

ORIGINAL RESEARCH

Social impact of the Iraq-Iran war as experienced by Iranian surgeons

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Abstract: Surgeons played a vital role in the Iraq-Iran War by healing injured soldiers and reducing the rate of death. The purpose of this study was to describe their lived experiences and social impact during the war. This qualitative study was conducted from May 2018-June 2019 and surgeons who participated in the Iraq-Iran War were invited. Semi-structured in-depth interviews were used to collect the data from 28 participants. Four main themes emerged from the data: 1- Military role was important in providing essential facilities and safe zones for personnel and soldiers at the warfront. 2- It was critical to reinforce the infrastructure for immediate medical assistance. 3- Disaster training for medical personnel was vital for triage, treatment, education and research planning. 4- Spiritual and religious beliefs. Disaster planning and training for physicians by drills is essential to meet the challenges of unexpected events and operative readiness requires drill training on a quarterly or semi-annual basis.

Keywords: combat; Iraq-Iran; military; war

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1. Introduction

The protracted war between Iraq and Iran from 1980-1988 resulted in mass casualties exceeding 180,000 lives lost which changed the course of history for the Iranian nation (1-3).

There is abundant evidence-based information about medical interventions and application of care for soldiers in combat regions and more recently concerning global survival rates (4), however, there is a paucity of knowledge concerning how physicians experienced challenges during this conflict (5-7). The consequences of war can have multiplicative effects on human suffering such as physical and psychosocial issues that can last over a lifespan (5), moreover, the social impact can change family roles, increase burden for care giving spouses (8, 9) and create childhood stress (10). The rate and extent of war disabilities and consequences thereafter are directly linked to medical approaches to war zone injuries (11). The outcome of casualties depends on physician training, experience, expertise and systematic procedures such as

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safety measures, triage (6, 11), evacuation and rapid transport to well-equipped hospital facilities (7, 12). Understanding through interviews of how rapid response (12) management can provide opportunities in the field to reduce complications of trauma (5, 9), could improve operative readiness. Regardless of the cause of war the goal is to save lives and reduce trauma which is the leading cause of injury. Medical management requires optimizing treatment protocol in the pre-hospital period, during hospitalization and in rehabilitation (13). For example, triage methods should be improved and adaptable for different emergent situations (6). Continuing education for treatment protocols not only reduce risk of mortality but avoid long term health care costs. An example of successful management of injured persons is the Boston Marathon bombing in 2013 where readiness and available resources reduced the overall rate of death near to zero (14). Systematic review of literature indicates that types of bodily injuries sustained during the 8-year Iraq-Iran conflict included explosive devices, chemical agents and landmines (2, 3) that put the safety of soldiers and others at risk. Physician reports from other countries (13, 15) indicate that the structure and process of rehabilitation and improved protective devices can promote personal safety for soldiers, and personnel operatives in the environment. Moreover, early rehabilitation could improve self-image and promote easier transition back into society. Part of physician experiences during disasters have a psychosocial component to consider that is of equal importance. According to Ravella (16) nurses serving in the Vietnam war experienced challenges with coping skills, social support, spiritual values, humor, and symptoms of post-traumatic stress disorder (PTSD). Physicians and other personnel may also struggle with feelings of inefficacy and moral decline due to stress in emergency medicine according to Stehman, et al. (17). Dean et al. (18) suggests that injury to our perceived spiritual dimension occurs because there are obstacles during the provision of care that are not under the control of the physician, and this can challenge inner beliefs leading to a serious outcome. Documented spiritual experiences concerning surgeons during the war is limited. Since Iranian surgeons felt they were not well prepared but played a vital role in the Iraq-Iran war, semi-structured interviews allowed expansive information to emerge. By extracting the essence of how physician lived experiences occurred, we proposed the information could be valuable toward national disaster planning and ultimately lessening social impact. Through improved medical training, innovative equipment and collective data, physicians can understand how to promote disaster readiness and adaptability for the future. The purpose of this study was to investigate and describe the experiences of surgeons during the Iraq-Iran war from 1980-1988.

2. Materials and Methods

2.1. Design

Semi-structured in-depth interviews in this qualitative study were conducted for obtaining data from surgeons who were transferred to the warfront. Interviews can reveal underlying issues and challenges through the narratives of individuals who are directly involved during disasters such as war (19). By this method researchers can triangulate with multiple methods, such as filming, audio taping and note taking to collect data (20).

