

# The respiratory care profession in Saudi Arabia: Past and present

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**Abstract:**

The respiratory care (RC) profession in Saudi Arabia is over 40-year-old. Although there have been major advancements in the profession, no history and enough information are available about its development and evolution at current. This paper describes the history and development of the field of RC and future prospects for the profession in Saudi Arabia. A comprehensive review and assessment were conducted through direct contact, interviews, and a review of existing documents in the Medical Services Division of the Ministry of Defense, the Ministry of Health, The Ministry of Civil Services, representative hospitals, academic institutions, and other relevant texts. The data obtained were evaluated for its relevance and grouped on a thematic basis. This is currently the first paper about the history and development of the RC profession in Saudi Arabia over the last 45 years.

**Key words:**

History, profession, respiratory care, respiratory therapy, Saudi Arabia

In Saudi Arabia, health-care services have developed rapidly since the establishment of Ministry of Health (MoH) in the early 1950s.<sup>[1]</sup> Since then, MoH had adopted most of the allied health professions except respiratory care (RC). It could be speculated that MoH at that time had not realized the value and importance of RC services. Therefore, until recent years, it was not officially recognized and identified as one of the health care professions in Saudi Arabia. The evolution of RC profession, also known as respiratory therapy, involves a diverse historical record since the mid-1970s. The rapid growth of the population and concomitant expansion of health-care services have greatly impacted on the advancement of the RC profession in Saudi Arabia.

This paper examines the historical and development cycles of RC profession as well as possible future prospects in Saudi Arabia.

## Early History of Respiratory Care Profession in Saudi Arabia

The first established RC department can be traced back to 1975 in Riyadh.<sup>[2]</sup> This department was located within a large territory hospital which was operated by Hospital Corporation of America, named King Faisal Specialist Hospital and Research Centre. Although it was the first RC department in Saudi Arabia, RC training to staff and empowering the profession within the country were solely adopted by the Medical Services Division (MSD), a health-care sector under the umbrella of Ministry of Defense.<sup>[3,4]</sup> This is based on the fact that the first two RC

schools in Saudi Arabia were under the umbrella of MSD, and also all large MSD hospitals had RC departments in contrast to MoH hospitals.

In the mid-1970s, the idea of having RC profession was stimulated by acknowledging the value of respiratory therapy technicians as a member of the open heart surgery team. The journey of RC history started when officials from MSD had visited Loma Linda University (LLU) in the USA and signed an agreement to provide cardiac surgery services (in MSD hospitals in Saudi Arabia). In 1976, the first surgery was performed on a 13-year-old girl at the Armed Forces Hospital in Khamis Mushait, located in military reservation in the southern region of Saudi Arabia.<sup>[4-6]</sup> The LLU heart team consisted of 19 members including, cardiologists, cardiac surgeons, anesthesiologists, nurses, respiratory technicians, and perfusionists. It is worth mentioning that LLU heart team believed that it was important to train the health-care providers

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of the hosting country. Hence, the service would continue even after the team had left. It is very likely that it was unstructured training. Within this context, MSD had asked some soldiers with basic nursing and health science backgrounds to be trained as technicians in all required specialties. Thus, each Saudi trainee accompanied a mentor from LLU heart team. There were also two respiratory therapists (RTs) on the team. Those RTs (from LLU heart team) were responsible for training some trainees who had an interest in respiratory therapy. This was probably the first RC on-the-job training (OJT) course in the country. Later on, some of those trainees were sent to the USA to be trained as respiratory technicians (S.A., personal communication, June 29, 2016).

Coincidentally, an American female (ER) with a degree in RC was able to join LLU team. She was accompanying her husband who was working as a radiographer in the hospital. She was subsequently hired as a respiratory therapy technician in the same hospital. An additional Saudi trainee also joined her for training purposes.

More importantly, MSD cardiac surgeons believed that a cardiac surgery team without RT would potentially increase the mortality rate among open heart surgery patients. Thus, the medical administration of the military hospital at Khamis Mushait decided to establish respiratory therapy department. ER was appointed as a supervisor of the second respiratory therapy department in Saudi Arabia. The role of the newly assigned respiratory therapy supervisor was to provide RC services as well as continue OJT for selected military staff who had an interest in respiratory therapy as a profession. One year later, she moved to King Fahad Armed Forces Hospital in Jeddah and established another new respiratory therapy department. Table 1 shows major events in the field of RC profession in Saudi Arabia.

