

# Military medicine's role in the armed forces and the need to develop specialized education programs in Iran military medicine

Rahmani R.\* MSc, Mehrvarz Sh.<sup>1</sup> MD, Zareei Zavaraki E.<sup>2</sup> PhD, Abbaspour A.<sup>2</sup> PhD, Maleki H.<sup>2</sup> PhD

\*Department of Education Management & Curriculum Development, Faculty of Psychology & Educational Sciences, Allameh Tabatabaai University, Tehran, Iran;

<sup>1</sup>Department of Surgery, Faculty of Medical, Baqiyatallah University of Medical Sciences, Tehran, Iran;

<sup>2</sup>Faculty of Psychology & Educational Sciences, Allameh Tabatabaai University, Tehran, Iran

## Abstract

**Aims:** Military forces are exposed to specific diseases and risks due to job conditions. Military medicine operates as an academic discipline related to the health needs of military forces. Specialized military medicine has started its activity almost since the onset of modern warfare in the twentieth century. Considering the world situation including the growing trend of war events, terrorism and natural disasters and also new changes in weapons and war strategies and their side effects, military medicine is evolving nowadays. This review article was written with the aim of evaluating the role, position and approaches of military medicine, assessing the military physicians' curriculum and the evaluating the priority of establishing specialty majors in the field of military medicine in Iran.

**Conclusion:** Military physicians need excellent knowledge, attitude and skill. Nowadays, military medicine has the following approaches: being professional and mobile, resuscitating and stabilizing the victims at the scene and strengthening pre-hospital measures. Establishing military emergency medicine with a special curriculum is a priority and can provide the needs of armed forces in good accomplishing their tasks. The military medicine departments of military medical universities should plan and design new curriculums with the specialized military medicine approach and develop it based on newly established needs. A specialized physician who has passed the military emergency medicine curriculum will be the best and the most appropriate choice for Iranian armed forces in emergency tasks and conditions.

**Keywords:** Armed Forces, Military Medicine, Military Physicians' Educational Needs, Military Medicine Curriculum, Military Emergency Medicine

## Introduction

Military forces of any country have a decisive role in defending and preserving the stability and security of the given country. These people, according to their tasks and missions and the type of their jobs are prone to special injuries and diseases. Military medicine is in charge of providing health care and services to the militaries.

Military medicine is a type of medical specialty that focuses on the risks and needs of soldiers and other members of military. Military service can give services in specialty and super-specialty levels in different military conditions including prevention and treatment of militaries, ergonomics and the effects of special military machine and devices [1, 2]. *Wardhuns* in the University of USUHS (University of homogenous health science) in the introducing of military medicine writes military medicine is an academic discipline that has the great support of scientific activities. Military physician diagnoses and removes the issues and needs of military forces through their knowledge and experience. Military medicine includes investigation, prevention, cleaning,

transportation, care and treatment of military forces that are exposed to dangers due to their job and have the disease or injuries. Therefore, military medicine is unique branch of medicine that is used to prevent and treatment of diseases and injuries resulting from military work in military operational environments [3]. Military medicine is a science that investigates the diseases and damages which happen in the military operations. Besides considering the usual diseases, military medicine treats a range of trauma and unique damages which are rare or unknown in other population [4].

*Best* et al. with respect to the mission and the role of military medicine say that: the main mission of military medicine in the world is health and treatment support of militaries with respect to the issues, dangers, damages and diseases that happen to them due to special occupational conditions. Finally, military health services lead to the health of militaries and increases the military power in them [5]. On the role of military medicine in armed forces *Gatman* writes: a successful war is not only the art, war, science, advanced defense and the interest of armed forces soldiers of that country, but it is dependent to

