

Respiratory Care Profession in Yemen: Past, Present, and Future

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ABSTRACT

The respiratory care (RC) discipline in Yemen emerged 15 years ago. Although there have been significant advancements in the domain, no documented history is available regarding its development and progress over the years. This paper highlights the history and development of the RC field in Yemen and highlights the major events that took place during these times that shaped the development of the RC discipline. A detailed, comprehensive review and assessment were conducted through direct communication, personal interviews, and the review of existing documents in the hospital's archives, academic institutes, Ministry of Public Health and Population, and other relevant resources. The gathered data were evaluated for relevance and grouped on a thematic basis. So far, this is the first paper on the comprehensive history and development of the RC discipline in Yemen.

Keywords: History, Profession, Respiratory care, Respiratory therapy, Yemen.

Indian Journal of Critical Care Medicine (2021): 10.5005/jp-journals-10071-23931

INTRODUCTION

Respiratory care (RC) is a healthcare discipline that focuses on the promotion of optimal cardiopulmonary function and health through the assessment, treatment, management, control, diagnostic evaluation, education, and care of patients with deficiencies and abnormalities of the cardiopulmonary system.¹ Respiratory therapists (RTs) perform a wide range of tasks, such as assessment of patients, management of their airways, assistance in the management of oxygen supplementation and mechanical ventilation, administration of aerosol medications, maintenance of bronchial hygiene, chest physiotherapy, pulmonary rehabilitation, home RC, and several additional modalities.¹ Depending on the clinical setting, these respiratory therapy services were solicited by different specialists, including anesthesiologists, intensive care specialists, anesthesia technicians, nurses, physiotherapists, and other allied health professionals.^{2,3} In recent times, this specialized career area has emerged as a unique specialty called "respiratory care." The evolution of respiratory therapy as a specialty in Yemen started back in 2016 after the graduation of the first batch of RC technicians (RCT). There was also a huge demand for RC services from hospitals due to new regulations made by the Ministry of Public Health and Population (MoPHP). In the Republic of Yemen, the healthcare system is divided into public (governmental) healthcare settings and private healthcare settings, which have developed rapidly since the establishment of the MoPHP in the early 1990s.⁴ Since then, the MoPHP has adopted most of the allied health specialties, except for the RC specialty. It could be speculated that the MoPHP at that time did not realize the value and importance of RC services. Therefore, until recently, it was not officially recognized and identified as one of the healthcare disciplines in Yemen. The RC discipline has a simple historical record since 2005. This paper aims to exhibit and document the historical development of the RC discipline and how the RC discipline needs to advance in the future.

HISTORY OF RESPIRATORY CARE IN YEMEN

The early history of RC in Yemen, born as it has grown in many countries, which began in clinical settings, back in 2005, by sending out four healthcare providers from the Thawra Modern General

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How to cite this article: Hamilah SN, Ahmari MAI, Alsabri MA, Alrubaiee GG. Respiratory Care Profession in Yemen: Past, Present, and Future. *Indian J Crit Care Med* 2021;25(8):890–895.

Source of support: Nil

Conflict of interest: None

Hospital (TMGH) in Sana'a to study the respiratory therapy course for 1 year at King Hussein Medical City, Royal Medical Services in Amman, Jordan. By the end of the year 2006, they completed the study, came back to work together, and established the first respiratory therapy unit in TMGH as the largest reference and teaching hospital in Sana'a, Yemen. In 2005, the respiratory therapy unit was opened by Jordanian RTs at a private hospital named the University of Science and Technology Hospital (USTH), Sana'a.⁵ The RC unit at TMGH included only four trained Yemeni RCT who trained for 1 year in Jordan. It was the first RC unit in Yemen. Initially, the unit started to set a plan for training programs directed at intensive care unit (ICU) healthcare providers to empower these professionals. The RC discipline within the country was solely adopted by first practitioners in the respiratory therapy unit at TMGH. In 2006, the RC discipline grew slowly because only one governmental and one private hospital had realized the important role of respiratory therapy. Therefore, the private hospital named USTH enrolled four members of their staff for the training course in respiratory therapy at the Islamic Hospital in Amman, Jordan. The training course was based on a short on-the-job training (OJT) course that lasted 4 months.⁵ The idea of having an RC discipline was stimulated by the acknowledgment of the value of respiratory therapy technicians and specialists to improve the outcomes of healthcare services,

