

# **Veterinary Medical Education in the Middle East and North Africa (MENA)**

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Veterinary medicine was developed in the ancient Arab civilization before the advent of Islam. In particular, horse medicine was practiced by the Arabian Bedouins as it was based on the Bedouins own ideas about their animals as an important part of their lives and survival.<sup>1</sup> In ancient Egypt, the Egyptian Papyrus of Kahun (1900 BCE) offer one of the first written records of veterinary medicine.<sup>2</sup> Cattle diseases and their treatment feature prominently in this document, reflecting the religious and economic importance of these species to early Egyptian society. Besides cattle, the diseases of dogs, birds and fish are dealt with fragmentarily, concentrating largely on afflictions that concern the animal's eyes. The Kahun papyrus also contains a portion that appears to concern veterinary gynecological matters.<sup>3</sup>

## **INTRODUCTION TO VETERINARY MEDICAL EDUCATION IN MENA REGION**

### **1. PREAMBLE**

In the King of Babylon Hammurabi Transcripts, 5 laws regulated human medicine and 3 laws regulated animal medicine are listed. The word “Baitari” was used by the pre-Islamic poets and that the Baitari was seen as itinerant doctor of men, as well as of animals.<sup>3</sup> Adel (1983), explained the origins of the word “veterinarian” as it is accepted now-a-days, or the “Baitari” which means “surgeon of animals” in Arabic language.<sup>4</sup> Hammurabi explained that baitari was modified to betar and then to vetar, and with time became veterinary. Hammurabi claimed that most probable

origin of the word “veterinary” is Arabic language.<sup>4</sup> The vocabulary of Arabic language before Islam proved that ancient Arabs practiced horse medicine. The earliest descriptions of horses were found in the pre Islamic (Gahiliya) poetry.

After the advent of Islam, Veterinary Medicine can be considered as the body of knowledge of Veterinary Medicine that was inherited by Muslims in the early phase of Islamic, from mostly Greek sources, but to which became added veterinary medical knowledge from, Persia, Syria, India and Byzantine. It has been reported that the first College of Veterinary Medicine was established at Al Moustansryia University, Iraq around 671 AD at the time of Abbasid Empire. Veterinarians of that time of both Muslim and non-Muslim cultures modified or added to this, their own observations and experimentation. Veterinary medicine then flourished and become a practical science that helped curing animal ailments and improved general animal health.

In the Arab world, the first College of Veterinary Medicine was established in Egypt in 1827, then Sudan in 1938 and Iraq in 1955. In the Arab Gulf States with the exception of Saudi Arabia, no College of Veterinary Medicine has yet been established. However, some veterinary medical programs have been recently established as parts of Science or Agriculture Colleges (e.g. UAE).

## **2. NUMBER AND DISTRIBUTION OF VETERINARY MEDICAL INSTITUTIONS**

The numbers of veterinary Colleges in the Middle East have increased in recent years (Figure 1).<sup>2</sup> The number of veterinary colleges in each country ranges from one to 26. Currently, there are around 106 or more VEEs in the MENA region. Unfortunately, there is a great variation in teaching systems, curricula, instruction languages and entry criteria between these institutions. This highlights the need for harmonization and standardization of veterinary education in the region.

Table 1. Veterinary Schools and Institutes in the Middle East and North America.