Studying the phenomena through exploration can enable researchers to derive meaning that underlies how physicians, for example, were able to perform (21). Even though the war occurred over 35 years ago, these surgeons were deeply embedded with the injured, yet the community has not heard about their experiences. Since these surgeons have over 25 years of work experience, we propose that the outcome of their reflective narratives might provide more understanding of individual self-concept, illuminate social impact of relationships especially during disasters and promote transferability of skills to the community. This in alignment with other qualitative research can contribute to the framework of social theory. This is an appropriate method of capturing information by investigating surgeons' experiences during war.

2.2. Data collection

A semi-structured in-depth interview approach was used to capture the participants' experiences. Purposive sampling (22) was the technique for recruiting surgeons who were attending an international congress of surgeons in May 2018 and June 2019. This sampling method enabled the participants to best answer the question of what and how they experienced events during the Iraq-Iran war (23). Two attempts for recruitment were necessary to reach adequate sample size. The study was explained, concerns were addressed, and informed consent was obtained from 30 participants before starting the interviews. Two participants did not complete the interview. Eligibility and final sample size included 28 participants and their characteristics are represented in Table 1. At the time of war, the participants were civil medics who volunteered to go to the warfront to provide medical services.

Interviews were performed in two sessions that ranged from 60 to 90 minutes. The data from the first interview did not meet the range and scope that was expected; therefore, we conducted a second interview in depth to achieve more enriched data. Questions asked during the initial interview included: "What important points can you remember from that time?", "How did you handle your patients?", "What difficulties did you encounter in the war?", and "What was the medical team problems at that time?" For the second ses-

Table 1: Demographic characteristics

Variable	value
Age range (year, mean $\pm$ SD)	54 to 87 years (64.42 $\pm$ 7.25)
Gender	
Male	27
Female	1
Specialty	
General surgeons	10
Neurosurgeon	10
Vascular surgeon	4
Thorax surgeon	3
Pediatric surgeon	1
Work experience range (year, mean $\pm$ SD)	25 to 48 years (35.28 $\pm$ 6.16)
Age at the beginning of the war (year)	20 to 47
Experience as a war physician (year)	Up to 8

SD: Standard deviation

sion 20 out of 28 participants agreed to elaborate more on their experiences when they were asked to explain what their first five priorities would be if they were exposed to similar conditions in the future. This question allowed the participants to elaborate more about their experiences and self-reflections. Data saturation was achieved when no new information could be retrieved from the participants (23). All interviews recorded data by audiotapes, filming, note taking and were then transcribed.

2.3. Data analysis

The four-phase method was used to analyze the data (21). All individual transcripts, audiotapes, films and notes were read and organized. All data were transcribed, and all sentences were written as initial codes. During the second-phase coding sub-categories were formed from the extracted segments from sentences that helped create a concept category. The third phase consisted of analyzing other content data such as filming, and along with member discussion, we gained meaning and insight to participant responses. In the fourth-phase recurrent patterns were formed into categories where several main themes emerged. Narrative themes were written by linking the categories (24).

2.4. Rigor

According to Houghton et al. (19) to ensure rigor there are specific approaches such as credibility, dependability, confirmability, and transferability to be considered. Credibility in this study was achieved by prolonged engagement of interviews and persistent observation along with filming by the researchers in the field and gaining full understanding of their experiences. Triangulation played a role in using multiple sources of data such as audiotaping, note taking, and filming participant responses. Confirmability was achieved by objectively using multiple sources of data collection, as it

provided a complete understanding of the phenomenon and to ensure focus was on the interviewees' responses (21). An External peer review source was used to determine interpretation of the data and similarity rate of comprehension (22, 24). Extracted data from three interviews were returned to the participants randomly for comparing their feedback to our interpretations (25).

Dependability was achieved when an internal check of several research team members read the interviews and analyzed the data codes. Transferability was enhanced by descriptive participant characteristics, interview responses, examples of the raw data and contextual themes that emerged from the categories as well as the findings (19). This process would allow the researchers and others to make an informed decision about considering applicability as an option in other similar contextual situations alternatively.

3. Results

Four main themes emerged from the interviews which included military role, infrastructure reinforcement, medical team characteristics, and the spiritual and religious beliefs. Disaster preparedness requires essential personnel to improve knowledge, skills and ability by drill training occasionally on a quarterly or semi-annual basis.