especially in critical care units. It is worth mentioning that it was important to train healthcare providers to provide RC services for all patients in need within hospitals inside the Sana'a province. Hence, the first training program in respiratory therapy, implemented by offering a short course in RC for 3 months, was initiated in 2006. It is very likely that this training was unstructured. Within this context, the TMGH administration asked some experienced ICU nurses to be trained as respiratory therapy technicians. Then, 17 ICU nurses were trained in the first training program of respiratory therapy, which included theoretical lectures and practical training sessions within ICUs at the TMGH for 3 months. The RTs (who trained in Jordan for 1 year) were responsible for training those who had joined the first program in respiratory therapy. This was probably the first RC OJT course in the country. Later on, exactly in 2009, the second training program in respiratory therapy was implemented, which targeted 29 ICU nurses from different governorates. In 2009, the first military hospital opened a new respiratory therapy department at 48 Model Hospital, which is located in the Sana'a province. More importantly, cardiac surgeons at the cardiac center at TMGH believed that a cardiac surgery team without RT would potentially increase the mortality rate among patients undergoing open-heart surgery. Thus, the administration of the TMGH decided to continue supporting the respiratory therapy unit and introduced more intelligent ventilators and other devices required for respiratory therapy. In 2013, the third short training program in respiratory therapy was implemented for experienced ICU nurses, and it lasted for 3 months.⁵

NOBLE BEGINNING OF RESPIRATORY CARE PROFESSION IN YEMEN

In October 2015, the first academic non-systematic diploma program was established at the Yemen Bilquis Medical Institute, located in Sana'a. This was a diploma program designed for three consecutive semesters. It consisted of theoretical subjects and practical training in the largest and teaching at the TMGH in Yemen. In the first batch, 31 students were enrolled and graduated on October 20, 2016.⁸ Since 2015, RC in Yemen has experienced many advancements academically and clinically. The first step taken was to increase the awareness of the importance and vitality of respiratory therapy; thus, a great idea emerged, to gather all hospital managers, medical leaders, and consultants in different medical specialties, during the first Yemeni conference of Respiratory Care (YCRC), YCRC held on November 06–07, 2017 at 48 Model Hospital.⁵ In 2017, the same year as the conference, the first systematic RCT program at the College of Emergency and Health Sciences was started.⁵ The scientific activities made a sound for our profession because many subsequent RC scientific activities have been held, such as the first scientific day for RC held in recognition of RC Week 18 on October 25, 2018, and the 2nd scientific day for RC, which held in recognition of RC Week 19 on October 25, 2019, and the World Asthma Day scientific activity and World COPD Day scientific activity all played a part in increasing the awareness of the RC discipline in Yemen. One of the biggest achievements that we have to mention is the establishment of a special governmental administrative body called the Respiratory Care Services Administration (RCSA) in the Ministry of Health. This new administration was created by the official statement issued by the Minister of Health, after exploring the important role of RTs, which was presented by Mr. Saleem Hamilah, BS, RC program, who played a crucial role in improving the RC discipline in Yemen. He changed the reality of RC to be a more important allied health profession than before.⁶ In 2019, the Hajjah University started teaching RC

3 years after high school. More importantly, RC developments occurred by issuing the National Guide of Respiratory Care Services in governmental and private hospitals, as issued by RCSA in July 2019 (Fig 1). This guide forced the administrations of hospitals to create RC departments within their hospitals and recruit RT staff. Thus, more hospitals requested RTs. This point led RCSA's director to contact educational universities and urge them to establish new academic educational programs, such as diploma of RCT and Bachelor of Science in Respiratory Care (BsRC), to meet the great need for RTs in hospitals.⁷ In 2020, BsRC was launched for the first time in Yemen at the Al-Razi University. This program has had a great impact on the progress of the RC discipline and is considered a great achievement in the development of RC in Yemen.⁸ More detailed events in history of RC in Yemen shown in Table 1. In 2018, RTs in Yemen have celebrated their first RC week (the first scientific day of RC) which sponsored by Yemen Bilquis Medical Institute, Sana'a.⁹

Then in 2019 the second RC week celebration (the second scientific day of RC) held under the umbrella of RCSA - MOPHP, Sana'a, Yemen.¹⁰

RESPIRATORY CARE REGULATION AND LICENSURE

The national regulatory body in Yemen is called the Yemeni Medical Council (YMC), which was founded in 2000. It is a governmental authority responsible for healthcare standards, regulations, practices, and professional ranking in all healthcare specialties and issuing licenses for all healthcare professionals who seek to work inside the Republic of Yemen.¹¹ RC before 2015 was not accredited until 2019. After the appointments of new board directors of the YMC, the RC specialty was introduced for the first time and has since been accepted as an independent discipline as per the accredited and licensed professions in the YMC.