\* Correspondence; Email: rahmani@bmsu.ac.ir

strong support of war. Medical categories are one of important supporting categories in war. He asserts that the rate of injuries in each successful war has had decreasing trend in the 20 and 21<sup>st</sup> centuries. One of the important factors in this issue is resuscitation skills as well as the surgical and medical interventions of medical categories [6]. *Ghanjal* on the role of military and military medicine in events and natural disasters writes: in today's world, military organizations and their dependent forces are among the organizations that generally have an active participation in these events. Because these forces have special characteristics and special fitness, they can appear in different roles and give services. These roles include assisting in saving, rescuing, treating and moving injured, wounded and needy people in injured area in natural disasters [7]. *Namjonik* believes that today military and combat medicine (military medicine) is a valid and scientific university field that has special usage among the specialist of these fields in the military centers and it is essential for the health of soldiers [8]. Also, *Baker* with respect to the missions of military medicine writes: there are two main missions for the military physicians: 1) readiness of military physicians for encountering unique needs of militaries in military events 2) the readiness of military doctors and having essential science and skills for giving daily medical and caring services to the military employees and their relatives [9].

*Hetz C.* et al. in the history of military medicine writes: military medicine was designed and developed along with military developments and evolution of war and war weapons with respect to their destructive role and for providing effective treatment to the injuries. Military medicine, almost, started from the time of modern war in 20<sup>th</sup> century by his work on the front lines of military triage [10]. *Leon* et al. writes about this issue in this way: This is the fact that there is relationship between the history of war and surgery (medical services). Since eighteenth century, a medical service in war was seriously in attention of most of arm militaries. Shortage of doctors and their inexperience in care of war victims and wounded in armies in countries such as England and France during the battle of Waterloo increased mortality in soldiers in the war. Then, in conclusion, the countries began trying to mobilize large group of physicians with respect to this issue [11].

*Namjonik* writes about this issue: Until twentieth century, military medicine did not have a special place in specialized position and physicians were generally used in peacetime and wartime in military organizations and places. Obviously, that was the

same in Iran until last half century. However, military clinic in its primary and simple form has very old history. Gradually, with the invention of firearms, weapons development, expansion of military fields, mobility of wars, increasing the power weapon and their destructive effect of fire, the injury rates of military and non-military forces was increased that improved military medicine advances [8]. *Lener & Souder* in relation of military medical advances and the necessity of its continuing with new approaches say that: in the long history of medical medicine, medical advances related to wounded people in war are parallel to the war military advances and their destructive characteristics [12]. *McCallum* says: improving the weapons exacerbated the injuries and exacerbating the injuries, showed the necessity of improvement of the injured people [13].

Before the 8 years of holy defense, the health and treatment affairs of militaries was done by the military units clinics and by experienced nurses and doctors who were non-militant. However the war health support was started in limited level first in primary level by paramedics and medical assistants and it in more specializing level with non-military physicians and nurses that was limited. With expanding the war length and improving the war management, combat health training centers was established in 1981 and it started teaching and training the military health care in nursing and paramedical technicians. During the eight years of sacred defense, the armed forced military medicine extended its services at different levels of care, from battle field to the forefront of battle that resulted in worthwhile and life-giving services to veterans. After the war, military medicine was developed in the form of training and academic courses in military universities of country with postgraduate admissions in military nursing, military health, etc., also, it was developed during the general medicine, nursing and paramedical courses. Considering the increasing trend of war and terrorism incidents in today's world, diversity of modern weapons and their effects and the incidence of unpredictable events and the role of militaries in these issues, changing the approaches of military medicine and developing its curriculum is essential. This study was conducted for investigating the role and the position of military medicine and its approaches, curriculum of military physicians and priorities for launching and establishing special fields in specialized level in Iran.

### **Educational needs of military medicine**

*Namjonik* believes that what should be taught in

military medicine curriculum in addition to what is taught in general and specialized medicine in non-military universities should be specific scientific contents including assessment of events, prevention of specific diseases, diagnosis and treatment of diseases and injuries of military occupational exposure, evacuation of wounded, hearing problems caused by the blast wave, abandoned weapons, aviation and space medicine issues, complications resulting from contacting with toxic gases, chemical, nuclear and microbial weapons, infectious diseases such as malaria, hepatitis, tuberculosis, AIDS and tropical diseases in military environment and operational areas, atmospheric conditions above or under or at sea level, very hot or very cold environments and the climatic conditions are considered and are taught to the military physicians. Also, preventive medicine, trauma disease management, behavioral science and local diseases medicine are other aspects in which a military physician must be professional [8].