<b>Country</b>	<b>Names of Veterinary Schools</b>
<b>AFGHANISTAN</b>	<ol style="list-style-type: none"> <li>1. Kabul University</li> <li>2. Nangarhar University</li> </ol>
<b>ALGERIA</b>	<ol style="list-style-type: none"> <li>1. Higher National Veterinary School (Ecole Nationale Veterinaire d'Alger)</li> <li>2. University of Batna, Institute of Veterinary Science</li> <li>3. University of Saad Dahlab</li> <li>4. Universite de Constantine, Institut of National Des Sciences Veterinaires</li> <li>5. University of Ibn Khaldoun, National Agricultural and Veterinary Institute of Tiaret</li> <li>6. University of Taref Veterinary Departement</li> <li>7. University of Mentouri – Constantine Faculty of Natural and Life Sciences</li> </ol>
<b>PAKISTAN</b>	<ol style="list-style-type: none"> <li>1. University of Agriculture, Faisalabad</li> <li>2. University of Veterinary &amp; Animal Sciences, Lahore</li> <li>3. Sindh Agriculture University</li> <li>4. Bahauddin Zakariya University</li> <li>5. College of Veterinary and Animal Sciences, Jhang</li> <li>6. Gomal College of Veterinary Sciences</li> <li>7. Islamia University</li> <li>8. Lasbela University of Agriculture, Water and Marine Sciences</li> <li>9. Pir Mehr Ali Shah Arid Agriculture University</li> <li>10. Riphah College of Veterinary Sciences</li> <li>11. University of Agriculture, Peshawar</li> <li>12. University of Poonch</li> </ol>
<b>SAUDI ARABIA</b>	<ol style="list-style-type: none"> <li>1. King Faisal University</li> <li>2. Qassim Branch, King Saud University</li> </ol>
<b>EGYPT</b>	<ol style="list-style-type: none"> <li>1. Alexandria University</li> <li>2. Assiut University</li> <li>3. Aswan University</li> </ol>

	<ol style="list-style-type: none"> <li>4. Beni Suef University</li> <li>5. Damanhour University</li> <li>6. Cairo University</li> <li>7. Alexandria University (Matroh branch)</li> <li>8. Suez Canal University</li> <li>9. Kafrelsheikh University</li> <li>10. Mansoura University</li> <li>11. Menia University</li> <li>12. Benha University</li> <li>13. Sadat Univeristy</li> <li>14. Menoufia University</li> <li>15. Sohag University</li> <li>16. South Valley University</li> <li>17. Assuit Univerity (Alwadi AlGadid Branch)</li> <li>18. Zagazig University</li> </ol>
<b>IRAN</b>	<ol style="list-style-type: none"> <li>1. Islamic Azad University of Babol School of Veterinary Medicine</li> <li>2. Islamic Azad University of Garmsar School of Veterinary Medicine</li> <li>3. Islamic Azad University of Karaj Faculty of Veterinary Science</li> <li>4. Islamic Azad University of Kazeroun Faculty of Veterinary Medicine</li> <li>5. Islamic Azad University of Sanandaj Faculty of Veterinary Medicine</li> <li>6. Islamic Azad University of Shabestar School of Veterinary Medicine</li> <li>7. Islamic Azad University of Shahrekord Faculty of Veterinary Science</li> <li>8. Islamic Azad University of Shoushtar Faculty of Veterinary Medicine</li> <li>9. Islamic Azad University of Tabriz School of Veterinary Medicine</li> <li>10. Islamic Azad University of Urmia Faculty of Veterinary</li> <li>11. Lorestan University School of Veterinary Medicine</li> <li>12. Razi University of Kermanshah Faculty of Veterinary Medicine</li> <li>13. Science and Research Branch of the Islamic Azad University, Faculty of Specialized Veterinary Medicine</li> <li>14. Shahid Chamran University of Ahvaz Faculty of Veterinary Medicine</li> <li>15. University of Kerman Faculty of Veterinary Medicine</li> <li>16. University of Mashhad Faculty of Veterinary Medicine</li> <li>17. University of Semnan Faculty of Veterinary Medicine</li> <li>18. University of Shahrekord Faculty of Veterinary Medicine</li> <li>19. University of Shiraz School of Veterinary Science</li> </ol>