EDUCATIONAL PROGRAMS IN RESPIRATORY CARE

RC education started professionally in Yemen as OJT in 2006 at the TMGH. Since then, the education of RC practitioners plays an effective role in delivering quality care to patients in some clinical settings. The role of RC practitioners has vastly expanded to have them assume more duties. Furthermore, the RC practitioner is increasingly involved in respiratory disease management, prevention, health, and wellness promotion.⁵ However, in Yemen, training and educational advancements were slow in the period between 2006 and 2016. Subsequently, a vast expansion and revolution in the education of the RC discipline occurred after 2016, as shown in Table 2. The details of the training and education developments in the RC profession in Yemen over the last 15 years described in Tables 3 and 4. For simplicity, it has been divided into two categories: non-systematic education (short OJT and long professional programs) and systematic education (which includes diploma or associate degrees and baccalaureate programs).

BIRTH OF THE RESPIRATORY CARE SERVICES ADMINISTRATION

In 2019, the Minister of Health officially delivered his prestigious and historical statement to establish a new administration for RC at the Ministry of Public Health and Population (MOPHP) that administration called RCSA. The RCSA was established on

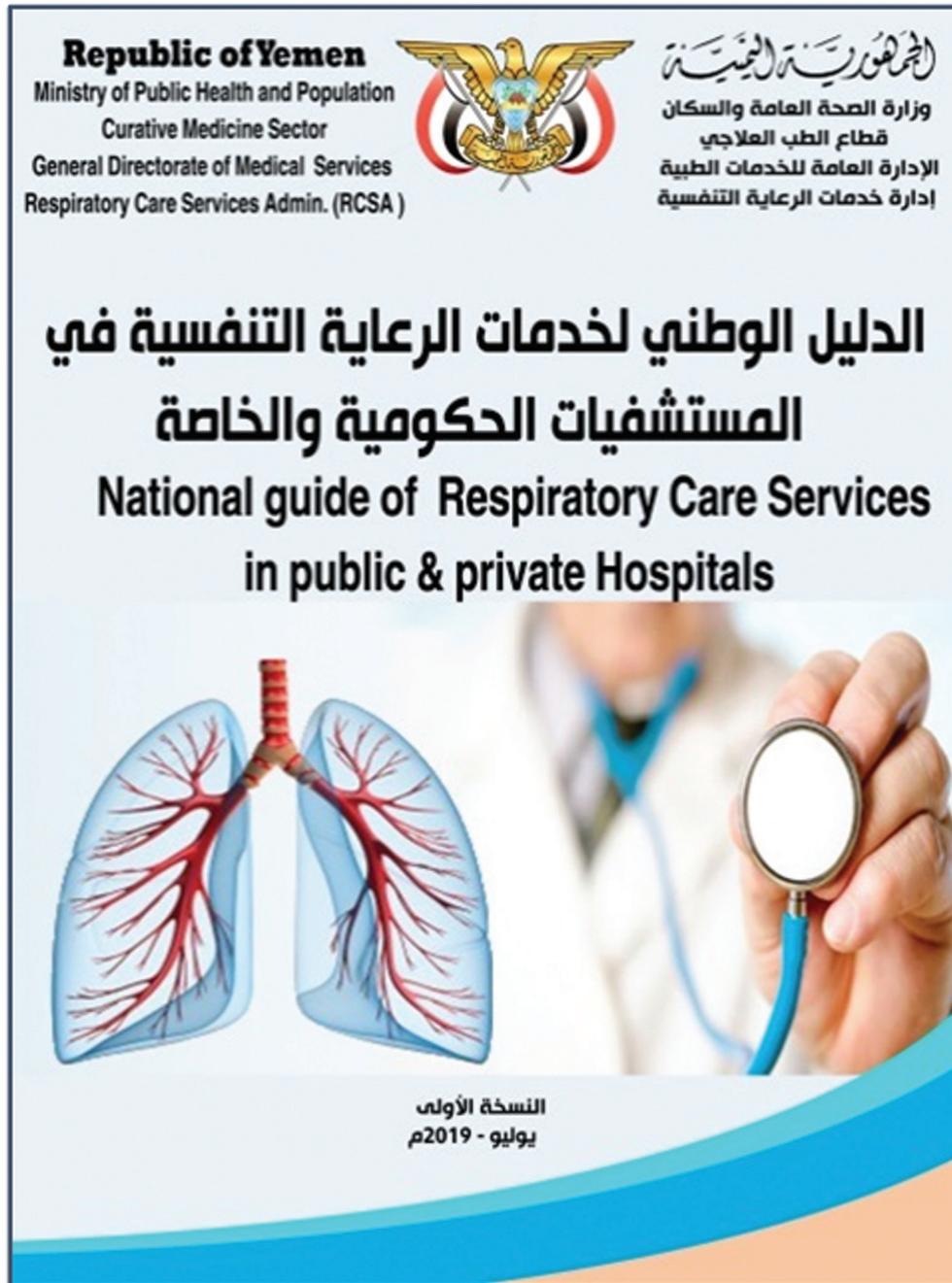


Fig. 1: National Guide of Respiratory Care Services in Public and Private Hospitals Issued by RCSA-MoH -2019-MoPHP⁵

September 09, 2019, with the aim of developing and promoting the RC discipline across the Republic of Yemen.

This was done in response to the challenges in clinical practice and is specifically tailored for dissemination knowledge regarding RT, through a short course, and helping to accredit newly systematic programs in RC, such as diploma and bachelors in RC. Here, we review the most important tasks assigned to the RCSA at the MoPHP as follows:

- Direct supervision of the RC departments in all private and public hospitals in the Republic of Yemen and follow-up of the application of the National Guide for Respiratory Care Services.
- Coordination with public and private institutes and universities to establish and start a Bachelor of Science in RC program.
- Development of policies and procedures of work and job descriptions of RTs in RC departments according to international recommendations and following up on their application in healthcare institutions.