### Educational Programs in Respiratory Care

RC practitioners play an effective role in delivering quality of care to patients in all clinical settings.<sup>[7]</sup> Continuing RC education and professional development for the profession started in the USA as OJT in the 1940s.<sup>[8]</sup> Since then, the role of RC practitioners has vastly expanded to assume more duties. Furthermore, the RC practitioner is increasingly involved in respiratory disease management, prevention, and health and wellness promotion.<sup>[9]</sup> However, in Saudi Arabia, training and education advancement went through a slow period from the mid-1970s until mid-2000s. Subsequently, a vast expansion and revolution in the education of RC profession have occurred.

The following sections will discuss the training and education developments in the profession over the last 45 years. For simplicity, it has been divided into three categories: OJT, diploma or associate degrees, and baccalaureate programs.

#### Early on-the-job training

As mentioned earlier, LLU heart team had the philosophy of providing clinical services and training to local Saudi health-care providers. Thus, unstructured OJT for RC technicians started since 1976. Later on, some of those trainees were sent to the USA for further training. In 1978, Riyadh Military Hospital was established; one of the newly established

**Table 1: Major events in the field of respiratory care profession in Saudi Arabia**

Year	Historical event
1975	First established respiratory care department at King Faisal Specialist Hospital and Research Center, Riyadh
1987	Inauguration of respiratory care diploma by Loma Linda University, school of allied health professions, extended campus, Riyadh military hospital
1988	Inauguration of the first national diploma of science in respiratory care at Prince Sultan Military College of Health Sciences, Dhahran
1999	Inauguration of the first bachelor of science program in respiratory care in King Faisal University renamed as University of Dammam
2002	Establishment of the Saudi group of respiratory care, the first official professional organization for respiratory care practitioners
2004	SSRC officially established under the umbrella of University of Dammam
2005	Establishment of the respiratory care scientific committee under the Saudi commission for health specialties
2006	SSRC officially elects the first members of the board of directors for the society
2011	SSRC recognized by the American Association of Respiratory Care
2012	Ministry of the civil service approves adding the job title "respiratory therapist" to other labor job titles in the health-care sector
2013	Establishment of respiratory care division under the Ministry of Health
2013	Fellowship in respiratory care under the Saudi commission for health specialties
2015	SSRC signed a memorandum of agreement with NBRC to deliver the board examinations for the Saudi respiratory care program graduates

NBRC = National Board for Respiratory Care, SSRC = Saudi Society for Respiratory Care

departments in this hospital was the cardiac services unit. Based on an agreement between MSD and LLU, LLU heart team moved from Khamis Mushait to Riyadh Armed Forces Hospital in the capital city of Saudi Arabia. Upon arrival, the team joined the local Saudi cardiac surgeons and started cardiac surgery services. Concomitantly, MSD authorities planned to invest on Saudi health-care providers. Therefore, MSD nominated some local Saudis who had basic knowledge in nursing and health sciences for training with LLU heart team. Again, an unstructured OJT training program was implemented to train nurses as respiratory therapy technicians, electrocardiograph technicians, operation room technicians, and perfusionists. According to MSD officials, performance of those technicians was remarkable, and the outcomes were satisfactory. However, respiratory therapy technicians were only capable of doing simple rigid tasks. In fact, they were not able to perform complicated tasks that require more cognitive and psychomotor skills. Therefore, Riyadh Armed Forces Hospital administration decided to recruit registered RTs from the USA to further train those technicians and supervise their performance.

Unstructured and informal training continued until the mid-1980s. It was only after this that MSD and the hospital administration realized the value and importance of the respiratory technician as a health-care provider. Subsequently,

a decision was made to establish a formal RC program in collaboration with LLU, School of Allied Health Professions.

### Diploma programs

In 1987, Riyadh Military Hospital inaugurated an associate science degree program in respiratory therapy with LLU, School of Allied Health Professions.<sup>[10]</sup> It was considered as an LLU satellite program. The program was designed to offer 3 years of didactic and clinical training in RC. The 1<sup>st</sup> year was considered to be preparatory year for English and basic health science courses. The first class graduated in 1990, and the last class was in 2001. Over a period of nearly 10 years, the program had graduated 65 students.<sup>[11]</sup>

In 1988, Military College of Health Sciences (currently known as Prince Sultan Military College of Health Sciences [PSMCHS, 2006]) in Eastern Province started the first national academic diploma in respiratory therapy. It consisted of 3-year didactic courses and 6-month clinical internship program. In 2007, the diploma program was upgraded to a bachelor's degree program in RC.