	<ul style="list-style-type: none"> <li>20. University of Tabriz Faculty of Veterinary Medicine</li> <li>21. University of Tehran Faculty of Veterinary Medicine</li> <li>22. University of Urmia Faculty of Veterinary Medicine</li> </ul>
<b>IRAQ</b>	<ul style="list-style-type: none"> <li>1. College of veterinary Medicine, University of Baghdad</li> <li>2. College of veterinary Medicine, University of Basrah</li> <li>3. College of veterinary Medicine, University of Duhok</li> <li>4. College of veterinary Medicine, University of Sulaimani</li> <li>5. College of veterinary Medicine, University of Mosul</li> <li>6. College of veterinary Medicine, University of Diyala</li> <li>7. College of veterinary Medicine, University of Fallujah</li> <li>8. College of veterinary Medicine, University of Tikrit</li> </ul>
<b>JORDAN</b>	<ul style="list-style-type: none"> <li>1. Faculty Of Veterinary Medicine, Jordon University of Science and Technology</li> </ul>
<b>LEBANON</b>	<ul style="list-style-type: none"> <li>1. Lebanese University</li> </ul>
<b>LIBYA</b>	<ul style="list-style-type: none"> <li>1. Omar Almuktar University</li> <li>2. Tripoli University</li> </ul>
<b>MOROCCO</b>	<ul style="list-style-type: none"> <li>1. Institut Agronomique et Veterinaire Hassan II</li> </ul>
<b>SYRIA</b>	<ul style="list-style-type: none"> <li>1. Al-Baath University, Faculty of Veterinary Medicine</li> <li>2. Hama University, Faculty Of Veterinary Medicine</li> <li>3. Deir Ez-Zor University</li> </ul>
<b>TUNISIA</b>	<ul style="list-style-type: none"> <li>1. Ecole Nationale de Medecine Veterinaire</li> </ul>
<b>TURKEY</b>	<ul style="list-style-type: none"> <li>1. Adnan Menderes University</li> <li>2. Afyon Kocatepe University</li> <li>3. Aksaray University</li> <li>4. Ankara University</li> <li>5. Atatürk University</li> <li>6. Balıkesir University</li> <li>7. Bingöl University</li> <li>8. Cumhuriyet University</li> <li>9. Çukurova University</li> <li>10. Dicle University</li> <li>11. Erciyes University</li> <li>12. Fırat University</li> <li>13. Harran University</li> <li>14. İstanbul University</li> <li>15. Kafkas University</li> <li>16. Kırıkkale University</li> <li>17. Mehmet Akif Ersoy University</li> <li>18. Muğla Sıtkı Kocaman University</li> <li>19. Milas Faculty of Veterinary Science</li> <li>20. Mustafa Kemal University</li> <li>21. Namık Kemal University</li> <li>22. Ondokuz Mayıs University</li> <li>23. Selçuk University</li> </ul>

	24. Siirt University 25. Uludağ University 26. Yüzüncü Yıl University
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### **3. ENTRY REQUIREMENTS FOR A VETERINARY MEDICINE**

#### **EDUCATION PROGRAM**

Most of the VEEs in the region follow a 5-year program with large variation in their entrance criteria. In most of these institutions, students enter directly after successfully completing high school by random selection methods.<sup>6,7</sup> In Jordan, an interview-based entry acceptance system has been implemented since 2012. In most countries entrance depends on the high school diploma GPA and the number of seats in each school. However, most of the school in the MENA region accept high numbers of students each year and this can inversely affect the quality of students. More detailed research into quality of students entering the veterinary programs is undergoing.

### **4. FUNDING AND COST OF VETERINARY MEDICAL EDUCATION**

In the Middle East, almost all veterinary schools are public and fall under the umbrella of a public University. While governmental contribution to veterinary education is limited, funding for school activities is paid by student's fees which vary, according to each institution, but they are around US \$500 to 900 per year. In Syria and Iraq before the wars, veterinary education was free.<sup>7</sup> In Egypt, higher education including veterinary medicine is almost free and supported by the

government. However, specialized programs in the governmental universities have been developed with considerable tuition fees.

