

Pneumologia

A framework for the identification of competencies required from Syrian pulmonologists during COVID-19 pandemic

Mohsen Shaheen^{1,2}, Zuhair Al-Nerabieah³, Mayssoon Dashash^{2,3,*}

¹Police Hospital, Ministry of Interior Affairs, Damascus, Syria

²Medical Education Master Program, Syrian Virtual University, Damascus, Syria

³Damascus University, Damascus, Syria

Abstract

English:

Objective: To identify essential competencies required for equipping pulmonologists to manage respiratory diseases such as the Covid-19 pandemic.

Methods: A descriptive and qualitative study was conducted. Focus group, which consisted of five Syrian members who were affiliated with the Syrian Association of Thoracic Medicine and Surgery were invited to formulate a preliminary list of competencies. Delphi technique with three cycles was also employed to evaluate the resulted list. The number of pulmonologists who accepted to take part was 67 out of 110. All competencies suggested by at least 80% of experts were included in the final list. Reliability was tested using Cronbach's alpha. Descriptive statistics including Mean and standard deviation were performed.

Findings: Forty-five essential competencies were identified including ten competencies in cognitive domain, 11 skills, and 24 competencies related to attitude domain.

Conclusion: A list of 45 competencies has been identified. It is hoped that they will guide and enable pulmonologists to provide the best health care to patients with respiratory infections, especially during the COVID-19 pandemic. It will also guide decision makers to design training programs that can address these competencies.

Keywords

Covid-19 • Competency-based medical education • Delphi Technique

Un cadru pentru identificarea competențelor cerute de la pneumologii sirieni în timpul pandemiei COVID-19

Rezumat

Romanian:

Obiectiv: Identificarea competențelor esențiale necesare pentru echiparea pneumologilor pentru gestionarea bolilor respiratorii precum pandemia Covid-19.

Metode: A fost efectuat un studiu descriptiv și calitativ. Focus grupul, format din cinci membri sirieni afiliați la Asociația Siriană de Medicină și Chirurgie Toracică, a fost invitat să formuleze o listă preliminară de competențe. Tehnica Delphi cu trei cicluri a fost, de asemenea, utilizată pentru a evalua lista rezultatelor. Numărul pneumologilor care au acceptat să participe a fost de 67 din 110. Toate competențele sugerate de cel puțin 80% dintre experți au fost incluse în lista finală. Fiabilitatea a fost testată folosind alfa lui Cronbach, au fost efectuate statistici descriptive, inclusiv media și abaterea standard.

Constatări: Au fost identificate patruzeci și cinci de competențe esențiale, inclusiv zece competențe în domeniul cognitiv, 11 abilități și 24 de competențe legate de domeniul atitudinii.

Concluzie: A fost identificată o listă de 45 de competențe. Se speră că acestea vor ghida și vor permite pneumologilor să ofere cea mai bună asistență medicală pacienților cu infecții respiratorii, în special în timpul pandemiei COVID-19. De asemenea, va ghida factorii de decizie să proiecteze programe de formare care să abordeze aceste competențe.

Cuvinte-cheie

Covid-19 • Educație medicală bazată pe competențe • Tehnica Delphi

*Corresponding author: Mayssoon Dashash

E-mail: mdashash@yahoo.com

Open Access. © 2022 Shaheen et al., published by Sciendo

 This work is licensed under the Creative Commons Attribution-NonCommercial-NoDerivs 4.0 License.

Introduction

Competency-based medical education (CBME) embraces several challenges for physician training worldwide and has the potential to alter contemporary medical education (1,2). It has been considered as a priority approach that should be implemented to overcome the COVID-19 pandemic (3,4). The traditional framework that begins with the question “what do pulmonologists need to know about COVID-19?” should be modified to the question “what cognitive, skill, and attitude competencies are required by pulmonologists to face COVID-19?”

Pulmonary medicine is considered one of the most critical specializations in medicine and society, since respiratory diseases represent the largest percentage that affect humans (5). Moreover, during COVID-19 pandemic, pulmonologists were at the frontline in the battle against the virus and were directly exposed to infection hazards (6).