In the late 1990s, several RC departments in different locations of the country were delivering the RC curriculum of California College for Health Sciences (CCHS) (currently known as Independence University) as individualized efforts. Those enrolled in CCHS program via distant learning already had a diploma in RC from the Saudi national program. However, the main purpose to enroll at CCHS program was to be eligible for the National Board for Respiratory Care (NBRC) examinations. It is worth mentioning that the Saudi higher education system does not approve or recognize distance learning programs.

In 2004, King Faisal Hospital and Research Center in Jeddah established a 2½ years diploma program from which three batches graduated with a total number of 14 graduates. For some unknown reason, the program was stopped in 2011. However, the hospital authorities decided to offer it again in 2014.

In 2006, LLU had again signed an agreement with the National Institute of Health Sciences, under the umbrella of Dallah Healthcare Company to open a satellite campus in Riyadh.<sup>[12]</sup> This program was initially proposed as a BSc degree offered by LLU.<sup>[6]</sup> However, due to logistical reasons, the program was only recognized as a 3 years associate degree program. The program was again stopped in 2013.<sup>[11]</sup> Table 2 shows all RC programs.

### Baccalaureate programs

In 1999, King Faisal University, currently known as University of Dammam in 2009, had established the first national baccalaureate program in RC.<sup>[13]</sup> It is a 4-year didactic course plus 1 year internship. The first batch consisted of 12 females who graduated in 2002. Presently, the program enrolls 40–50 students annually.

The two RC programs, both at PSMCHS (28 years old) and the University of Dammam (17 years old), have for many years been the main government resources for RC education in the country. However, since 2005, there has been, what could be called, a revolution in RC programs in both private and governmental academic sectors.

## Respiratory Care Regulation and Licensure

The national regulatory body, which is called the Saudi Commission for Health Specialists (SCFHS), was established in 1992.<sup>[14]</sup> It is an independent governmental authority responsible for health-care standards, regulations, practices, and professional ranking in all health-care specialties.<sup>[15]</sup>

In 2002, SCFHS formally recognized RC profession by establishing the Respiratory Care Scientific Committee (RCSC). The chairman of RCSC represents the profession in the scientific board of allied health profession. The overall objectives of the RCSC were mainly professional development, accreditation, and recognition. The professional development further focuses on RC practice through identifying the scope of

**Table 2: Respiratory care programs in Saudi Arabia**

School name	City	Degree	School type	Gender	Initiated year	Status
Loma Linda University, School of Allied Health Professions, extended campus	Riyadh	Diploma	Government	Male	1987	Phased out 2001
Prince Sultan Military College of Health Sciences, Dhahran	Dhahran	Diploma	Government	Male	1988	Phased out 2007
University of Dammam	Dammam	Bachelor	Government	Male/female	2007	Current
Riyadh Armed Forces Hospital	Riyadh	Diploma	Government	Female	2008	Phased out 2011
King Faisal Specialist Hospital and Research Center	Jeddah	Diploma	Government	Male	2003	Phased out 010
National Health Institute	Riyadh	Diploma	Private	Male	2015*	Current
King Saud University	Riyadh	Bachelor	Government	Male	2004	Phased out 2010
King Saud Bin Abdulaziz University for Health Sciences*	Riyadh	Bachelor	Government	Male	2011	Current
	Jeddah	Bachelor		Male/female	2009**	Current
	AlHassa	Bachelor		Male/female	2014***	Current
	AlHassa	Bachelor		Male/female	2013***	Current
Inaya Medical college	Riyadh	Bachelor	Private	Male/female	2011	Current
AlMaarefa colleges	Riyadh	Bachelor	Private	Male/female	2011	Current
Jazan University	Jizan	Bachelor	Government	Male/female	2013	Current
Taibah University	AlMadinah	Bachelor	Government	Male	2013	Current

\*Re-initiated I, \*\*Main campus I, \*\*\*Branch

practice, ethics, setting standards of diploma programs, and postgraduate education such as higher diploma, fellowship, and residency programs. Moreover, it approves continuing medical education for the RC profession. The accreditation role strives at evaluating and approving educational programs (diplomas only), educational institutions, and training centers. Furthermore, RC certificates and degrees issued outside Saudi Arabia are evaluated through the RCSC. The regeneration role of this board focuses on renewing of licenses for RC institutions and professionals.