3.1. Military role

An interviewee explained that during the initial phase of the war a centralized emergency management agency was not yet established to support the provinces, personnel, and provision of health and human resources. Participant 11 said, "Initially, there were no coordinating military officers to establish joint field offices or procedures to provide access for medical supplies and resources." Participant 17 said, "Therefore, we had to find alternative ways of obtaining the neces-

sary tools we needed to provide patient care." This means, for example, if antibiotics or supplies arrived late, it increased the risk of death. This suggests that in all disasters an organized framework of operatives is necessary to provide pathways for access to resources. At the same time the military role of monitoring and situational awareness could ultimately reduce consumption of financial resources. Toward the last few years of the war and up to now, there has been numerous health policy reforms to address this (26).

Participant 12 said, "It is important that soldiers wear protective standardized military clothing and gear whether they are behind the frontlines or in the trenches. Some soldiers did not have or did not wear steel helmets and hoods or lacked the discipline thereof. This caused more severe missile and shrapnel injuries." In any national emergency the main objective is to reduce human suffering and mortality rates. By providing safe, effective uniforms, and gear such as protective helmets as well as vests, the combat soldier can be better protected during any conflict.

Interviewees emphasized that programs for disaster training and operative readiness to meet the challenges of any conflict between nations should begin well in advance of the events. Participant 4 remarked, "In the sudden unexpected emergence of war we were transferred to the war zone without being adequately informed or psychologically prepared." Although civilian doctors volunteered to go to the war zone, logical decision making became a challenge which may have resulted in increased mortality and a higher rate of injury among soldiers. Participant 4 continued by saying, "Initially, there were not many military trained doctors to cover war the entire war front and therefore, civilian doctors volunteered to help." Operative readiness and critical thinking are essential for military and all essential personnel to understand how to proceed during a disaster. Training and education shared by other nations could be useful and strategic (15). As part of the national response framework, the military played an important role in preparing essential equipment to ensure that the collective system including personnel can function adequately.

3.2. Infrastructure reinforcement

Most interviewees perceived increased stress on the medical team who were burdened by the load of care that was demanding on them. They believed that in order to keep the medical team safe, areas far from the warfront, such as a 'no fly zone' would enable personnel to maximize medical services and resources. Participant 3 and Participant 4 said, "We had enough human resources and equipment in the last year of the war", Participant 19 added, "In the war zone we needed to assess the geographical terrain and create more equipped hospitals in the safety zone." Participant 2 said, "The existence of the underground hospitals was one of our dreams."

Participant 21 said, " Suddenly the black bridge close to our hospital was destroyed and shattered all the glass in the hospital."

Designated safe zones along with military management in high-risk regions such as underground buildings could provide more safety for those on the war front. Furthermore, during disasters, the presence of the field hospitals could be more effective. It can reduce the casualty load and improve patient survival rate and outcome. Participant 17 said, "After several years in the midst of war, when we arrived in Piran-Shahr city, an underground hospital had been made", Participant 4 said, "During the last two years of the war, the hospitals were better equipped." Field hospitals in Iran emerged between 1980-1987 treating more than 7,000 patients (27). According to Heidarpour, Iran initially was dealing with economic and transportation challenges so field hospitals provided a solution to that problem (27).

3.3. Medical team characteristics

Physicians, nurses and specialists are medical personnel that carry out specific duties during disasters. Achievable outcomes depend on management of tasks, functions, and goals that interrelate efficaciously the activities and access to organizational resources.

Participant 5 said, "At the start of the war, fewer organizations existed managing medical personnel." Participant 19 said, "Even in the midst of war adequate trauma centers were not yet available." Participant 1 and 12 said, "The medical services were managed by Public Health and Urgent Care Administration immediately after the start of the war and also included hospital administration along with human resource management." Participant 14 continued by saying, "it led to reduced pressure on the medical unit as well as enhanced medical services. In addition to military medics, other physicians volunteered to go to the war zone. Participant 11 said, "We held 2- week classes for nurses to prepare them before they were transferred to the war zone hospitals".

Effective communication between personnel triaging soldiers at the warfront and the medical team functioning behind the front-line is important to provide clear direction and prevent further complications. Participant 3 and participant 17 said, "To carry out triage, knowledge, skills and ability is required to avoid dangerous consequences." Participant 23 said, "Medical care was provided by less trained volunteer citizens." Education and training can reduce casualty rates. By identifying medical personnel either by uniforms or identification cards could improve access to medical services.