## **5. ENROLLMENT AND GRADUATION**

The number of students entering each veterinary institute in the region varies according to country but generally it has increased tremendously in recent years.<sup>6,7</sup> In Jordan for example, since the establishment of the school in 1989 up until 2012, the number of students accepted was around 25 to 30. After 2012 the number has increased to over 60 in average. In other countries such as Egypt and Algeria, the number of students in each school varies from 200 and up to 700 per year. Although, the new specialized programs in Egypt have limited number of students (ranging between 30-50 students per year).

After the completion of a program, graduation is usually granted following completion of all graduation requirements including final exams, research projects or seminars and clinical training.<sup>8</sup> Although the number of female students is increasing every year, there are still less female veterinary students than their male counter parts when compared to the USA, UK and European countries.

## **6. CURRICULA**

Most of the VEEs in the MENA region follow a 5-year program except few that implement a 6-year program (i.e Tunisia, Morocco, and Iran).<sup>8</sup> The veterinary program usually starts with basic science courses including biology, mathematics and physics. The veterinary basic sciences including anatomy, histology, cell biology, and



biochemistry and physiology are then administered in the second year. In the third year, para-clinical courses are administered including microbiology, immunology, parasitology, pharmacology, pathology, genetics, animal nutrition, foods and feedstuffs, economics and administration of animal production. In the fourth year clinical science courses begin which include general and systemic medicine, surgery, and theriogenology. In the last year, clinical training commences and different clinical rotations are implemented. In some schools, fish, bee, and rabbit, medicine and production courses are offered. Unfortunately, most veterinary schools in the MENA region lack in-patient teaching hospitals and instead rely on out-patient clinics to train graduates.

## **7. DURATION OF VETERINARY MEDICAL PROGRAMS**

Veterinary education program length varies among the different regions in Middle East; however it is usually a five to six-year undergraduate program starting immediately after high school.<sup>6-8</sup>

## **8. CONTINUED PROFESSIONAL DEVELOPMENT**

Continuing professional development is offered in most of the MENA countries, either as formal postgraduate programs like Specialized Diploma (one year), Masters of Science (two years) or PhD programs (3-4 years).<sup>8</sup>

In Egypt, for example, most of the veterinary medicine colleges include one or more specialized units such as those for Diagnostic Imaging, Experimental Surgery, Pet Animal Surgery, Meat Hygiene, Poultry Industry etc. These units are dedicated for professional development and training of graduated veterinarians

through regular designed training program. Professional training is usually performed according to training needs assessment of the graduated veterinarians.

Many faculty members at the veterinary schools in the Middle East have earned their postgraduate training from universities in the United States, Canada, Europe and Australia. In Jordan, many of the clinical sciences faculty members carry double degrees including PhD and board certification from different American colleges such as veterinary practitioners' boards, internal medicine and surgery in both large animals and small animals, or Theriogenology. The development of residency programs in the different veterinary medical specialties is on going, especially in Egypt, Jordan, Saudi Arabia. Many more veterinary schools in the region are planning to develop such programs in the future. Although, official school administered continuing education programs are limited to formal training programs and conferences, internet based programs are being planned in many countries.

## **9. ACCREDITATION SYSTEMS**

Since 2004, most of the countries in Middle East and North Africa begin to establish Quality Assurance Systems and/or Accreditation in higher education.<sup>12-15</sup> Some of the countries such as Egypt, Jordan and Saudi Arabia launched national agencies to review the system of higher education including the veterinary programs. For example in Egypt, in the period between 2004-2008, QAAP (Quality Assurance and Accreditation Project, Ministry of Higher Education), conducted site visits to eight of the Veterinary Medical Colleges in the country (62%). According to their standards, the effectiveness of quality management and enhancement, academic

standards of educational programs, quality of learning opportunities, research and other scholarly activity and community involvement were all evaluated. Similar national accreditation visits and criteria have been carried out in Jordan and Saudi Arabia.

There are no standardized procedures to ensure high quality veterinary education in the region except for few schools that are accredited by European Association of Establishments for Veterinary Education (EAEVE) in Turkey.<sup>6,7</sup> The VEEs face a lot of challenges including reduced governmental support. The admission criteria and student numbers, in many of the programs, are controlled by ministries of higher education and therefore some schools will accept as low as 50 students while others may accept up to 700 students/year.