According to RCSC database, the major achievements for this board are listed as follows:

- Approval of job description by SCFHS for the four categories of RC professional ranks: Technician, specialist, senior specialist, and consultant
- In 2013, SCFHS directed RCSC to establish a clinical fellowship in RC. The fellowship qualifies RT to assume more responsibilities and work as a senior and consultant RT
- In 2014, SCFHS launched the sixth edition of the guideline booklet for health professional classification and registration, which included 12 subspecialties developed by RCSC to advance the profession of RC.<sup>[15]</sup>

In the past, there was no formal registration for the RTs, no examinations, and no accreditation for their continuing education. However, currently all RTs must be registered by SCFHS before practice, and they have to attend a series of educational activities to renew their registration. Only diploma program graduates sit for registration examination to earn their practicing licenses. However, in mid-2014, SCFHS formulated a panel of RC examination committee who would be responsible for reviewing the test bank, designing a blueprint, and preparing a question bank for all domains of the RC blue-print. In the coming years, all RC graduates at all levels would have to sit for qualifying examinations to earn their SCFHS registration license, according to SCFHS officials.

Another credentialing body is the NBRC, which is an American agency that offers different levels of certifications for those who graduated from US accredited programs. Alotaibi<sup>[13]</sup> showed that only 15% of RTs in Saudi Arabia were credentialed by NBRC. Figure 1 shows recent data obtained from NBRC for credentialed Saudi practitioners.

### Accreditation for Respiratory Care

The National Commission for Academic Accreditation and Assessment (NCAAA) is the national accreditation body for RC bachelors and postgraduate programs.<sup>[16]</sup> The NCAAA was established in 2004 to improve the quality of academic education in Saudi Arabia. All RC baccalaureate degree programs are currently under consideration for NCAAA accreditation. However, for diploma programs, SCFHS is still the national accreditation body.

Another source of accreditation is the International Education Recognition System (IERS) by the International Council for Respiratory Care.<sup>[17]</sup> It is worth mentioning that the RC bachelor degree program at PSMCHS was accredited by IERS in 2008.

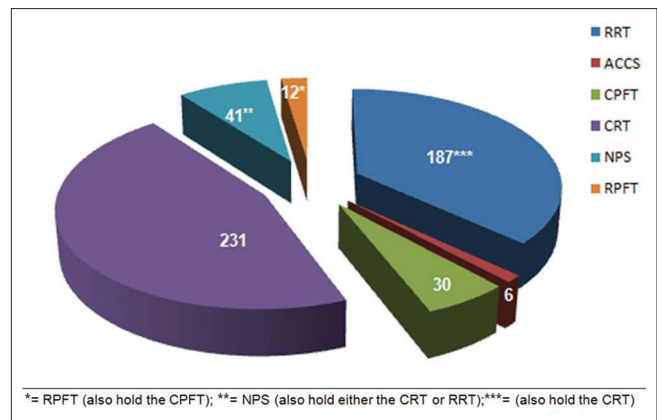


Figure 1: Credentialed Saudi respiratory care practitioners by National Board for Respiratory Care, USA

### Professional Organizations

In 1996, a small group of registered RTs had decided to establish, what was called "Saudi Respiratory Care Group (SRCG)," under the auspices of the Saudi Heart Association. The purpose of SRCG was to act as a professional body for RTs in Saudi Arabia. In December 2004, SRCG was officially recognized in an official election for a 1-year term and acted under the auspices of Saudi Thoracic Society.

In January 2005, Saudi Society for Respiratory Care (SSRC) was established under the umbrella of University of Dammam.<sup>[18]</sup> SSRC is a nonprofit organization, established to develop and support RC profession. Furthermore, it aims to empower its professional members and improve RC practice in Saudi Arabia.

Since the 2005 inauguration, SSRC leadership has made great emphasis on scientific offering and encouragement of research, organizing scientific conferences (six international conferences), building a communication network, and providing scientific consultation and advice in the field of RC.

Over the years, SSRC, with its main office located in Dammam in the Eastern Province, established chapters in western region (2008), central region (2010), and southern region (2014) of Saudi Arabia to support the profession and to fulfill the mission and vision of the society.

