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Clinical Practice and Education of Respiratory Care in Pakistan

1. Muhammad Shahzaib Rasheed
Respiratory Therapist, University of Lahore.
2. Muhammad Awais Waheed
Lecturer, Respiratory Therapist, University of Lahore.
3. Yasir Ali (Correspondence Author)
Lecturer, Dermatology, University of Lahore
4. Iqra Abid
Respiratory Therapist
5. Ruhamah Yousaf
Senior Lecturer, Respiratory Therapist, University of Lahore
6. Ahmad Ali
Respiratory Therapist, University of Lahore
7. Afidah Wjid
Lecturer, Surgical Technology, University of Lahore
8. Chandni Rubina
Lecturer, Surgical Technology, University of Lahore
9. Alia Naseer
Senior Lecturer, Surgical Technology, University of Lahore

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ABSTRACT

Background: Respiratory care in Pakistan, including airway management, oxygen therapy, and pulmonary rehabilitation, improves outcomes and reduces costs, underscoring the need for strong clinical education and training.

Objective: To evaluate the clinical practices and education of respiratory care in Pakistan.

Methodology: A descriptive cross-sectional study based on a survey. Sample size of (n=86) RTs and age of 18 to 65. This study lasted 6 month form 15 Feb 2024 to 15 July 2024. Data for this study was collected from RTs across Pakistan using an online Google Form.

Results: A study of 86 respiratory therapists (RTs) in Pakistan found that 8.1% have a master's degree, 83% are graduates, and 8.1% hold an associate degree. The gender distribution is 53% female and 47% male. Most RTs work in hospitals (91.9%) as therapists (95%). The average age varies by degree, with full-time employment at 93% and most RTs having 1-4 years of experience (67.4%). Key tasks include ventilator management (91.9%) and oxygen therapy (95.3%). Challenges are low recognition (77.9%) and inadequate education (70.9%), with all RTs supporting licensing.

Conclusion: RTs in Pakistan face challenges needing licensing, diverse education, and better recognition to enhance their professional landscape.

Key words: Respiratory care, clinical practice, education, licensure, Pakistan.

INTRODUCTION

A general assessment of the patient, managing the airways, helping with and managing oxygen supplementation and mechanical ventilation, giving aerosol medication administration, bronchial hygiene, chest physiotherapy, pulmonary rehabilitation, home respiratory care, and a number of other modalities are all included in the term "respiratory care" (Sreedharan & Varghese, 2020).

Every year, respiratory disorders that cause 2.2 million deaths include whooping cough, asthma, bronchitis, colds, and pneumonia. Each year, the cost of treating these diseases exceeds $20 billion(Afzal et al., 2021).

Deaths from lower respiratory tract infections are common, especially in developing nations like Pakistan. 23% of paediatric mortality in Pakistan, a country of 199 million people, is caused by respiratory illnesses(Naz et al., 2019).

Healthcare professionals that specialize in providing vital and life-saving services connected to the pulmonary system are known as respiratory care practitioners (RCPs). The field of respiratory care (RC), also known as respiratory therapy, originated in the US in 1950s.

Modern treatments for cardiorespiratory are managed by respiratory care specialists(Almeshari et al., 2022).

Over 50% of RTs are employed by acute care hospitals, where they offer patients therapeutic and diagnostic services (Almeshari et al., 2022).

In Pakistan the field of respiratory therapy is very new. The field of respiratory therapy is well-established in a number of global locations (Zaccagnini et al., 2024).

Past research indicates that when RTs with the necessary qualifications offer RC services, patient outcomes are enhanced and healthcare costs are decreased(Alotaibi, 2015).

The two primary components of healthcare education are theoretical and practical (clinical), and they work hand in hand. The practical component enables students to develop strong clinical skills to produce well-trained and qualified healthcare practitioners to improve public health and provide high standards of patient care. The theoretical component is primarily delivered through lectures, case studies, and in-class discussions(Siraj et al., 2023).

Both the health care delivery system and health care education initiatives have shown the clinical setting to be a central component. In many ways, the clinical learning environment (CLE) is a key enabler of health care education. (Alghamdi et al., 2019).