- Supervision and planning of external scholarship programs in the field of RC in cooperation with the concerned ministries.
- Introduction of the RC specialization in the YMC as an allied medical specialty and working on issuing classification certificates and licenses to practice RC.

Table 1: Summary of the major events in the field of RC profession in Yemen

Year	Event
2005	Respiratory Care has been started at TMGH, Sana'a, where four members of the hospital staff were sent to a training course in Jordan Country.
2005	Opening the first respiratory therapy unit in Private Hospital at USTH, Sana'a by Jordanian RTs.
2006	The four members who trained in Jordan Country, opening the first RC unit at TMGH, Sana'a.
2006	Conducting the first RT batch on-the-job training course for 3 months at TMGH, Sana'a.
2009	Conducting the second RT batch on-the-job training course for 3 months at TMGH, Sana'a. How many members were trained?
2013	Conducting the third RT batch on-the-job training course for 4 months at Al-Kuwait University Hospital, Sana'a.
2015	Inauguration of the first academic specialized diploma in respiratory care by Yemen Biliquis Medical Institute, Sana'a.
2016	The first batch graduated RT Diploma from Yemen Biliquis Medical Institute, Sana'a.
2017	The second batch graduated RT Diploma from Yemen Biliquis Medical Institute, Sana'a.
2017	First Yemeni conference of Respiratory Care held for the first time at 48 Model Hospital, Sana'a, Yemen.
2017	Inauguration of the first academic systematic diploma of RCT by College of Health and Technical Emergence Sciences, Sana'a.
2018	The first RC week celebration (the first scientific day of RC), sponsored by Yemen Biliquis Medical Institute, Sana'a.
2019	Establishing governmental RCSA at the MoPHP, Sana'a, Yemen.
2019	The second RC week celebration (the second scientific day of RC) under the umbrella of RCSA, Sana'a, Yemen.
2019	Inauguration of the first academic diploma of RCT in Gov. University by HU, Hajjah.
2019	Issuing the National Respiratory Care Services at private and public hospitals—2019 by RCSA-MoH.
2019	Holding the first-ever celebration across Yemen in recognition of World Asthma Day.
2019	Holding the first-ever celebration across Yemen in recognition of World COPD Day.
2019	Introducing the RT Profession as a core standard in the accreditation of any hospital by RCSA-MoPHP.
2020	Introducing the RC specialty as an accredited independent profession in Licensure medical system in Yemen, that is, Yemeni Medical Council.
2020	Inauguration of the first academic systematic BsRC by Al-Razi University, Sana'a.

