

Overview of Assault-Induced Trauma Presenting to a Trauma Centre in Oman

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ABSTRACT: Objectives: Assault-induced trauma (AIT) is a public health concern that must be addressed and acknowledged. This study aimed to characterise cases of AIT presenting to Sultan Qaboos University Hospital (SQUH), Muscat, Oman. **Methods:** This retrospective descriptive study included patients presenting with AIT to the emergency department of SQUH from January 2007 to December 2018. The data obtained included incidence, patients' demographics, mode of assault, triaging, management and hospital stay. The data were collected using the hospital's information system and subsequently analysed. **Results:** A total of 268 cases of AIT were identified and 239 fulfilled the study criteria. The highest incidence recorded was in 2018, accounting for 72 cases. The mean incidence of AIT was 20 ± 19 per year. The sample was predominantly comprised of males (82.4%) and Omani citizens (65.3%). Most patients (66.9%) were between the ages of 20 and 39. The most common mode of assault was the use of bodily force (34.7%). Additionally, 18.4% were triaged as red cases. In terms of management, 84.5% of the cohort were treated non-surgically. No incidence of in-patient mortality was recorded. **Conclusion:** This study found that the rate of AIT averaged at 20 per year with most of the victims being young males. This was the first study that examined AIT in Oman and its results will aid future research and the estimation of the magnitude of this problem in the community.

Keywords: Trauma; Physical Violence; Demography; Oman.

ADVANCES IN KNOWLEDGE

- Assault-induced trauma (AIT) in Oman is an uncommon presentation and this was the first study that addressed AIT in the Sultanate.
- Most AIT cases were male, Omani citizens and between the ages of 20–39; the most common mode of assault was bodily force.

APPLICATIONS TO PATIENT CARE

- This study shed light on the incidence of AIT in Oman and helped in assessing the magnitude of the problem in the community.
- The findings of this study will also form the basis for further research and policy creation.

ASSAULT-INDUCED TRAUMA (AIT) IS A potentially life-threatening emergency that often requires a multidisciplinary approach, as it can contribute substantially to illness, disability and early death. Victims of such traumatic injuries, who are usually young males, sustain injuries of varying complexities.^{1,2} The injuries can range from a simple isolated wound to complex injuries involving multiple organs.¹ These injuries are commonly caused by the use of bodily force and the use of blunt and sharp objects.^{2,3} According to the 2016 Omani statistics, 1,631 cases of assault were reported in the year 2015.⁴ Contemporary medical literature pertaining to victims of AIT is scarce, especially in Oman.

To the best of the authors' knowledge, no local literature in this field has been published yet. This study aimed to characterise cases of AIT victims presenting to Sultan Qaboos University Hospital (SQUH), a tertiary care trauma centre in Al Khoud, Muscat, Oman. This will aid the analysis of local trends and the improvement of current management methods, thereby encouraging further research and the enhancement of health service delivery.

Methods

This retrospective descriptive study included cases of AIT that presented to the emergency department of SQUH between January 2007 and December 2018. Cases of self-inflicted injuries, accidental injuries and patients with insufficient data in their medical records (more than three of the studied variables) were excluded from this study. Furthermore, victims of assault who died prior to their arrival at the hospital were also excluded.

Cases were extracted from the Electronic Patient Record using the Hospital Information System TrakCare® (InterSystems Corporation, Cambridge, Massachusetts, USA; HIS). The data collected from the electronic records of all eligible cases were incorporated into an analysis sheet in the Statistical Package for the Social Sciences (SPSS), Version 22 (IBM Corp., Chicago, Illinois, USA).

The data obtained included the following variables: incidence of assault per year, victims' demographic data (age at the time of the assault, gender and nationality) and mode of assault. Information regarding triaging

at the emergency department was also gathered and classified into red cases or non-red cases, where red cases were defined as cases that required the activation of the trauma team per hospital protocol. Details regarding the patients' hospital stay and management were also collected. The forms of patient management were classified into surgical (defined as any patient requiring a procedure in the operating theatre) and non-surgical management. Patients who required non-surgical management were further subdivided into those who required a procedure (e.g. suturing and chest tube insertion) and those who were treated conservatively. Missing data were recorded as 'unknown'. Ethical approval was obtained from the Ethics Committee at the College of Medicine and Health Sciences, Sultan Qaboos University (REF. NO.SQU-EC/182/16 MREC#1364).

Results

A total of 268 cases of AIT were identified during the study period and 239 fulfilled the study's criteria and were included. The mean incidence of AIT was 20 ± 19 per year. The years 2007 and 2008 had the lowest incidence with three cases each year. In addition, the highest incidence recorded was in the year 2018, which accounted for 72 cases in total. Furthermore, since the year 2016, the rate of incidence has shown an annual doubling pattern [Figure 1].