In December 2010, another step forward on the journey of SSRCs successes, the American Association for Respiratory Care recognized SSRC as an international affiliate.<sup>[17]</sup>

### Saudi Society for Respiratory Care and National Board for Respiratory Care Agreement

In May 2015, in an attempt to further advance the profession, SSRC signed a memorandum of agreement with NBRC to deliver the board examinations for the Saudi RC program graduates. The examination would be coordinated and proctored by SSRC but delivered and analyzed by NBRC. Although the examination is exactly the same, but the agreement clearly stated that those candidates who passed these examinations

**Table 3: Respiratory care personnel in the healthcare sectors in Saudi Arabia (April 2011)**

Sector	Number	Percentage	Saudis	Percentage	Other nationalities	Number	Percentage
Ministry of health	379	25.6	371	25	Philippines	990	67
Other governments facilities	885	60			North America	88	6
Private sector	213	14.4			Others	28	2
Total	1477	100					

would not be allowed to add the well-known NBRC titles such as Certified Respiratory Therapist and Registered Respiratory Therapist. The SSRC Board therefore developed their own titles. Accordingly, the candidate who passed the examinations would be entitled to be classified as a Certified Respiratory Specialist or Registered Respiratory Specialist. SSRC do not have the authority to enforce these examinations. However, they encouraged all graduates to take them to standardize the RC practice.

### Respiratory Care Workforce

According to MoH statistical book for 2014, Saudi constitutes 72.6% of the allied health professionals.<sup>[19]</sup> However, the RC workforce in Saudi Arabia relies heavily on expatriates who are recruited from different countries. Majority of them work for large specialized hospitals with North American standards. Alotaibi's data collected in 2011, indicated a remarkable shortage of Saudi RTs, which constituted only 25% in total.<sup>[13]</sup> Table 3 shows RC personnel in the health-care sectors in Saudi Arabia.<sup>[13]</sup>

RC is still not well recognized and fully appreciated in Saudi hospitals. This could be attributed to the age of the profession and difficulty in recruiting RTs nationally and internationally. It is therefore not surprising that 78.6% of all Saudi hospitals have no RTs. Data show that there is one RT for every 17,629 Saudi population.<sup>[13]</sup>

The fact that MoH controls more than 60% of the Saudi health system could have a significant and positive impact on the profession. MoH has only recently recognized the RC profession, which means RC will definitely be included as part of the Saudi workforce. Moreover, the Saudi Central Board for Accreditation of Healthcare Institution (CBAHI) has included RC as one of their hospital accreditation standards. Thus, hospitals will ultimately have to establish RC services to conform to CBAHI requirements.

More importantly, significant changes in RC profession occurred in late 2012, where the Ministry of Civil Services approved adding the job title "respiratory therapist" to other labor job titles in the health-care sector. Previously, graduates with bachelor's degrees were hired under job titles other than RT such as physical therapist. This was because RC profession was not recognized by Ministry of Civil Services. This was a significant step forward and has contributed to more RTs being recruited in governmental hospitals.

### The Future of Respiratory Care

As it was mentioned earlier, not all hospitals in Saudi Arabia recognize RC services and acknowledge the importance of RC practitioners. Among the 443 hospitals registered

in the health system's database, only 88 hospitals have RC departments.<sup>[13]</sup> Therefore, a significant expansion and development in RC services are anticipated for the following reasons: first, CBAHI<sup>[20]</sup> has included RC services as one of its accreditation requirements. This means that all hospitals will ultimately have to establish their own RC department if they want to be nationally accredited. Accordingly, RC personnel demands will significantly increase. Second, recognition of the profession by Ministry of Civil Services. Third, proliferation of RC educational programs. Last but not the least, establishment of 3 years RC fellowship program. This would secure professional development for RTs. It also may attract and encourage more candidates to join the profession.

It seems that there is an ongoing process of recognition, expansion, standardization, and advancement in the RC education and scope of practice for the profession. SCFHS and SSRC would therefore have to respond to these changes appropriately. SCFHS would have to recognize NBRC/SSRC examinations as a requirement for the practice. In addition, RC residency and fellowship programs would have to be implemented. Moreover, SSRC would have to encourage academic institutions to move toward a master's degree level.

### Conclusion

This is the first study outlining the evolution of the RC profession in Saudi Arabia. Major historical events which best describe its development and progresses over the last few decades are described. RC began with slow progress, but during the last decade, revolutionary changes had occurred in terms of professional recognition, educational programs, increase of practice need, and workforce. However, shortage of staffing and difficulty of recruitment remains the major obstacles. Nevertheless, RC in Saudi Arabia will likely progress rapidly in the next few years. This progress will be supported by having more Saudis with postgraduate degrees, establishing new baccalaureate programs, postgraduate diplomas, residency, and fellowship programs in different RC subspecialties.

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### Conflicts of interest

There are no conflicts of interest.