It is clear that pulmonologists should be appropriately prepared to ensure that all necessary preventive and protective measures are taken to maximize occupational safety and minimize health risks (7). In addition, they should be properly trained to provide the best health care during assessment, treatment, and following up. Pulmonologists should also be successful role performers, since they must possess performance abilities that allow them to operate across a broad range of situations over an extended period of time (8).

In this regard, a systematic framework of competencies should be designed in which the observable abilities of pulmonologists, integrating multiple components such as knowledge, skills and attitudes could be identified.

Therefore, the aim of this research was using Delphi methodology to identify the basic competencies required for pulmonologists to face Covid-19 within the local settings of the Syrian Arab Republic.

Materials and Methods

This study was undertaken to identify a list of essential competencies required from pulmonologists in order to offer the best health care for patients with respiratory diseases including COVID-19 using Delphi technique. The ethical approval was obtained from the ethical committee at the Syrian Virtual University (Number 211710, dated 22/09/2020). In addition, informed consent was obtained from all participants in the focus group. This research was designed and reported according to Conducting and Reporting Delphi Studies (CREDES) guidelines (9). After obtaining the ethical

approval, a descriptive and qualitative study was conducted. The study included a survey, which was designed based on a review of medical literature and a consultation of a group of experts in the field of pulmonology in the health sector in Syrian Arab Republic.

To formulate a preliminary list of basic competencies for pulmonologist, a focus group method was employed. The focus group included five pulmonologist consultants who accepted to participate in this research virtually using Zoom platform.

Consultants were asked to identify competencies required for pulmonologists after explaining about the aim of the study. The discussion resulted in 92 items, which were documented and categorized into cognitive, skills and attitude domains.

Then, Delphi methodology, through three cycles, was implemented in the second step of the process to identify essential competencies required from pulmonologists to face COVID-19. Pulmonologists who were affiliated with the Syrian Association of Thoracic Medicine and Surgery of a minimum of 5 years of experience and who have practiced as pulmonologists in Syrian hospitals during the peak of COVID-19 pandemic from 2020 to 2021 were considered experts and invited to be part of the expert panel. A 110 pulmonologists, who met the expert panel criteria, were invited by the principal investigator MS to participate in this study. However, only 67 pulmonologist accepted the invitation. The response rate was 61%.

In the first cycle of Delphi, a specific questionnaire was designed using google forms and distributed through social media. The questionnaire included introduction about the aim of study together with explanation about the privacy policy that the research team will follow in order to ensure the confidentiality of participant's data. In addition, the questionnaire included the preliminary list that was suggested by focus group. Participants were asked to evaluate each competency using a 5 point Likert scale according to its importance from 0 to 5 as following (Not important at all, Not important, Neutral, Important, Very important). In addition, an empty field was added at the end of the questionnaire for participants to suggest important competencies that were not reported in the preliminary list.

The second Delphi's cycle questionnaire contained a summary of results extracted in the first cycle and the modified list of competencies according to experts' suggestions. Similarly, participants were asked to evaluate each competency. A minimum mean value of 2.5 or more was considered the essential for each competency to move to the third and final cycle of Delphi's technique. In the third cycle, the obtained competencies from the second cycle were sent again to all

participants for re-evaluation using the previously described method.. Competencies suggested by at least 80% of experts were included in the final list. The data were analyzed using IBM SPSS Statistical Package, the reliability of the survey was tested through Cronbach's Alpha, Descriptive statistics including Mean of the answers to know the trend of the answer based on Likert Scale and standard deviation to know homogeneity of answers.

Results

The number of pulmonologists who accepted to be part in the expert panel was 67 out of 110(61%). A total of 46 competencies were suggested by the focus group including 10 items in the cognitive domain, 15 skills and 21 competencies in the attitude domains.

In the first Delphi's cycle questionnaire, the experts panel suggested five additional competencies in the cognitive domain (n=1), 1 was added to the skills domain and 3 were added to the attitude domain.

In the second Delphi cycle, answers mean of all competencies suggested by focus group and experts panel exceed the threshold to qualify for the third cycle (Mean value ≥ 2.5).