Pakistan offers respiratory therapy through a number of different programs, Four-year degree Program, Associate degree, One-Year Post-Graduation Diploma, The two-year diploma(eduvision.edu.pk/institutions, 2024).

On-the-job training (OJT) was the first step toward respiratory care (RC) education in the United States in the 1940s. (Al-Otaibi & AlAhmari, 2016).

The American Association for Respiratory Care (AARC) recommended RTs to seek additional training and certification in 2003. Respiratory care bachelors or master's degrees are now offered by 61 out of 438 programs(Alqahtani et al., 2022).

For all medical professions, including respiratory care (RC) trainees, clinical education (CE) is essential. An RC degree with a focus on cardiovascular and pulmonary illnesses allows students with specific skill sets to deal with individual patient problems and conditions and function as licensed medical professionals. (Al Khathlan et al., 2022).

On March 3, 2022, Pakistan formed an Allied Health Professionals Council that included respiratory therapy. Setting standards for respiratory therapists' practice, certification, and training is dependent on this growth(Council, 2024) (Minhas et al., 2022).

Since Pakistan did not have a licensing system for respiratory therapists at the time of this research. According to a 2014 American Association for Respiratory treatment (AARC)

nationwide survey, there were around 172,921 RTs licensed to provide respiratory therapy in the US, which is 19% more than there were in a 2009 survey(Smith et al., 2017).

Fortunately is currently no information available on the number of RTs in Pakistan. In Canada, there are over 12,000 practicing respiratory therapists (RTs) who possess clinical expertise, knowledge, and skills in cardiorespiratory health care(Zaccagnini et al., 2021).

An advanced practice respiratory therapist (APRT) is a certified and credentialed professional with specific training who is employed to undertake tasks beyond those of a registered respiratory therapist, according to the American Association of Respiratory Care (AARC) and the Commission on Accreditation for Respiratory Care (CoARC)(Alismail & López, 2020).

In Pakistan, educational programs and licensing regulations play a major role in the particular obstacles that respiratory therapists (RTs) face in their career. Considering the challenges, getting a license is still essential to their progress(Council, 2024).

Although respiratory therapy is widely accepted in the US, many other nations do not recognize it as a distinct specialty. Just 40.6% of 335 ICUs in 20 Asian countries were found to have respiratory therapists on staff, according to a recent survey. Only 32.3% of ICUs in middle-class countries, such as China, had respiratory therapists on staff(Li et al., 2018).

Material and Method

A descriptive cross-sectional study was conducted to explore the clinical practice and education of respiratory care in Pakistan. The data collection process involved respiratory therapists from across country, ensuring a comprehensive overview. This study was completed over a span of six months, specifically from 15 Feb 2024 to 15 July 2024. The sample size for this study was calculated based on a 95% confidence level and a 5% margin of error, with the prevalence of opinion on respiratory care license at 94%. This resulted in a required sample size of 86 participants. The inclusion criteria for the study were respiratory therapist’s age between 18 and 65 years who were either currently working or actively seeking employment in the field and excluding students of respiratory therapy and professionals from other medical fields. This careful selection process ensured that the study focused specifically on the target population of respiratory therapists. Data collection was facilitated through a multiple-choice questionnaire-based survey administered via Google

Forms from respiratory therapists across Pakistan. The collected data was recorded analysed by using SPSS version 27.

Survey Items

The survey gathered data on respiratory care practice and education in Pakistan from respiratory therapists nationwide. It covered demographic details, educational background, job responsibilities, and professional development opinions. Key areas included gender, age, workplace, unit, department, highest academic qualification, major, graduation year, and professional training. Job-related queries addressed titles, required qualifications, job nature, years of experience, and income. ICU responsibilities such as intubation, ventilator management, and oxygen therapy were examined. The survey also explored the necessity of a respiratory therapist license and development obstacles like market conditions, training insufficiencies, and economic factors, with space for additional comments.

