

# A series of civilian fatalities during the war in Syria

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## ABSTRACT

**BACKGROUND:** A considerable number of deaths due to firearm injuries have occurred during wars all over the world. In this study, it is aimed to evaluate demographic characteristics and injury properties of cases died during civil war in Syria.

**METHODS:** The postmortem examination and autopsy reports of 321 forensic deaths occurred between January and December 2012 were analyzed, retrospectively. Of the 321 forensic deaths, 186 cases were injured and died in the civil war in Syria and, therefore, included in the scope of the study. Four cases died by natural causes or traffic accidents were excluded.

**RESULTS:** Cases were most commonly (n=73, 39.2%) aged between 21 and 30 years, and 21.5% (n=40) of cases aged under 20 years. Of females, 68.8% (n=11) were children and young adults under 20 years of age. An overwhelming majority of deaths (n=125, 67.2%) were caused by explosive and shrapnel injuries, followed by (n=49, 26.3%) gunshot injuries related deaths.

**CONCLUSION:** This study indicated that a significant proportion of those who died after being injured in the Syrian war were children, women and elderly people. The nature and localization of the observed injuries indicated open attacks by military forces regardless of targets being civilians and human rights violations.

**Key words:** Autopsy; civilian deaths; Syrian war.

## INTRODUCTION

People are widely exposed to adverse effects of wars worldwide. During wars, besides deaths of soldiers, high rates of civilian deaths have been reported. Injuries and deaths of soldiers and civilians were seen during the uprising in Syria in Arab Spring. Additionally, due to civil war, considerable social and medical problems were caused by migration to neighboring countries as refugees.<sup>[1,2]</sup>

Individuals injured in the civil war in Syria were mostly transferred to Hatay, a neighboring city of Turkey, for treatment. Among these, those who died were included in the scope of this study. Cases of deaths caused by injuries in the civil war

in Syria were evaluated in terms of demographic characteristics and features. Data collected was statistically analyzed and discussed in light of the related literature.

## MATERIALS AND METHODS

The records of Hatay Public Prosecutor's Office were used. The postmortem examination and autopsy reports of 321 forensic deaths occurred between January and December 2012 were analyzed, retrospectively. Of the 321 forensic deaths, 186 deaths caused by injuries in the civil war in Syria were included in the scope of the study. Four cases that migrated to Turkey because of war and died by natural causes or traffic accidents were excluded from the study. Although sufficient information on the occupations of the cases could not be obtained, it was evaluated in accordance with the statements of their relatives. These cases were evaluated in terms of age, gender, injured body parts, and types of injury. Cases were assessed by two independent physicians using AIS (abbreviated injury scale) and ISS (Injury Severity Score). Data collected was statistically analyzed using SPSS (Statistical Package for Social Sciences) for Windows 13.0. Distribution between the ISS values and injury sites was evaluated by one way ANOVA test and a p value of <0.05 was considered as statistically significant.

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## RESULTS

Among the cases, 91.4% (n=170) were male and 8.6% (n=16) were female. Ages of males ranged between 2 and 89 years, while ages of females ranged between 1 and 60 years. Mean age of males and females were 32 and 18 years, respectively (Table 1). Regarding age groups, a great number of cases (n=73, 39.2%) aged between 21 and 30 years. Among all, 21.5% (n=40) of cases aged under 20 years. Interestingly, 68.8% (n=11) of females were under 20 years of age. An overwhelming majority of deaths (n=125, 67.2%) were caused by explosive and shrapnel injuries, followed by (n=49, 26.3%) gunshot injuries related deaths. Among the remaining cases, twelve (6.5%) were caused by blunt force traumas as a result

of building collapse, fall from height and being thrown onto wreckage and etc. during explosions. Observed injuries were gunshot wounds, explosive and shrapnel injuries, burns and blunt traumatic injuries.

Eighteen out of 186 cases (9.7%) were dead on admission to the hospital. Eighty-three out of 186 cases (44.6%) died within the first 24 hours after arrival to the hospital. On the other hand, the rest (n=85, 45.7%) died during treatment within 2-120 days due to complications of primary injuries.