TMGH, Thawra Modern General Hospital; USTH, University of Science and Technology Hospital; RCSA, Respiratory Care Services Administration; RT, Respiratory therapist; CHTES, College of Health and Technical Emergence Sciences; HU, Hajjah University; BSc, Bachelor of Science; BsRC, Bachelor of Science in Respiratory Care; RCT, Respiratory care Technician; RC, Respiratory Care; MoPHP, Ministry of Public Health and Population

- Organization of training and awareness programs related to the RC specialization in coordination with the concerned administrations to improve the medical services that are provided to patients in need.
- Issuing of the manuals for consumables and medical machines and devices related to the specialty of RC in cooperation with the relevant administrative units.
- Coordination with local and international associations and organizations to develop the RC specialty in the Republic of Yemen.
- Representation of RC specialization in all local and international forums and conferences related to specialization in respiratory therapy.
- Raising the efficiency and competence of RC practitioners in all governmental and private hospitals through continuous medical education and training in accordance with the latest global standards and evidence-based practices.

RESPIRATORY CARE WORKFORCE IN YEMEN

According to the database of MoPHP - April 2020, there are only 177 RC practitioners in Yemeni hospitals and therefor Yemeni RC practitioner represented 99.44%. Most of them work in large hospitals, especially in northern governorates and for more detailed RC personnel in the health-care sectors in Yemen showed in [Table 5](#).⁵

FUTURE OF RESPIRATORY CARE IN YEMEN

There are ongoing initiatives to increase the number of RC programs nationwide, especially at the bachelor's degree level. Another important initiative is to establish licensure for practice

designated for the RC discipline. Current efforts to establish the Yemeni Association for Respiratory Care and the introduction of Yemen as a member of the International Council for Respiratory Care are underway.

CONCLUSION

The evolution of the RC discipline in the Republic of Yemen is promising and advancing. This is the first paper to highlight the advancement of RC over the last 5 years, and it addresses the slow progress of the profession since it emerged, back in 2006. With the recent significant advancement of the discipline, the shortage of staff and difficulty in recruitment remains a major obstacle. Ongoing efforts at current are underway to establish the Yemeni Association for Respiratory Care and introducing Yemen as a member of the International Council for Respiratory Care. In addition, the development of RC evidence-based practices encourages the scientific researches. Nevertheless, the RC discipline in Yemen will likely progress rapidly in the next few years.

ACKNOWLEDGMENTS

We would like to thank Prof Ahmed Qasem Al-Ansi, Prof Yahia Al-Huraibi, Prof Nouradden Aljaber for true continuous support to our profession and also for their valuable contribution to the manuscript. We also thank Mr Mansoor Abu baker, Mr Fateh Aldden Al-Emad, Mr Waleed Al-Haj, Mr Jaleel Ghalib, Dr Huda Qashwa, Dr Hamdi Hufdhallh and Dr Taha Al-Mahbashi for their help in completing this paper, to Dr Hameed Almamari, Deputy manager for General Directorate of Medical Services at MOPHP, Dr Ali Al-Mufti, MD, Manager of General Directorate of Medical

Table 2: The non-systematic and systematic educational programs in respiratory care in Yemen

<i>Non-systematic education</i>	<i>Systematic education</i>
<ul style="list-style-type: none"> • Short courses (On-the-job Training): <ol style="list-style-type: none"> 1. Thawra Modern General Hospital, Sana'a, OJT courses. These courses were run by four staff who got trained in Jordan country. These courses were offered for 3 months period, the first one was offered in the year 2006 for 17 trainees. The other short course was offered in 2013 for 4 months for 30 trainees. 2. University of Science and Technology Hospital OJT courses. Group of staff got trained in Jordan country have started in the year 2006 to conduct serial trainings in respiratory care. First batch with six trainees for 3 months. The other two batches were in the year 2015 with 57 trainees and the other one in 2018 with 35 trainees. These courses targeted nurses and anesthesia professionals who previously holding at least a diploma for 3 years after high school. 3. High institute of health sciences. In 2017, the High institute of health sciences implemented one OJT course that included 12 trainees. • Long courses: <ol style="list-style-type: none"> 1. Yemen Bilquis Medical Institute Respiratory Therapy Diploma The first long course program has started back in 2015 at Yemen Bilquis Medical Institute, this 1-year program diploma tailored for graduates of the following: <ul style="list-style-type: none"> • Diploma degree in nursing and medical assistant. • Bachelor's degree in Medicine or nursing or anesthesia. Thirty-one students enrolled in the first batch. The total yet graduates from this program are 60 students. 2. High institute of health sciences. This is a 1-year specialized diploma program, which is tailored for graduates of: <ul style="list-style-type: none"> — Diploma degree in nursing and medical assistant. Total graduates 22 students. 	<ul style="list-style-type: none"> • RCT Diploma (3 years after high school) <ol style="list-style-type: none"> 1. College of Emergency and Health Sciences : The first 3-year program started in 2017 at the College of Emergency and Health Sciences, which is considered the first community college in Yemen to start a regular study in respiratory care. 2. Hajjah University : The second school that started a similar program was Hajjah University, the first governmental school to teach respiratory care program in Yemen. The program inaugurated in 2019 and still runs with an annual intake of 30 to 40 male/female students. • Bachelor of Science in Respiratory Care Four years study and 1-year internship The inauguration of the first academic systematic Bachelor of Science in Respiratory Care was in 2020 by Al-Razi University that established the first academic RC department in Yemen and started to teach BsRC with four academic years plus a 1-year internship. The BsRC program supposed to enrolls 40 to 50 male/female students annually, this program will be been the main resource for RC education in Yemen. Moreover, there are plans to launching such a program in governmental universities to facilitate more students enrolling in the program and empowering the profession with excellent graduates.