In the final cycle of Delphi technique, most of the answers were considered items either important or very important, and with a small standard deviation, which indicates the homogeneity of the answers and their convergence to their arithmetic mean.

However, as stated earlier, only competencies with the mean > 4.21 (80%), which corresponds to (very important) was adopted as an accepted competencies to be in the final core list, and all competencies whose mean was < 4.21 were excluded (Table 1).

Table 1. List of competencies after 3rd cycle of Delphi technique

Cognitive competencies			
Knowledge	Mean	SD	Answer
1. Identify symptoms and signs of respiratory diseases	4.84	.373	very important
2. Recognize respiratory drugs	4.82	.424	very important
3. Differentiate between upper / lower respiratory infections	4.82	.386	very important
4. Explain treatment modalities for upper / lower respiratory infections	4.82	.386	very important
5. Detect Respiratory failure	4.75	.438	very important
6. Recognize basics of arterial blood gases	4.54	.682	very important
7. Identify signs and symptoms of other body systems	4.45	.501	very important
8. Identify Respiratory disease/ immunosuppressive diseases	4.22	.813	very important
9. Detect immunosuppressive diseases that cause respiratory diseases	4.21	.729	very important
10. Describe mechanical ventilation mechanism	4.10	.699	Important
11. Recognize fungal respiratory infections*	4.06	.886	Important
Skills competencies			
Skills	Mean	SD	Answer
12. Perform appropriate clinical examination	4.90	.308	very important
13. Provide Differential diagnosis	4.82	.575	very important
14. Recognize clinical signs of respiratory diseases	4.78	.517	very important
15. Follow up cases after diagnosis	4.76	.430	very important
16. Interpret radiographic diagnosis	4.72	.623	very important
17. Provide diagnosis of respiratory diseases	4.57	.583	very important
18. Provide care for patients with respiratory diseases	4.67	.533	very important
19. Handle patient's file appropriately	4.52	.725	very important
20. Manage invasive and non-invasive ventilation	4.43	.722	very important
21. Provide Oxygen supply	4.39	.758	very important
22. Provide Arterial blood gas	4.30	.779	very important
23. Manage critical lung cases in the ICU*	4.01	.826	important
24. Manage elderly and children with respiratory diseases*	3.93	.990	important
25. Provide endotracheal intubation*	3.87	.936	important

Continued

Table 1. Continued

Skills competencies			
Skills	Mean	SD	Answer
26. Apply chest drainage*	3.64	1.040	important
27. Take oral and pharyngeal swabs*	3.39	1.205	Neutral
Attitude competencies			
Attitude	Mean	SD	Answer
28. Maintain Continuous learning and studying	4.72	.454	very important
29. Demonstrate commitment to the ethics of the profession	4.72	.454	very important
30. Maintain self-development	4.72	.454	very important
31. Deal with patients with calmness and patience	4.61	.491	very important
32. Deal with patients and accommodate their medical complaints	4.57	.783	very important
33. Deal with fellows respectfully	4.57	.679	very important
34. Deal with nursing staff professionally	4.40	.494	very important
35. communicate with administrative and managerial staff effectively	4.55	.658	very important
36. Develop the required communication skills	4.54	.502	very important
37. Show the ability to gain patient's trust	4.52	.660	very important
38. Respect patient's privacy	4.52	.682	very important
39. Work under pressure	4.49	.504	very important
40. Deal with colleagues with respect	4.48	.503	very important
41. Make a good impression on patients, and colleagues	4.48	.660	very important
42. Update training patiently in his field of specialization	4.46	.804	very important
43. work in a team	4.46	.725	very important
44. Show ability to break bad news effectively	4.40	.889	very important
45. Demonstrate Self-criticism and criticism from others	4.40	.579	very important
46. Show Awareness of personal limitations and seek medical aid from colleagues in controversial cases	4.40	.524	very important
47. Alleviate patient's pain and show empathy	4.39	.650	very important
48. Demonstrate commitment to work during the residency period	4.37	.671	very important
49. Share success with others and appreciate their efforts	4.36	.620	very important
50. Apply scientific evidence in clinical practice	4.33	.683	very important
51. Deal privately with elderly patients, children, vulnerable patients with special needs	4.27	.827	very important

*: Excluded competencies (Mean < 4.21).