Result

The study examines 86 respiratory therapists (RTs) in Pakistan. The participants were with 46 (53%) female and 40 (47%) male. A young workforce, 52 (61%) were aged 21-25. Most RTs, 79(91.9%), worked in hospitals, primarily in ICUs, with 75 (87.2%). Academically, 72 (83.7%) held graduate degrees, and 80 (93%) majored in respiratory therapy. Most graduated recently, between 2021-2024 53(61.6%). Professional training was nearly universal, 85 (99%), mainly clinical. Many RTs, 59 (69%), had clinical practice certificates, with 56 (65.1%) in ACLS/BLS. Job roles ranged from Primary 21 (24.4%) to Advanced 35 (40.7%), with 82 (95.3%) working as therapists. Full-time employment was common, 80 (93%), and work experience varied, with 58 (67.4%) having 1 to 4 years. Monthly incomes varied, with 27 (31.4%) earning less than 40,000 PKR. Daily ICU tasks included intubation, 30 (34.9%), ventilator management, 79 (91.9%), and oxygen therapy, 82 (95.3%). Master's RTs handled specialized tasks more frequently than graduates and associates. All RTs supported licensing, citing educational diversity, 62 (72.1%) and recognition, 56 (65.1%) as professional development barriers. Obstacles included insufficient RT recognition, 67 (77.9%) and education programs 61(70.9%).

Table 1: Characteristic of participants

Characteristics of the RTs From Different Educational System			
Basic Characteristics	**Master** n(%)(n=7)	**Graduate** n(%)(n=72)	**Associate/degree** n(%)(n=7)
Gender			
Male	2 (29%)	33 (46%)	5 (71%)
Female	5 (71%)	39 (54%)	2 (29%)
Age			
age mean +- SD	28.71 +- 4.16	24.94 +- 2.86	26.57 +- 3.50
18-20	0 (0%)	0 (0%)	0 (0%)
21-25	1 (14%)	49 (68%)	3 (43%)
26-30	5 (71%)	18 (25%)	3 (43%)
31-35	0 (0%)	5 (7%)	1 (14%)
36-40	1 (14%)	0 (0%)	0 (0%)
41to 65	0 (0%)	0 (0%)	0 (0%)
Working place			
Hospital	5 (71%)	67 (93%)	7 (100%)
University	2 (29%)	5 (7%)	0 (0%)
Respiratory care product company	0 (0%)	0 (0%)	0 (0%)
Department name			
ICU	5 (71%)	64 (89%)	6 (86%)
HDU	0 (0%)	2 (3%)	1 (14%)
Pulmonology ward	0 (0%)	2 (3%)	0 (0%)

Medical ward, Rehabilitation centre	0 (0%)	0 (0%)	0 (0%)
Allied health department in university	2 (29%)	4 (6%)	0 (0%)
Highest academic qualification.			
PhD	0 (0%)	0 (0%)	0 (0%)
Master	7(100%)	0 (0%)	0 (0%)
Graduate	0 (0%)	72 (100%)	0 (0%)
Associate degree	0 (0%)	0 (0%)	7 (100%)
Highest degree graduation major.			
Respiratory therapy	3 (43%)	70 (97%)	7 (100%)
Intensive care technology	0 (0%)	2 (3%)	0 (0%)
Anaesthesia	1 (14%)	0 (0%)	0 (0%)
Public health	1 (14%)	0 (0%)	0 (0%)
Health professionals education	1 (14%)	0 (0%)	0 (0%)
Masters health and hospital management	1 (14%)	0 (0%)	0 (0%)
Nursing	0 (0%)	0 (0%)	0 (0%)
Graduation year of highest degree.			
mean +- SD	2017 +- 4.07	2020 +- 2.85	2019 +- 2.23
2021 to 2024	1 (14%)	49 (68%)	3 (43%)
2020 to 2016	5 (71%)	18 (25%)	4 (57%)
2015 to 2011	0 (0%)	5 (7%)	0 (0%)
2010 to 2006	1 (14%)	0 (0%)	0 (0%)
2005 to Before 2000	0 (0%)	0 (0%)	0 (0%)
Have you received professional training in respiratory therapy?			
Yes	7(100%)	71 (99%)	7 (100%)
No	0 (0%)	1 (1%)	0 (0%)
If yes, what is the training format?			
Undergraduate	3 (43%)	28 (39%)	0 (0%)
Associate Degree	0 (0%)	0 (0%)	3 (43%)
Post-Graduation Diploma	1 (14%)	2 (3%)	2 (29%)
Clinical training in respiratory therapy at hospital	3 (43%)	41 (57%)	2 (29%)
Have you obtained a clinical practice qualification certificate?			
Yes	7(100%)	47 (65%)	5 (71%)
No	0 (0%)	25 (35%)	2 (29%)
If yes, what kind of clinical practice qualification certificate?			
ACLS / BLS	7(100%)	44 (61%)	5 (71%)
Sleep Study	0 (0%)	2 (3%)	0 (0%)
Pulmonary Function Tests	0 (0%)	1 (1%)	0 (0%)
What is your current job title?			
Advanced	6 (86%)	29 (40%)	0 (0%)
Intermediate	1 (14%)	25 (35%)	4 (57%)
Primary	0 (0%)	18 (25%)	3 (43%)
What are the qualifications for professional titles?			
Therapist	4 (57%)	72 (100%)	6 (86%)
Technician	0 (0%)	0 (0%)	1 (14%)