Regarding the development of military medicine curriculum *Baker* writes:

These programs were developed in the United States after World War II for improving medical care in militaries. During the Korean War, the University of USUHS started complementary medicine educational programs (military medicine) at the undergraduate level. In addition, educational programs were developed in military resident level in this university in order to incorporate them in the war. At present, USUHS university have graduate programs in military medicine training for each of ground, air and sea forces in order to keep the health and treatment needs of military people and their relatives and for replying the people's needs in natural disastrous conditions [9].

*Cloonan* at the fifteenth international conference on military medicine in relation to the current challenges in current military training programs and needs and the necessities of evolving and reviewing these program writes: changes in the military medicine training courses can be effective on the operation of military medicine for replying the health and care needs of militaries during the coming years. According to *Cloonan*, these challenges are placing in the era of new technologies, emerging of new technologies in medicine, changes in military organizations and its management such as changes in military strategies at the international level, limiting the military units with multiple functions and their more flexibility, less using of military forces unlike previous conventional wars, individual weapons development, the existence of threats and emerging diseases, emergence of new weapons and weapons

technologies, changes in ethics and social expectations and emerging diseases and poisoning related to chemical and biological components [14].

*Ilewellyn* defines three time periods for military medicine and its educational programs [15]:

1. Pre-modern era (pre-world war II): the focus of military medicine is primary on infectious and tropical diseases and the action for prevention and treatment of them in the conditions were there was no antibiotics yet. There was very limited knowledge regarding the surgery and the care existed before and after surgical procedures. In this era specialist were only medical graduates and not an important element of military medicine.

2. The modern era (post war II): in this era with discovery of antibiotics and development of diagnostic method, fundamental changes have been made in the performance of health caregivers and physicians. During this period, cares before and after surgery and resuscitation measures, was significantly improved. Surgeries could do more invasive surgical procedures that were not imaginable before World War II. In 1976, in the University of USUSH, a special military program was founded with a four-year curriculum. This curriculum was specifically focused on subjects such as tropical medicine, emergency medicine, preventive medicine, military psychology, and medical aspects of chemical, biological and radioactive weapons. During the world war II, the best medical universities in US was established in military systems and they could train the best military medicine specialists that this group tried in the surgical, internal domains as well as infectious diseases in world war II. In 1987 the excellent book "war physicians" was written by *Albert. E. Cowdrey*. Finally, in this era, in the medical center "Walter Reed" the specialized and super specialty was established. Some of the successes of U.S. military medicine in Korean War were developing mobile military medicine (mobile field hospitals), major surgeries in the front lines, measures for resuscitation, creating stability in the injuries state through blood transfusion and replacement of crystalloid fluid and air rapid evacuation of wounded people.

3. Postmodern period (future period): *Ilewellyn* believes that in future direction of military medicine will be: 1) Downsizing, mobility and flexibility in military medicine, 2) Increasing the capacity of pre-hospital in all levels 3) Developing of small and resistant hospitals such as surgical units in front line. 4) Ability to quick stabilization in the situation of injured people and evacuating the patients to a higher level of care level.

*Stevens* believes that due to the changes and challenges in the next 30 years in the fields of biology and information technology, changes in military training program is essential [16].

*Mayo* in the Fifteen International Conference on Military medicine, believes that the role and new missions of military in the future aspects are: assisting in crisis and disasters, humanitarian aids, peace support, urbane and terrorist incidents and using new weapons including ballistic missiles.

He believes that in order for military medicine to do its supportive role with competence, it should make the necessary and essential evolution in the field of right manpower, new and advanced technologies and equipment (for education, diagnosis and treatment in war and non-military situation) as well as effective information, communication, management and leadership [17].

*Naomi* has emphasized the all type of military forces threats as following and he has emphasized the readiness of military medicine for meeting the needs of militaries [18]:

1) Chemical, biological, radiological and nuclear threats, 2) Threats associated with toxic industrial chemicals, 3) Threats related to infectious diseases and drug-resistant microorganisms, 4) Threats related to new or changed conventional weapons, 5) New infectious diseases 6) Counter-intelligence threats, 7) Non-military injuries 8) War traumatic stress syndrome.

