities in the study setting should not expect an increase in the overall number of injuries among elderly people during Ramadan.

According to the municipal statistical office, the proportion of the Muslim population aged ≥ 60 years in Semey was 69.3% in 2010–2012. Given that the ethnic and religious composition of the population in Semey is very similar to that of Kazakhstan, the results may be relevant at the national level.

For better understanding of links between fasting during Ramadan and injuries in the former Soviet republics of Central Asia, studies using individual data are warranted. Replication of this study in larger cities such as Shymkent (Kazakhstan) or Tashkent (Uzbekistan) with a greater proportion of Muslims may contribute to better understanding of the effects of fasting on injuries at a population level.

Conclusions

Contrary to several previous studies, this study found no evidence for an increased number of injuries among elderly people during Ramadan in Kazakhstan. This can be explained, in part, by ethnic, religious and cultural heterogeneity of the Kazakhstani population, and the older age of subjects in this study compared with other studies. However, the results should be interpreted with caution until they are replicated in larger cities in Central Asia.

Author statements

Ethical approval

The study was approved by the Ethical Committee of Semey State Medical University.

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Competing interests

None declared.

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