Researcher	3 (43%)	0 (0%)	0 (0%)
What is the nature of your current job?			
Full-time respiratory therapist	7(100%)	67 (93%)	6 (86%)
Part-time respiratory therapist	0 (0%)	5 (7%)	1 (14%)
Please fill in the number of years you have been engaged in the above work?			
1 to 4 months	0 (0%)	8 (11%)	2 (29%)
5 to 10 months	0 (0%)	6 (8%)	0 (0%)
1 to 4 year	3 (43%)	51 (71%)	4 (57%)
5 to 10 year	3 (43%)	5 (7%)	1 (14%)
More than 10 years	1 (14%)	2 (3%)	0 (0%)
What is your monthly income?			
less than 40000PKR	0 (0%)	25 (35%)	2 (29%)
40000 – 50000PKR	0 (0%)	15 (21%)	0 (0%)
51000 – 60000PKR	0 (0%)	6 (8%)	3 (43%)
61000 – 70000PKR	0 (0%)	2 (3%)	1 (14%)
71000 – 80000PKR	0 (0%)	8 (11%)	1 (14%)
81000 – 90000PKR	2 (29%)	4 (6%)	0 (0%)
91000 – 100000PKR	2 (29%)	4 (6%)	0 (0%)
more than 100000PKR	3 (43%)	8 (11%)	0 (0%)

This table show the characteristics of Respiratory Therapists (RTs) based on their highest educational degrees, Out of 86 participants, Most Master's RTs were female 5(71%), while the majority of Associates were male 5(71%). Majority of Graduate RTs are aged 21-25 49(68%), Masters RTs are largely aged 26-30 5(71%). Most RTs work in hospitals, with 5(71%) of Masters, 67(93%) of Graduates, and 7(100%) of Associates. The majority work in ICU: Most 64(89%) of Graduates, and 6(86%) of Associates. Most Graduates 70(97%) and Associates 7(100%) majored in Respiratory Therapy. Most graduated between 2021 and 2024. Almost all RTs received professional training, Masters training includes undergraduate 3(43%). Graduates training includes clinical training 41(57%). Graduates have 44(61%) and Associates have 5 (71%). Most Masters RTs hold advanced positions 6(86%). Most RTs are full-time: 7(100%). Master’s earn more, with 3(43%) earning more than 100,000PKR. Graduates and Associates have varied income distributions, with some earning less than 40,000PKR to more than 100,000PKR.