*Cloonan* presents the necessity of changes in military medicine curriculum for essential readiness of military medicine graduates considering the threats and challenges during 20 to 30 years. He knows these challenges as emerging threats, emerging threats, changing of missions, military operations, and changes in culture and ethics [19].

*Baker* believes that the skills needed in medicine, is originally different from the non-military medicine. He states that in order to make preparation in military physicians to perform assigned missions, the qualified, wide, deep and unique curriculum is needed [9].

### **Development in military educational programs with specific curriculum**

*Wardhoon* introduces the military medicine training program at the University of USUHS as followings:

This university considers its activities in education and research in the field of military medicine as the unique one and considers its purpose as the extension of military medicine for developing health in militaries. The school curriculum of this school is 700 hours more than other medical schools. In the subjects of the

curriculum of these university subjects of military medicine, preventive medicine, critical medicine, tropical medicine, etc. are important and are emphasized [3]. *Panichkul* in the article with the title of military medicine teaching to the students of medicine officer university of Thailand writes [20]:

This university has unique curriculum in relation to medical medicine. This curriculum includes military science knowledge, war medical skills, preventive military medicine, military applied physiology and disaster medicine in militaries. The interesting part of this curriculum is giving it in form of simulated war operation and military discipline. In these courses, medical officer students learn all the knowledge about the way-boards ordination command medicine, Advanced Trauma Life Support (ATLS), Cardiopulmonary Resuscitation (CPR), Advanced Cardiac Life Support (ACLS) and other vital medical procedures. He writes: These students should learn the experience and skills of taking care of small injuries and critical injuries and complications related to war such as war stress syndrome in different conditions. This curriculum is a combination of multiple subjects that are introduced as follows:

Military sciences 1: It is the provider of first students' military experience that is consists of following topics:

1- Military training of war with and without weapon; 2- Training of how to use map and compass in day and night conditions of war; 3- How to communicate with other military units in field; 4- The training of military strategies, security and military discipline; 5- First aid in the war; 6- How to transfer wounded people from the front line.

Military sciences 2: Includes topic: 1- Continued military training; 2- Management and care of the wounded people in an explosion; 3- Learning to do triage; 4- Skills in bandages, stopping bleeding, splinting and not moving of injured limbs, performing basic CPR and transferring of primary injuries; 5- Training in caring of wounded and injured people from chemical, biological and nuclear factors in the war; 6- Referral system of wounded people; 7- War relief station; 8- Operational management of medical centers in war zones.

Military sciences 3: Includes topics: 1- Learning how to deal with physiological changes of soldiers; 2- The environment hazards of soldiers in war, seasickness, mountain sickness, heat and cold injuries, injuries of stinging, eye, nose and ear injuries, heart rhythm disorders, military taxidermy, explosive damage,

wounds resulted from bullets, multiple trauma and injuries and sport injuries; 3- Health in the war and military environments; 4- Most common infectious diseases in the frontline and among troops; 5- Leadership strategies in the medical field.

**Military Science 4:** Consists of following topics: 1- Advanced Cardiac Life Support (ACLS) and Advanced Trauma Life Support (ATLS); 2- Create a connection in above-mentioned military science (1 to 3).

*Shapira* in relation to specialized fields of military medicine in United States writes: Medical students receive degree of MD (medical degree in general) after completion of training or internship, and then they enter the specialized courses which include: mobile medicine in peacetime, advanced trauma course, nuclear war, chemical, biological and physiological medicine, marine medicine, space medicine, economics in military medicine, military epidemiology, military psychology, etc. [21]. Department of Military Medicine in 2006 in respect to the necessity of change in medical education writes: entering doctors to war, has forced them to have better strategy about the care and treatment of war victims etc. this has led the traditional military medicine to have great advances. Military medical training programs for preparing them to perform new roles are changing. Curriculum of military medicine includes caring of injured people, public health, preventive medicine, humanitarian assistance in disasters, tropical medicine, special care of families, etc. [22]. *Henry* with respect to the educational needs and mission in military medicine in United States writes: Military medical system has a unique mission. Not only they present caring services to the military members of the U.S., but also, they are ready to be deployed to war zones for medical services. They, also, are deployed to humanitarian missions in disasters. This mission in military medicine necessitates the unique education. So, they have special educational program [23]. *Truitt* with respect to the necessity of training military doctors writes: Since there is a difference between military and non-military trauma with respect to their mechanism, distribution, organization and transfer of injured people, there is the need for trauma management and care to provide essential readiness with respect to physicians' training [24].