Human resource capability is another aspect to consider when deploying medical personnel to the warfront. Resident physicians and medical students should be employed based on their capabilities. Participant 28 said, "We needed to handle the emergencies with expert surgeons." Participant 9 said,

"We required more specialists in the field of trauma to provide the best surgical interventions to the wounded soldiers." Participant 19 said, "The surgeons' team should include at least one traumatologist to guide the residents".

Regardless of the contribution of few traumatologists during the war, interviewees emphasized training more expert specialists in various fields.

Though it was not available in the Iraq-Iran war, an essential part of treatment was access to a rehabilitation center. Interviewees emphasized rehabilitation centers were necessary to promote health for all individuals involved in disasters; moreover, it would include psychological counseling for both physicians and soldiers. Data registration of patients and creating data sets that include history, physical exam, radiologic findings and surgical interventions should be initiated as early as possible.

Participant 25 continued by saying, "Because of a higher number of casualties, intraoperative monitoring and recording was not feasible." Participant 23 said, "Following war casualties was a challenge because registration and reporting during the war was not possible." Participant 1 said, "We did not learn how to write articles which resulted in a major loss of information", and Participant 25 said, "Computerizing the data at that time was not yet developed."

The lack of information and missing data meant that continuity of care during and after the war would become a challenge.

Participant 26 said, "I did a literature search to find similar cases and specific details but found a paucity of information." Participant 6 said, "Toward the end of the war we improved the process of collecting and categorizing data and information." Data management was necessary long after the war because of the need for further medical management and rehabilitation.

3.4. Spiritual and Religious Beliefs

Another dimensional theme was spiritual and religious beliefs that emerged from the interview data. Although it is not evident in the literature, the participants expressed it as a symbol of importance for soldiers, medical personnel and others. Perceived psychological characteristics also emerged such as self-confidence, faith, sympathy, nationalism, dedication, commitment, compassion and martyrdom.

Participant 7 said, "The feeling of nationalism and safeguarding the country from enemy attack was present among soldiers." There was an element of religious conviction to go to war and fight. Participant 8 said, "They had significant commitment and sympathy," Participant 14 added, "Even if they died of their injuries, they would be considered martyrs." "Some of the soldiers refused medical care to help their friends first." Participant 18 said, "Martyrdom was accepted respectfully as a final journey to heaven."

Participant 7 and Participant 25 said, "After ending each operation, I was depressed from observing such terrific injuries to our soldiers." The degree of social impact from these experiences cannot be underestimated.

4. Discussion

Findings presented here indicate that operative readiness was critical to effectively manage war casualties and to provide services to all personnel. The in-depth interviews enabled us to explore what and how physician experiences during the Iraq-Iran war impacted their performance; moreover, it increased awareness about how social interrelationships were needed to manage that event.

We understood from the data that military leadership was a priority to provide emergency management, effective communication and access to resources through interrelated field offices. Situational awareness and monitoring events were necessary to ensure safe surroundings for personnel to function. This finding is consistent with Firouzkouhi's et al. (6) results that involves leadership role, and adequate human resources to manage warfront activity. Goniewicz et al. (7) and Firouzkouhi et al. (6) supports this view that coordination of resources and services can predict the rate of mortality and morbidity. Moreover, if emergency management framework is organized, there could be less economic burden imposed on the nation. In contrast, Rahimi-Movaghar et al. (5) suggested that rapid transport, antibiotics and antiepileptics assume a more critical role when considering death and disability.

Alternatively, the essence of this observation infers that military preparedness operates on standardized drill training and knowledge of technologies along with discipline of proper use of technology that will protect them and others by reducing harm.

Infrastructure reinforcement arose from the data as an important theme. Previous studies (7, 28, 29) reveal that established policy, protocols and procedural guidelines can be used to provide standardized care when the infrastructure operates in an organized systematic manner. We understood that if trained paramedics could quickly assess trench injuries, then immediate evacuation of casualties and rapid transportation to safe zones might improve survival rates. The current study results were consistent with Pink (30) and Rigal et al. (29) indicating organized handling of wounded soldiers from the front line to safe zones would provide continuity of care. Several years in the midst of war, underground stations were built for initial treatment and triaged patients to either field hospitals or safe zone trauma centers. Ultimately, an established system of emergent care and rapid transport to appropriate facilities could narrow the time of injury to initial treatment and thus promote survival.