A great number of cases (n=101, 54.3%) suffered from multiple regional injuries, followed by head and neck (n=45, 24.2%) injuries (Table 2). In vast majority of cases, the cause of death

**Table 1.** General properties of cases

	n	%	Minimum	Maximum	Mean
Age (years)					
Men	170	91.4	2	85.00	31.8±14.6
Women	16	8.6	1	60.00	18.2±17.3
All cases	186		1	85	30.6±15.3
Injury Severity Score	186		16	75	43.0±21.5
Duration of treatment (days)	186		0	120	5.4±11.1

**Table 2.** Distribution of injured body parts

Body part	n	%
Head and Neck	45	24.2
Chest, Abdomen and Back	28	15.3
Extremities	12	6.3
Multiple parts	101	54.3
Total	186	100

**Table 3.** Distribution of causes of death

Cause of death	n	%
Brain hemorrhage and brain damage	70	37.6
Vascular damage and exsanguinations	42	22.6
Internal organ damage and internal hemorrhage	30	16.2
Internal organ damage and complications	22	11.8
Brain hemorrhage and internal hemorrhage	15	8.1
Bone fracture and complications	4	2.2
Spinal fractures and respiratory paralysis	1	0.5
Burns and complications	1	0.5
Brain damage and complications (meningitis)	1	0.5
Total	186	100

**Table 4.** Comparison of injury regions according to ISS

	Body regions	n	Mean	Std. Deviation	p*
ISS	Head-Neck	45	44.8889	25.01383	0.001
	Multiple region	101	47.2178	20.17355	0.001
	Chest-Abdomen	28	31.0357	17.50023	0.001
	Extremity	12	29.3333	11.22767	0.001

\*p&lt;0.05; ISS: Injury Severity Score.

was traumatic brain injury and hemorrhage, followed by exsanguinations due to damage of vessels and/or internal organs (Table 3) (Figure 1).

AIS scores were  $\geq 4$  in all cases. AIS scores were 5 in 54.8% (n=102), while 6 in 27.4% of cases. There was a statistically significant difference between ISS scores regarding injured



**Figure 1.** (a) Injury due to blunt trauma. (b) Injury due to explosion. (c-f) Shrapnel injury.

body parts, which was most significant in cases of head and neck injuries (Table 4) (Figure 1).

## DISCUSSION

18.6% of deaths caused by firearm injuries all over the world have reportedly occurred during wars. War related injuries and deaths demonstrate different characteristics compared to civilian traumas. Civilian traumas are mostly blunt force traumas while war related traumas are mostly responsible for penetrated injuries caused by firearms and explosives (shrapnel, bullets, etc.). Injuries caused by pieces of shrapnel have been reported to be more fatal compared to injuries by bullets.<sup>[3-6]</sup> Similar to the literature, in the presented series an overwhelming majority of deaths were (n=125, 67.2%) caused by shrapnel injuries due to explosions.

A study dealing with injured body parts during wars revealed that injury rates for different body parts were quite close. Head, neck, chest, and abdominal injuries were reported to be more fatal compared to injuries involving extremities. Most war related deaths have been reported to occur instantaneously at the incident scene or within the first 30 minutes after admission to a hospital.<sup>[7]</sup> Another study interested in fatalities during the war in Croatia showed that injuries mostly involved muscle and soft tissue, followed by bony tissue, abdominal and thoracic regions.<sup>[6]</sup> Studies concerning injuries caused by bombings presented that head and neck injuries were responsible for high morbidity and mortality.<sup>[8-13]</sup> In our study, injuries involving multiple body parts took the first place, followed by injuries involving the head and neck region. AIS scores were  $\geq 4$  in all cases. ISS scores were most significantly increased in cases of head and neck injuries. Similarly, in our series, the most common cause of death was head and neck injuries. High ratio of head and neck injuries, and injuries involving multiple body parts are thought to be the results of bombing attacks (air strikes, tank and mortar attacks, hand grenade explosions, and etc.).