## Conclusion

Military physicians need essential knowledge and skill for performing their role. In today's world, military

medical departments work in public and professional levels for educating and training of military doctors. Considering that Islamic Republic of Iran has always encountered various military and terrorist threats and considering that today great changes, diversity and complexity has been created in war weapons and their usage and effect, and since Iran is one of apt places for natural disasters such as flood and earthquake, and considering that armed force has active role in these issues, this necessity is felt that military medical universities in line with their mission make essential strategies for developing military medicine training and training of physicians and nurses in accordance with international experiences and today's and futures' changes. In this situation that we are almost at the beginning of the development of military medicine and considering the primary needs of war incidents and natural disaster events for emergency medical and pre-hospital actions, and considering the new orientation of military medicine in the militaries' missions, it is concluded that establishing the specialized field of emergency military medicine with special curriculum is in priority and it can provide the needs of armed forces to successfully operate their missions. Therefore, military medicine department in military medicine universities require military planning and designing of new educational program with professional approach to military medicine and its development in according to new needs. Designing the curriculum of military emergency medicine, is the first step toward the development of professional clinical training programs that the particular curriculum for this field has been designed and developed by the author. *Gutman* on the role of emergency medicine writes: "in Vietnam War, resuscitation science was broadly used and it led in presenting advanced pre-hospital emergency and surgical cares. In this time, emergency medicine was emerged as a specialty. He states that the U.S military organization looks at military emergency medicine as very valuable asset and the U.S. medical command, has the approach of using experts in war such as using the expertise of military emergency and surgery medicine. He believes that the emergency specialist is only one of the specialists that not only are strongly trained and has obtained resuscitation skills, but also, he can diagnosis the surgical diseases from internal diseases and can treat their primary cures properly. Therefore, it seems that in military systems, military emergency medicine should be more considered whether in wartime or in peace time [6]. Therefore, medicine specialist and graduated physician by passing military medicine curriculum have the best

and most appropriate medicine specialty in caring and managing critically ill people and war injured ones in missions and military conditions.

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Iran's exercises and military literature make it clear that its air planners understand the value of airborne early warning and C4I systems, airborne intelligence, electronic warfare platforms, unmanned aerial vehicles (UAVs) and airborne refueling. Where UAVs are concerned, Iran has an active program and two families of reconnaissance, target and lethal UAVs. However, the IRIAF has not been able to progress in other areas. Iranian training and material support assisted HAMAS in the development of the Qassam rocket, extending the range to 40km. Iran continues to supply weapons, money, and weapons components to Palestinian extremist groups that are then smuggled into Gaza through tunnels in the Philadelphi corridor. Military medicine developed from the need to maintain the combat efficiency of the personnel and, consequently, provide medical care in peacetime and especially in wartime. This made it necessary to set up in the armed forces a specialized organization to provide systematic medical support for the troops—the military medical service—and to work out a definite procedure and the methods most suitable under conditions of troop combat activity. Before any other branch of the public health service, military medicine took shape as an element of the state apparatus. As a result, it could obtain the s Military training programs of the Armed Services can be discussed and classified in many different ways and from many points of view. Military training, aimed at the accomplishment of tasks associated with the military mission, includes introduction into military life, training in a specific military specialty, and development of the servicemember for responsibilities as a leader and for specialized duties and functions. In the aggregate, military service training programs are designed to convert young civilians to military life, train them as military specialists and/or military leaders, and then develop those selected through a systematic career progression as servicemembers are prepared for higher skill levels and greater leadership responsibilities.