SD: Standard deviation.

As shown in Table 2, the final list of essential competencies required from pulmonologists in order to offer the best health care for patients with respiratory diseases including COVID-19 using Delphi technique contained 45 items and were distributed as following: 10 related to cognitive domain, 11 related to skills domain and 24 related to attitude domain.

Discussion and Conclusion

This research was undertaken to identify “Cognitive”, “Skills” and “Attitude” competencies, which are the basis of creating a generation of specialists in Pulmonology with a high level

of competence to meet the needs of patients with pulmonary diseases such as COVID-19 and to take personal and community measures to fight the pandemic. The identification of competencies would be helpful to design integrated training programs of high standards that can recruit more qualified pulmonologists to cover the lack of pulmonologists in most governmental medical institutions (10).

Based on competency –based medical education, several studies have identified the essential competencies required from the health professionals in order to approach patients with COVID-19 (11–14).

Essential clinical skills and training are insufficient and not based on modern medical education. Thus, it is important to improve the quality of education and training and to design a

Table 2. Essential basic competencies required for pulmonologists to face COVID-19

Domain	Competency
Cognitive competencies	1. Identify symptoms and signs of respiratory diseases 2. Recognize respiratory drugs 3. Differentiate between upper / lower respiratory infections 4. Explain treatment modalities for upper / lower respiratory infections 5. Detect Respiratory failure 6. Recognize basics of arterial blood gases 7. Identify signs and symptoms of other body systems 8. Identify Respiratory disease/ immunosuppressive diseases 9. Detect immunosuppressive diseases that cause respiratory diseases 10. Describe mechanical ventilation mechanism
Skills competencies	11. Perform appropriate clinical examination 12. Provide Differential diagnosis 13. Recognize clinical signs of respiratory diseases 14. Follow up cases after diagnosis 15. Interpret radiographic diagnosis 16. Provide diagnosis of respiratory diseases 17. Provide care for patients with respiratory diseases 18. Handle patient's file appropriately 19. Manage invasive and non-invasive ventilation 20. Provide Oxygen supply 21. Provide Arterial blood gas
Attitude competencies	22. Maintain Continuous learning and studying 23. Demonstrate commitment to the ethics of the profession 24. Maintain self-development 25. Deal with patients with calmness and patience 26. Dealing with patients and accommodate their medical complaints 27. Dealing with fellows respectfully 28. Deal with nursing staff professionally 29. communicate with administrative and managerial staff effectively 30. Develop the required communication skills 31. Show the ability to gain patient's trust 32. Respect patient's privacy 33. Work under pressure 34. Deal with colleagues with respect 35. Make a good impression on patients, and colleagues 36. Update training patiently in his field of specialization 37. work in a team 38. Show ability to break bad news effectively 39. Demonstrate Self-criticism and criticism from others 40. Show Awareness of personal limitations and seek medical aid from colleagues in controversial cases 41. Alleviate patient's pain and show empathy 42. Demonstrate commitment to work during the residency period 43. Share success with others and appreciate their efforts 44. Apply scientific evidence in clinical practice 45. Deal privately with elderly patients, children and vulnerable patients with special needs

structured integrated educational and training program capable of bridging educational gaps (15). The Delphi Technique is well-thought-out as one of the most valuable techniques for identifying competencies in medical education (16,17). It has several advantages over other decision-making methods, since it facilitates ownership and increases acceptance of the generated consensus rather than possible bias developed by dominant individuals (18,19).

This study have employed two research methodologies including a focus group method to generate a preliminary list of competencies and the Delphi technique method with 3 cycles to refine and complete the preliminary competency list as recommended by previous studies (20–22). The highest score for the cognitive competencies was the clinical signs and symptoms of respiratory diseases, which emphasizes the need for the pulmonologist to have a broad theoretical knowledge of the basics of chest diseases.

For skill competencies the highest score was for the clinical examination, this can confirm the importance of this competency for a pulmonologist to provide diagnoses of chest diseases, such as COVID-19.