Previously conducted studies showed that civilians were the ones mostly affected and human rights were violated during wars all over the world. During Croatian war, it was reported that out of 23% civilian deaths, 5.8% were children and 27.9% were females.<sup>[6]</sup> Similarly, among injured individuals in Palestine, 9% were women and 12% were children under 14 years of age.<sup>[5]</sup> Dramatically, during the Gulf war, civilian injuries comprised 34%.<sup>[14]</sup> In accordance with the literature, among the fatalities presented in this study, women constituted 8.6%, children and young adults under 20 years of age constituted 21.6%, and individuals aged over 50 years constituted 10.8%. The subjects in this study included patients injured during Syrian war and died in our city. In the presented series, injuries were induced by gunshot wounds, explosive and shrapnel injuries, and burns and blunt traumatic injuries. Interestingly, shrapnel injuries involved extensive tissue dam-

age characterized with dirtiness and burned irregular edges. Bone fractures, brain and internal organ damages caused by small shrapnel pieces indicated high-energy impact. In addition, we believe that lack of a timely and professional first aid increased death risks.

Forensic autopsies were carried out to find out the mechanism, cause and manner of death, and to determine time of death, characteristics and severity of wounds, and factors contributing to death. Owing to its judicial nature, performing detailed forensic autopsies on bodies in the course of war is of high importance in terms of documenting the characteristics of injuries.

This study indicated that a significant proportion of those who injured and died in the Syrian war were children, women and elderly people. However, since cases exposed to more severe and fatal wounds died in the battlefield, the rate of civilian deaths is estimated to be much higher than presently reported. The nature and localization of the observed injuries suggested that these deaths might have been caused by air strikes indicating open attacks by military forces without discriminating civilians and opposition forces. Furthermore, obtained results are strongly indicative of significant human rights violations during the uprising and civil war in Syria.

Conflict of interest: None declared.

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## KLİNİK ÇALIŞMA - ÖZET

### Suriye'deki savaş esnasında meydana gelen sivil ölümler

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**AMAÇ:** Tüm dünyada ateşli silah yaralanmaları nedeniyle meydana gelen ölümlerin önemli bir kısmını savaş esnasında meydana gelmektedir. Bu çalışmada Suriye'deki iç savaş nedeniyle ölen olguların demografik özellikleri ve yaralanma niteliklerinin değerlendirilmesi amaçlandı.

**GEREÇ VE YÖNTEM:** Hatay merkezde 2012 Ocak-Aralık ayları arasında meydana gelen 321 adli ölüm olgusunun ölü muayene ve otopsi tutanakları geriye dönük olarak incelendi. Suriye'de meydana gelen çatışmalar esnasında yaralanarak ölen 186 olgu çalışma kapsamına alındı. Doğal hastalık veya trafik kazası sonucu ölen dört olgu çalışma dışı bırakıldı.

**BULGULAR:** Olgular en sık olguların 21-30 yaş aralığında olduğu (n=73, %39.2), 20 yaş altındaki olgu oranının %21.5 (n=40) olduğu belirlendi. Kadın olguların %68.8 (n=11) oranında 20 yaş altı çocuk ve ergenler olduğu görüldü. Olguların %67.2 (n=125) oranında bombalama ve şarapnel etkisi ile %26.3'ünün ateşli silah mermi çekirdeği yaralanması sonucu öldüğü belirlendi.

**TARTIŞMA:** Sonuç olarak savaşta yaralanarak ölenlerin önemli bir bölümünün çocuk, kadın ve yaşlı kişiler olduğu görüldü. Yaralanma nitelik ve özellikleri silahlı sivilere gözetilmeksizin yapılan saldırılar nedeniyle önemli insan hakları ihlalleri meydana gelmektedir.

**Anahtar sözcükler:** Otopsi; sivil ölümler; Suriye savaşı.

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