There was a predominance of males who represented 197 cases (82.4%) compared to females who represented 42 cases (17.6%). The mean age was 29 ± 11 years with the highest incidence of assault involving victims aged between 20 and 29 (38.5%), followed by those between 30 and 39 (28.5%), while only four (1.7%) cases of assault involving patients below the age of 10 were documented. The majority of the assaults were on Omanis compared to non-Omanis (65.3% versus 34.7%). The most common mode of assault was the use of bodily force (34.7%)

followed by knives (21.3%), blunt objects (18.8%), the use of explosives (1.3%) and sharp objects (1.3%). The mode of assault was not documented in some cases (19.7%).

Of the total cases of AIT identified, 18.4% of the patients were triaged as red cases on arrival at the emergency department. Approximately 30.1% of the patients required admission to the in-patient wards with a median length of stay of two days (interquartile range = 3) and three (4.2%) of those patients required intensive care unit admission. Regarding the types of management, 15.5% of the patients required surgery. Out of the patients who were treated non-surgically, 23% required a procedure (e.g. suturing and chest tube insertion) and 61.5% were only treated with conservative treatment. No cases of in-hospital mortality were documented [Table 1].

Discussion

This study aimed to describe the incidence, demographics, mechanisms and management of AIT victims presenting to SQUH. To the best of the authors' knowledge, this is the first study to provide a detailed description of this type of trauma in Oman.

In this study, a total incidence of 268 cases was found over 12 years. Studies conducted in Europe, UK and Africa have demonstrated that factors contributing to an increase in assault rates include unemployment, low socioeconomic status, gross income and alcohol consumption. On the other hand, being educated served as a positive protective factor against being assaulted.^{3,5-7} Keeping these factors in mind, it should be noted that the rate of unemployment in Oman has continued to decrease, reaching 1.84% of the total labour force in 2019.⁸ Regarding education, Oman showed a persistently increasing high gross enrolment rate in primary and secondary education, which reached 102.9% and 107%, respectively.⁹ Furthermore, in March 2020, the National Center for Statistics

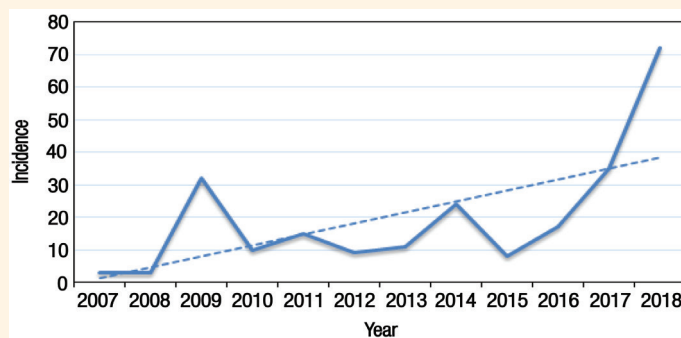


Figure 1: Incidence of assault-induced trauma cases per year at Sultan Qaboos University Hospital in Muscat, Oman, from 2007–2018 (N = 239).

Table 1: Characteristics, mode of assault and management approach of assault-induced trauma patients (N = 239)

Variable	n (%)
Gender	
Male	197 (82.4)
Female	42 (17.6)
Age in years	
0–9	4 (1.7)
10–19	40 (16.7)
20–29	92 (38.5)
30–39	68 (28.5)
40–49	22 (9.2)
50–59	12 (5.0)
≥ 60	1 (0.4)
Nationality	
Omani	156 (65.3)
Non-Omani	83 (34.7)
Mode of assault	
Bodily Force	83 (34.7)
Knife	51 (21.3)
Unknown	47 (19.7)
Blunt Object	45 (18.8)
Bite	7 (2.9)
Explosives	3 (1.3)
Sharp Object	3 (1.3)
Triage	
Red Case	44 (18.4)
Non-Red Case	195 (81.6)
Inpatient management required	
Yes	72 (30.1)
No	167 (69.9)
Management	
Surgical	37 (15.5)
Procedural	55 (23.0)
Conservative	147 (61.5)

and Information published that Oman has seen an increase in the average monthly income of households over the previous years.¹⁰ Additionally, a report by the World Health Organization (WHO) titled 'WHO Global Information System on Alcohol and Health (GISAH)', which was last updated in 2018, showed that Oman witnessed alcohol consumption of 0.8 L

per capita in 2016, which was significantly lower when compared to the global consumption at 6.4 L in the same year.¹¹ Considering all this, no obvious reason for this increase could be pinpointed by the current study; thus, this warrants further investigation. Regarding the low incidence of assault cases in the years 2007 and 2008, this might not have reflected the true incidence during those years, as the HIS was in its early stages then. Therefore, the retrieval of patients' electronic medical records from that time was difficult. Since 2016, the incidence of assault cases presenting to the emergency department has been doubling each year.