In addition, most of the schools struggle to achieve the appropriate distribution of the basic vs clinical courses in their curricula (3 years basic vs 2 years clinical), and often in the clinical years, there are more theoretical sessions offered than practical training sessions due to caseload availability.

Unfortunately, some schools also provide little continuing education. This problem is intensified by the inadequate regulation of the veterinary profession by Veterinary Statutory bodies (VSB) since in these countries the VSB either is absent or of limited effectiveness.

Progress has already been made in some cases. In a regional conference for improving veterinary education for the Arab Faculties that was held in April, 2016 in Jordan, participants from 30 VEEs discussed various current veterinary curricula,

teaching methods, and numbers of students admitted to their schools.<sup>6,7</sup> The need for complying with OIE and EAEVE guidelines on core veterinary curriculum and day 1 competencies was addressed.<sup>9</sup> The Deans agreed that there is a lot of work to be done and pledged to work toward improving veterinary education in the region according to international standards.

According to the OIE and EAEVE standards, providing high quality veterinary education is necessary to equip graduating veterinarians with the basic knowledge and skills to perform well, and to support national veterinary services effectively in their countries. It is the opinion of these international organizations that in many developing countries, the quality of veterinary education could be improved by establishing and implementing minimum day 1 competencies and harmonizing key curriculum elements to fit with international standards.

## **10. BEGINNING OF PROFESSIONAL PRACTICE**

In the MENA region, there are no compulsory national board exams, or state/provincial exams. After graduation, students need to register with the national veterinary association to obtain a license that remains valid for life. To continue as an active member, the veterinarian must simply pay the annual fee. In Egypt, for example, the medical sector in the ministry of higher education has started to introduce time limited license (5 years) that could be extended if there is demonstration of professional development by the candidate. It is expected that this certification will be applied in the veterinary sector in the near future; a step that will enhance the process of professional development in the veterinary sector.

The outcomes of the Developmental Engagement site visits to the veterinary schools in Egypt had been evaluated.<sup>12</sup> This study concluded that there is a crucial need to reduce the number of the Veterinary Medical Colleges and concentrate on the quality rather than quantity. The number of the enrolled students in each college should be reduced to be equivalent to available equipment and other teaching and learning resources. Moreover, designing and implementation of a strategy linked with the labor market is essential. The design, content and delivery of the current curricula for the programs should be modified to ensure that it facilitate the attainment of most of the stated Intended Learning Outcomes (ILOs). Furthermore, effective engagement with students, employers and professional bodies is required and more emphasis on the practical skills is essential.

## **11. GOALS FOR VETERINARY MEDICAL EDUCATION AND PROFESSIONAL PRACTICE IN MENA REGION**

The need for highly competent and well-trained veterinarians in the region is increasing especially with the rapid spread of many trans-boundary animal diseases including those of public health and food security, as well as the emerging and re-emerging diseases.<sup>6,7</sup> Unfortunately, the entry and graduation requirements in these VEEs are not harmonized and there is great variation in their curricula.

Ultimately, the goal of all VEEs in the region is to come together and establish their own regional accreditation body. This ensures that the rules and guidelines for minimum day 1 competencies are set and implemented to help achieve highly competent veterinarians. The mission of this accreditation system must focus on

evaluating and promoting high quality standards for veterinary education establishments. Accreditation will ensure both the public and prospective veterinary students that the institution graduates high quality veterinarians who are able to deliver high quality veterinary services to their clients. Alternatively, although is not possible for most schools at this time, VEES can apply for consultative visits by EAEVE as a first step toward full accreditation.<sup>10</sup> The American Veterinary Medical Association (AVMA) is another possibility, but the challenges facing the VEE in the MENA region, make this possibility more of a dream, at least in the current situation.<sup>11</sup>

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