The collected data showed that the continuous learning and studying about respiratory diseases, including COVID-19 were the most important attitude competency, as this competency can increase the knowledge of pulmonologists and enhance their ability to follow up patients during illness, recovery and rehabilitation. The response rate to the survey was 100%, which can indicate that every participant of the surveyed pulmonologists believe in the importance of developing training for residents in pulmonology, as COVID-19 pandemic has shown a significant impact on clinical and theoretical training in the field pulmonology and respiratory infectious diseases.

The participant's perspectives have shown that all of the attitude competencies were very important. Previous work has reported negative attitude towards providing health care to patients with SARS-CoV-2 infection and thoughts it was ethical to refuse care to patients with COVID-19. However, they also indicated that health workers might change their attitude due to improved knowledge about transmission and increasing availability of treatment over time (23).

Researchers addressed the need for protecting health workers by providing services and interventions to enhance physical safety and lower burnout risk (24).

The findings of this study have emphasized the need of equipping pulmonologists with attitude competencies to enable them to provide patients with pulmonology diseases with the best health care.

In conclusion, a list of 45 competencies has been identified. It is hoped that they will guide and enable pulmonologists

to provide the best health care to patients with respiratory infections, especially during the COVID-19 pandemic. It will also guide decision makers to design training programs that can address these competencies.

Acknowledgments

Authors would like to thank all pulmonologists who accepted to take part in this study and all staff in the Police Hospital, Ministry of Interior Affairs, Damascus, Syria for their cooperation. This study is part of MSc dissertation to obtain master degree in Medical Education and is financially supported by Syrian Virtual University.

Authors' contributions

MSH is the principal researcher collected focus group and Delphi technique data. MD supervised the study. ZA participated in writing the manuscript. Both MSH and MD participated in designing the study, data analysis and interpretation, writing the manuscript and revising it before submission. All authors read and approved the final manuscript.

Declarations

Conflicts of Interest

The authors declare no conflict of interest.

Institutional Review Board Statement

The ethical approval was obtained from the ethical committee at the Syrian Virtual University. Informed consent was obtained for focus group participant by social media while survey participant informed consent was confirmed and documented in the electronic questionnaire introduction.

Competing interests

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Data Availability Statement

Data used to support the findings of this study are available from the corresponding author upon request.

Funding

This study is supported by the Syrian Virtual University, Syria.