## References

1. Long DE. Culture and Customs of Saudi Arabia. Westport, Connecticut: Greenwood; 2005. p. 144.
2. DeBakey ME, Beall AC Jr., Feteih N, Mardini M, Guinn GA, Mattox KL. King Faisal Specialist Hospital and Research Centre Cardiovascular Surgery Unit: First year. *Cardiovasc Res Cent Bull* 1979;18:41-4.
3. Al-Ebrahim K, Shafei H, Mohammed Z. Cardiac surgery in the Kingdom of Saudi Arabia. *Asian Cardiovasc Thorac Ann* 1995;3:36A.
4. Loma Linda Heart Team Reports from Saudi Arabia. *Canadian Messenger Union*. Vol. 45; 1976. Available from: <http://www.CUM19760315-V45-06.pdf>; <http://www.documents.adventistarchives.org/Periodicals/CUM/CUM19760315-V45-06.pdf>. [Last cited on 2016 Jul 17].
5. Weismeyer R. Heart Team Operates on 35 Saudi Arabians. *The Advent Review and Sabbah Herald*. 1976. p. 383-5.
6. Scope News – News – Scope Autumn 2001: Respiratory Therapy Program in Kingdom of SA; 2001. Available from: <http://www.llu.edu/news/scope/aut01/nsrespther.page>. [Last cited on 2015 Nov 13].
7. Stoller JK. 2000 Donald F. Egan Scientific Lecture. Are respiratory therapists effective? Assessing the evidence. *Respir Care* 2001;46:56-66.
8. Mathews P, Drumheller L, Carlow JJ; Assistance of the American Association for Respiratory Care; National Board for Respiratory Care; Council on Accreditation of Respiratory Care. Respiratory care manpower issues. *Crit Care Med* 2006;34 3 Suppl: S32-45.
9. American Association for Respiratory Care: Definition of Respiratory Care; April, 2014. Available from: [http://www.aarc.org/resources/position\\_statements/defin.html](http://www.aarc.org/resources/position_statements/defin.html). [Last accessed on 2015 Nov 10].
10. Saudi Arabia Venture: Respiratory Therapy. SCOPE, Loma Linda University; 1996. Available from: [http://www.zs5emtqK\\_Attachmen\\_-\\_List\\_of\\_Off-campus\\_Distance\\_Education\\_Programs\\_July\\_2008\\_.pdf](http://www.zs5emtqK_Attachmen_-_List_of_Off-campus_Distance_Education_Programs_July_2008_.pdf). [Last cited 2016 Jul 18].
11. Coalition\_Chronicle\_April\_2014.pdf [Internet]. Available from: [http://www.cobgrte.org/images/Coalition\\_Chronicle\\_April\\_2014.pdf](http://www.cobgrte.org/images/Coalition_Chronicle_April_2014.pdf). [Last cited 2016 Jul 10].
12. International Spotlight: Saudi Arabia. Available from: <http://www.washingtonpost.com/wpadv/specialsales/spotlight/saudi/dallah.html>. [Last cited on 2015 Dec 10].
13. Alotaibi G. Status of respiratory care profession in Saudi Arabia: A national survey. *Ann Thorac Med* 2015;10:55-60.
14. The Saudi Commission for Health Specialties. Available from: <http://www.scfhs.org.sa/en/about/Pages/default.aspx>. [Last cited on 2015 Nov 13].
15. Health Professionals Classification and Registration Portal. Available from: <http://www.scfhs.org.sa/en/registration/Pages/default.aspx>. [Last cited on 2015 Nov 13].
16. National Commission for Academic Accreditation & Assessment. Available from: <http://www.he.moe.gov.sa/en/aboutus/Institutions/Pages/academic-accreditation.aspx>. [Last cited on 2015 Nov 13].
17. ICRC Links. Available from: <http://www.irccouncil.org/newsite/links/>. [Last cited on 2015 Nov 13].
18. Saudi Society for Respiratory Care. SSRC Profile. Available from: <http://www.ssrc.org.sa/ssrc-profile/>. [Last cited on 2015 Nov 13].
19. Ministry of Health, Statistical Book for the Year 1435H. Available from: <http://www.moh.gov.sa/en/Ministry/Statistics/book/Documents/Statistical-Book-for-the-Year-1435.pdf>. [Last accessed on 2016 Jun 26].
20. CBAHI – Saudi Central Board of Accreditation for Healthcare Institutions. Available from: <http://www.cbahi.gov.sa/apps/en/home.aspx>. [Last cited on 2015 Nov 13].