Table 3: Short and long non-systematic respiratory care courses in Yemen

<i>School name</i>	<i>City</i>	<i>Duration</i>	<i>Degree</i>	<i>School type</i>	<i>Gender</i>	<i>Initiated year</i>	<i>No. of enrolling students.</i>	<i>No. of graduated students.</i>	<i>Status</i>
TMGH	Sana'a	3 months	OJT short course	Governmental hospital	Male/female	2006	—	17	Phased out 2014
TMGH	Sana'a	3 months	OJT short course	Governmental hospital	Male/female	2009	—	29	
TMGH and Kuwait Hospital	Sana'a	3 months	OJT short course	Governmental hospital	Male/female	2013	—	30	Phased out 2014
USTH	Sana'a	3 months	OJT short course	Private hospital	Male/female	2010	—	6	Phased out Dec. 2018
USTH	Sana'a	6 months	OJT short course	Private hospital	Male/female	2016	—	57	Phased out Dec. 2018
USTH	Sana'a	6 months	OJT short course	Private hospital	Male/female	2018	—	35	Phased out Dec. 2018
HIHS	Sana'a	6 months	OJT short course	Private hospital	Male/female	2017	—	12	Phased out 2017
BMI	Sana'a	1 year	Diploma	Private	Male/female	2015	46	60	Current
HIHS	Sana'a	1 year	Specialized Diploma	Governmental	Male/female	2019	22	—	Current

TMGH, Thawra Modern General Hospital; USTH, University of Science and Technology Hospital; HIHS, High Institute of Health Sciences, Sana'a; BMI, Bilquis Medical Institute.

Table 4: Systematic respiratory care programs in Yemen

School name	City	Duration	Degree	School type	Gender	Initiated year	Enrolling students no.	Graduated students no.	Status
A-Regular BsRC after high school :									
RU-Yemen	Sana'a	5 years	BsRC	Private	Male/female	2020/2021	50	0	Current
B-Regular RC Technician Diploma after High School:									
CEHS	Sana'a	3 years	Diploma	Private	Male/female	2017	20	0	Current
HU	Hajjah	3 years	Diploma	Governmental	Male/female	2019	48	0	Current

RU-Yemen, Al-Razi University—Yemen; CEHS, College of Emergency and Health Sciences; HU, Hajjah University

Table 5: Respiratory care personnel in the healthcare sectors in Yemen (April 2020)

Sector	Number	Percentage	Yemeni	Percentage	Other nationalities	Number	Percentage
Ministry of Health	110	62.10%	176	99.44%	Philippines	1	0.56%
Other governments facilities	21	11.90%			Others	0	0%
Private sector	46	26.00%		0.56%			
Total	177	100.00%					

According to the database of MoPHP, April 2020

services and Emergency at MOPHP, Dr Ali Jahaf, Deputy of Curative Medicine Sector at MOPHP, Dr. Taha Al-Mutawakel - Minister of Health for their true continuous support to the respiratory care profession in Yemen.

Ethical approval: Ministry of Public Health and Population in Yemen approved this study.

Contributorship: S.H. and M.A. conceived and designed the study; S.H. was responsible for data collection; S.H. did the analysis and generated the data, and wrote the first draft, M.A., G.A., and M.H. revised the manuscript and all authors approved the final manuscript.

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