References

- Ryan MS, Holmboe ES, Chandra S. Competency-Based Medical Education: Considering Its Past, Present, and a Post-COVID-19 Era. *Acad Med*. 2022;97:S90-7. doi:10.1097/ACM.0000000000004535
- Van Melle E, Hall AK, Schumacher DJ, Kinnear B, Gruppen L, Thoma B, et al. Capturing outcomes of competency-based medical education: The call and the challenge. *Med Teach*. 2021;43:794-800. doi:10.1080/0142159X.2021.1925640
- Richardson D, Kinnear B, Hauer KE, Turner TL, Warm EJ, Hall AK, et al. Growth mindset in competency-based medical education. *Med Teach*. 2021;43:751-7. doi:10.1080/0142159X.2021.1928036
- Schumacher DJ, Caretta-Weyer H, Busari J, Carraccio C, Damodaran A, Gruppen LD, et al. Competency-based time-variable training internationally: Ensuring practical next steps in the wake of the COVID-19 pandemic. *Med Teach*. 2021;43:810-6. doi:10.1080/0142159X.2021.1925098
- Reyffman PA, Washko GR, Dransfield MT, Spira A, Han MK, Kalhan R. Defining impaired respiratory health. A paradigm shift for pulmonary medicine. *Am J Respir Crit Care Med*. 2018;198:440-6. doi:10.1164/rccm.201801-0120PP
- Holanda MA. Pulmonology in the 21st century and the mark left by COVID-19. *J Bras Pneumol*. 2022;47. doi:10.36416/1806-3756/e20210499
- Pietersen PI, Konge L, Jørgensen R, Stolz D, Farr A, Laursen CB. Pulmonologists' work and clinical life during the COVID-19 pandemic: a society-led survey. *Breathe*. 2022;18. doi:10.1183/20734735.0001-2022
- Piro R, Casalini E, Livrieri F, Fontana M, Ghidoni G, Taddei S, et al. Interventional pulmonology during COVID-19 pandemic: current evidence and future perspectives. *J Thorac Dis*. 2021;13:2495. doi:10.21037/jtd-20-2192
- Jünger S, Payne SA, Brine J, Radbruch L, Brearley SG. Guidance on Conducting and REporting DElphi Studies (CREDES) in palliative care: Recommendations based on a methodological systematic review. *Palliat Med*. 2017;31:684-706. doi:10.1177/0269216317690685
- Rajhans V, Rege S, Memon U, Shinde A. Adopting a modified Delphi technique for revisiting the curriculum: A useful approach during the COVID-19 pandemic. *Qual Res J*. 2020;20: 4: 373-382. <https://doi.org/10.1108/QRJ-05-2020-0043>
- Dashash M, Almasri B, Takaleh E, Abou Halawah A, Sahyouni A. Educational perspective for the identification of essential competencies required for approaching patients with COVID-19. *East Mediterr Heal J*. 2020;26:1011-7. doi:10.26719/emhj.20.111
- Sklar DP. COVID-19: lessons from the disaster that can improve health professions education. *Acad Med*. 2020; 95(11):1631-1633. doi:10.1097/ACM.0000000000003547
- Lee SH, Noh J-W, Kim Y, Ryoo HW, Park K-H, Park SY, et al. Expert consensus on measures to promote physical and psychological health among COVID-19-related healthcare workers in Korea using Delphi technique. *Infect Chemother*. 2022;54:247-257 doi:10.3947/ic.2021.0137.
- Soriano JB, Murthy S, Marshall JC, Relan P, Diaz J V, Group WHOCCDW. A clinical case definition of post-COVID-19 condition by a Delphi consensus. *Lancet Infect Dis*. 2022;22(4): e102-e107. doi:10.1016/S1473-3099(21)00703-9
- Kalchiem-Dekel O, Schwalk AJ, Patel NM, Lin I-H, Beattie JA, Husta BC, et al. COVID-19 impact on interventional pulmonology training. *ATS Sch*. 2021;2:236-48 doi:10.34197/ats-scholar.2020-0126OC
- Drumm S, Bradley C, Moriarty F. 'More of an art than a science'? The development, design and mechanics of the Delphi Technique. *Res Soc Adm Pharm*. 2022;18:2230-6. doi:10.1016/j.sapharm.2021.06.027
- Harteis C. Delphi-technique as a method for research on professional learning. *Methods Res. Prof. Learn. Dev.*, Springer; 2022, p. 351-71.
- Niederberger M, Köberich S, Network D. Coming to consensus: the Delphi technique. *Eur J Cardiovasc Nurs*. 2021;20(7): 692-695. doi:10.1093/eurjcn/zvab059
- Thangaratnam S, Redman CWE. The delphi technique. *Obstet Gynaecol*. 2005;7:120-5.
- Khiami A, Dashash M. Identification of the role of oral health educators in elementary schools during COVID-19 pandemic: a competency framework. *BMC Res Notes*. 2022;15:1-8. doi:10.1186/s13104-021-05887-z
- Geng Y, Zhao L, Wang Y, Jiang Y, Meng K, Zheng D. Competency model for dentists in China: results of a Delphi study. *PLoS One*. 2018;13:e0194411. doi:10.1371/journal.pone.0194411
- Benzian H, Greenspan JS, Barrow J, Hutter JW, Loomer PM, Stauf N, et al. A competency matrix for global oral health. *J Dent Educ*. 2015;79:353-61.
- Ottolenghi J, McLaren RA Jr, Bahamon C, Dalloul M, McCalla S, Minkoff H. Health Care Workers' Attitudes Toward Patients With COVID-19. *Open Forum Infect Dis*. 2021; 15;8(8):ofab375. doi: 10.1093/ofid/ofab375.
- Janeway D. The Role of Psychiatry in Treating Burnout Among Nurses During the Covid-19 Pandemic. *J Radiol Nurs*. 2020;39(3):176-178. doi:10.1016/j.jradnu.2020.06.004