Trauma centers provided more optimum care because they were better equipped so the medical team could provide a higher level of standardized care. This, theoretically, could reduce secondary insult to the injury. Alternatively, field hospitals in Iran lessened the burden of casualty load. Previous studies (15, 30) align with the current study that field hospitals could meet the needs of emergent treatment by reducing casualty loads based on triage decision making.

The need for specialized training in trauma surgery among the medical team characteristics emerged from the interviews. Historically, since the mechanism of injury has changed during wartime (3, 15), it suggests that it is almost imperative that surgeons develop specialized skills to treat casualties. Trauma surgeons play an important role in war because of the range of skills for treating acute injuries such as missile wounds, explosive fragments, and shrapnel injuries. Considering this, participants in this study indicated that they did not have enough experience to deal with these types of injuries.

Contrary to other types of disasters, a continuous flow of patients was transported to hospitals and treated by some physicians with limited range of skills. Considering the mechanisms of injury, medical care, and lack of human resources outcome of care was predicted. Firouzkouhi et al. (6) assessed nurses' experiences in triage during the war and the results were similar in that they did not have the skills to deal with chemical victims of war. We understood, that regardless of level of responsibility, the entire medical team needs periodic drill training, education and research to prepare when disasters arise. Our findings were consistent with Gierson et al. (11) that a balance of human resources, trained medical and nursing personnel could handle mass casualties using organizational skills.

The social impact of war injuries involves recovery and rehabilitation that can last for the lifespan of a soldier. Previous studies show that rehabilitation centers were established during or after disasters such as war (12). According to Ghoseiri et al. (31) post-war veterans in Iran are supported by the Veterans and Martyrs Foundation (VMAF). The type of rehabilitation is based on prevalence of war related injuries (31). Although the focus of this study was not about experiences of rehabilitation and impact on families, exploration of these issues could contribute valuable information to the scientific community.

Data collection and categorization of registry during the war was not feasible initially but later on a procedure emerged. Ravella et al. (16) and Scannell-Desch (32) support this view that publishing wartime knowledge is vital for future planning. Contrary to this idea, there was no systematic method or reasonable decision making to record data, so its importance was not really understood. The essence of a spiritual dimension emerged from the interviews as characteristic be-

liefs expressed by military and medical team personnel. Participant perception was that there were inseparable components of their belief system that they related to throughout the duration of the war. This is consistent with Valiee et al. (33) study of nurses who faced long term challenges of their profession.

Characteristically, they shared similar beliefs such as compassion, sympathy, commitment, nationalism and resilience as a range of cultural values that impacted their level of satisfaction. This suggests that there is a connection between spiritual religious belief systems and perception of well-being.

Limitation in the study was sample size as access to participants was a challenge. Also, we evaluated opinions of a limited war surgeons leading to a kind of selection bias, thus these results should be considered cautiously. The power of transferability, however, could be determined by application to similar situations. Although the war ended approximately thirty-three years ago, it could have impacted participant recall of events besides influencing on their answers. Conversely, the participants served in an eight-year war and along with their work experiences, the indelible events of that era could have provided more meaningful self-reflection.

5. Conclusion

Disaster preparedness emerged as the overall essence of these experiences and that operative readiness requires occasional drill training and education on a quarterly or semi-annual basis. Equally important was the omnipresence of a belief system that impacted satisfaction among medical team members. Recommendations for future research includes exploration of care-giver life satisfaction of post-war veterans with head injuries. In addition, descriptive exploration of childhood stress could enlighten the scientific community and ultimately increase public awareness.

6. Declarations

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6.2. Authors' contributions

Conception and design: VRM, ZG, SMG, JA; Analysis and interpretation of data: ZG, AP, VB, KN; Drafting the article or revising it critically for important intellectual content: AP, ZG, JA, VRM, JA, SMG, VB; Final approval of the version to be published: all authors

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6.4. Conflict of interest

Authors declare that they have no conflict of interest.

6.5. Ethics Statement

The Ethics Committee of Tehran University of Medical Sciences approved the study, and the reference number is IR.TUMS.VCR.REC.1398.797.

The ethical approval was achieved from the Ethics Committee of Tehran University of Medical Sciences. All participants agreed to be interviewed voluntarily and could opt out of the interview at any time. They acknowledged that they understood by signing the consent form. The participants' names were assigned to a number to ensure anonymity.

6.6. Data Availability Statement

All the data was stored safely in the trauma and surgery research center.

6.7. Using artificial intelligence chatbots statement

We declare that we did not use artificial intelligence chatbots.

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