Wright and Kariya's study included assault patients presenting to the accident and emergency department in a hospital in Scotland and it was found that 80% of the assault cases involved males with a mean age of 28 years.¹² Hadjizacharia *et al.*'s study explored different types of assault injuries in California, USA, by examining the patients' outcomes following blunt assault over a period of 13 years; the study found that 89.7% of the cases involved males with a mean age of 36 years.¹³ El-Abdellati *et al.*'s study, which was conducted in Belgium in 2016, discussed the epidemiology and treatment strategies of assault-induced stab injuries and concluded that 95% of the assaults occurred on men with a mean age of 31 years.¹⁴ Subba *et al.*'s 2010 study aimed to establish the patterns of injuries in victims of physical assault presenting to a hospital in Western Nepal; the study found that the majority of cases (~63%) involved young males between the ages of 16 and 35.¹⁵ The present study is in agreement with the international published literature, as males accounted for 82.4% of the total number of cases with a mean age of 29. This establishes that across continents and types of assault injuries, young males are usually targeted. Furthermore, Subba *et al.*'s study demonstrated that the male predominance pattern also extended throughout all age groups.¹⁵

The most common mechanism of injury in the present study was the use of bodily force (34.7%) followed by the use of knives (21.3%) and blunt objects (18.8%). This was in line with Wright and Kariya's study where body force was the most common mechanism, followed by the use of knives.¹² Mullen *et al.*'s study, which was conducted in Pennsylvania, USA, examined interpersonal violence among youth aged 8–24 years and concluded that the use of bodily force was the most common mechanism.¹⁶ The fact that bodily force was used the most might reflect that most cases of assault were impromptu or not premeditated, as the assaulter(s) had not armed themselves beforehand. This is also apparent in the types of weapons commonly used (knives and blunt

objects, e.g. bricks and shoes), which are usually easy to obtain and could have been available on the site of the incident for the perpetrator to utilise. The low incidence of gun use can be attributed to the fact that it is not easy to obtain a gun in Oman. To possess a gun, one must go through many legal procedures and protocols, which are monitored by the Weapons Law of Oman. Those include and are not restricted to the following: being 25 years of age, passing a physical and mental wellbeing test and having no criminal background.¹⁷

In the present study, the median length of stay was two days. O'Mullane *et al.*'s study reviewed cases of assault that took place between 2001 and 2007 (data was obtained from the Victorian State Trauma Registry for Assaults). It identified 803 patients and a median length of stay of five days, which was longer compared to the present study.¹⁸ El-Abdellati *et al.*'s study focused on assaults by stabbing and they found a median length of stay of three days.¹⁴ David-Ferdon *et al.*'s study was conducted in the USA and analysed the trends of non-fatal assault injuries between the years 2001 and 2015 in patients between the ages of 10 and 24; they found that 87% were treated and discharged from the emergency department and did not require inpatient admission.¹⁹ The present study found a slightly lower rate of 69.9%; this could be explained by the difference in the age groups included between the two studies.

Furthermore, it has been established in the literature that great improvement has been made in the past few years in the approach adopted for the treatment of assaulted patients. Treatment modalities have shifted toward a more conservative approach than an invasive approach that was practised previously.²⁰ Indeed, findings in the present study demonstrated that the main treatment approach was non-surgical in 84.5% of the total cases, out of whom the majority were treated conservatively (72.8%).

For the present study, certain limitations should be noted. First, the lack of proper documentation of assault-induced trauma cases, which possibly resulted in missing several cases that had presented within the studied period. Second, this study provided an incomplete picture of the magnitude of this problem in Oman as it did not include cases that were managed in outpatient clinics and other health facilities. This, in turn, might affect the generalisability of the study's results. Finally, this study did not include those who died before arriving at the hospital and those who did not seek medical attention.

Conclusion

This was the first study that examined AIT in Oman. It provides an insight into the demographics, mode of assault and the management of assault cases presenting to SQUH within the 12-year study period. The mean incidence of AIT was 20 per year with most of the victims being males (accounting for 82.4%) of young age with a mean age of 29. The results of this study will aid in improving trauma care by providing a basis for future research and an estimation of the magnitude of this problem in the community.

CONFLICT OF INTEREST

The authors declare no conflict of interest.

FUNDING

No funding was received for this study.

AUTHORS' CONTRIBUTION

MA-B and AA-H drafted the proposal and applied for the ethical approval. MA-B, AA-H, IA-Z and FA-S collected the data. HA-M and IA-Z conducted the data analysis. HA-Q supervised the work. MA-B, HA-M and AA-H drafted the manuscript. All authors approved the final version of the manuscript.

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