Table 2: Comparison on Job Responsibility of participants

Comparison on Job Responsibility of RTs From Different Educational Programs			
Job Responsibility	**Master** n (%) (n=7)	**Graduate** n (%) (n=72)	**Associate/degree** n (%) (n=7)
Intubation	6 (86%)	24 (33%)	0 (0%)
Extubation	6 (86%)	64 (89%)	6 (86%)
Ventilator parameter setting	6 (86%)	64 (89%)	6 (86%)
Spontaneous breathing trial	6 (86%)	67 (93%)	7 (100%)
Monitoring	6 (86%)	70 (97%)	7 (100%)
Circuit management	6 (86%)	67 (93%)	7 (100%)
Ventilator management	6 (86%)	66 (92%)	7 (100%)
Oxygen therapy	6 (86%)	69 (96%)	7 (100%)
Aerosol therapy	5 (71%)	66 (92%)	7 (100%)
suctioning	6 (86%)	67 (93%)	7 (100%)
BIPAP	6 (86%)	68 (94%)	7 (100%)
CPAP	6 (86%)	67 (93%)	7 (100%)
Chest physiotherapy	6 (86%)	60 (83%)	7 (100%)
Arterial puncture	5 (71%)	62 (86%)	7 (100%)
Arterial blood gas analysis	5 (71%)	66 (92%)	7 (100%)
Pulmonary function test	5 (71%)	25 (35%)	2 (29%)
Bronchoscopy assistant	6 (86%)	23 (32%)	1 (14%)
Transportation of patients on mechanical ventilation	6 (86%)	37 (51%)	2 (29%)
Extracorporeal membrane oxygenation management	5 (71%)	5 (7%)	0 (0%)
Pulmonary ultrasound	2 (29%)	7 (10%)	0 (0%)
Nutrition management	5 (71%)	8 (11%)	0 (0%)
Nitric Oxide Therapy	3 (43%)	5 (7%)	0 (0%)
Training and assessment	2 (29%)	1 (1%)	0 (0%)

This Table show RTs with a Master's 6 (86%) of them performed intubation, compared to 24 (33%) of Graduates. Extubation, ventilator parameter setting, spontaneous breathing trials, monitoring, circuit management, ventilator management, oxygen therapy, suctioning, BIPAP, CPAP, chest physiotherapy, arterial puncture, and arterial blood gas analysis were common tasks, with 6 (86%) of Master's RTs involved. When it came to more specialized tasks like bronchoscopy assistance and transportation of patients on mechanical ventilation, 6 (86%) of Master's RTs were involved.

Table 3: Obstacle

Obstacles of RT Development for RTs From Different Educational Programs			
Obstacle	**Master** n(%)(n=7)	**Graduate** n(%)(n=72)	**Associate/degree** n(%) (n=7)
Necessity of RT certification/licensure:			
Yes	7(100%)	72(100%)	7 (100%)
No	0 (0%)	0 (0%)	0 (0%)
Current limiting factors for the development of the respiratory therapy profession?			
Market, the current domestic medical level is developed	4 (57%)	8 (11%)	1 (14%)
Most medical staff in Pakistan does not pay enough attention to respiratory treatment work.	5 (71%)	46 (64%)	5 (71%)
Education, lack of diversity	4 (57%)	52 (72%)	6 (86%)
system, lack of qualifications	3 (43%)	32 (44%)	3 (43%)
Establishment, no suitable position	4 (57%)	12 (17%)	2 (29%)
Economic factors	1 (14%)	10 (14%)	1 (14%)
Obstacles of RT development in your department			
A. Shortage of RT professionals	2 (29%)	22 (31%)	2 (29%)
B. Insufficient training for RT	2 (29%)	40 (56%)	2 (29%)
C. Insufficient recognition of RTs value	5 (71%)	56 (78%)	5 (71%)
D. Economic factors	1 (14%)	7 (10%)	1 (14%)
Obstacles of RT development in Pakistan:			
A. Scope of practice is limited	1 (14%)	9 (12%)	1 (14%)
B. Insufficient recognition on RTs value	2 (29%)	59 (82%)	6 (86%)
C. Insufficient RT education programs	5 (71%)	53 (74%)	3 (43%)
D. Lack of certification and license	3 (43%)	50 (69%)	4 (57%)
E. Economic factors	0 (0%)	3 (4%)	0 (0%)

In this Table out of 86, All RTs 100% agree on the necessity of certification and licensure. Education diversity is highlighted as a concern by 52 (72%) of Graduate, and 6 (86%) of Associate degree holders. A shortage of RT professionals is noted by, 22 (31%) of Graduate, and 2 (29%) of Master's and of Associate degree holders. Insufficient training is an issue for 40 (56%) of Graduate, and 2 (29%) of Master's, and Associate degree holders. The recognition of RTs' value is lacking according to 56 (78%) of Graduate, and 5 (71%) of Masters and of Associate degree holders. Economic factors affect 7(10%) of Graduate, and 1 (14%) of Masters and of Associate degree holders. Recognition of RTs' value is insufficient for 59 (82%) of Graduate, and 6 (86%) of Associate degree holders. Education programs are inadequate for 5 (71%) of Master's, 53 (74%) of Graduate. Lack of certification and licensure

is a problem for 3 (43%) of Masters, 50 (69%) of Graduate, and 4 (57%) of Associate degree holders.

DISCUSSION

The study by Li et al. (2018) highlights significant challenges and advancements in respiratory care education in mainland China, reflecting similar issues in Pakistan. Our data shows a diverse yet predominantly young workforce in respiratory therapy, with 91.9% employed in hospitals and 87.2% in ICUs. Most participants (83.7%) hold graduate degrees, and 99% have received formal training. There is a unanimous agreement (100%) on the necessity of implementing licensure for respiratory therapists in Pakistan. Key obstacles include insufficient recognition (77.9%), limited educational diversity (72.1%), and lack of certification and licensure (66.3%). Addressing these issues through systemic changes can enhance professional standards and improve respiratory care quality in Pakistan(Li et al., 2018).

The cross-sectional survey by Shevade et al. (2021) In India, 73% of RTs hold a bachelor's degree, 16.5% have a master's degree, and others hold diplomas or qualifications. In Pakistan, the study evaluates clinical practices and education, focusing on RT competencies. In India, 96.6% of RTs are employed in roles requiring respiratory therapy knowledge, with 77.6% working in acute care settings. The Pakistani study emphasizes improving outcomes through strong clinical education but lacks specific competencies. In India, RTs frequently manage conditions like pneumonia and asthma, but there is a gap between training and practical application, particularly in recommending diagnostic procedures and initiating patient education. In India, most RTs are in southern regions, highlighting an uneven distribution of services. Pakistan's study suggests the need for better clinical education to overcome obstacles in respiratory care. Both studies highlight the need for improved education and training for RTs. The Indian study provides detailed insights into educational background and job roles, while the Pakistani study focuses on the importance of clinical education. (Shevade et al., 2021).

Smith et al. (2017) In New York, the field is highly professionalized with diverse roles (e.g., staff therapists, directors) and work environments (e.g., university hospitals, home care). Practitioners typically hold advanced degrees (bachelor’s or masters) and have extensive experience (72% with over 15 years). In contrast, Pakistan’s respiratory therapists are predominantly young (61% aged 21-25), primarily work in hospitals (91.9%), and most

hold graduate degrees (83.7%). Despite the necessity of professional training and licensing, Pakistan faces significant obstacles, including insufficient recognition of RTs' value and limited educational programs. This underscores a more established and structured profession in New York compared to a developing field in Pakistan struggling with recognition and growth.(Smith et al., 2017)

The study by Hamilah et al., (2021) In Yemen, and respiratory therapy education includes both short-term courses and long-term programs. Yemen's training initiatives have focused on upgrading skills through on-the-job training and specialized diplomas, reflecting a structured approach to building expertise. In Pakistan, shows a near-equal gender distribution and a predominantly young workforce, with most respiratory therapists working in hospitals, particularly in ICUs. Despite high rates of professional training, the field in Pakistan faces significant barriers such as insufficient recognition, limited educational programs, and lack of certification and licensure. Both countries highlight the necessity of formal licensing and the need for improved recognition and educational diversity to advance the profession.(Hamilah et al., 2021).

CONCLUSION

The study concludes that respiratory therapists (RTs) in Pakistan face significant challenges that obstruct their professional development. These challenges include a lack of recognized licensing, inadequate educational diversity, and insufficient recognition of the profession.

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