PERINATAL JOURNAL

Original Article

Perinatal Journal 2026; 34(1):890-898

https://doi.org/10.57239/prn.26.03410091

The knowledge of Indonesian pulmonology residents about respiratory syncytial virus

Fariz Nurwidya[1,2*] Ajeng Tias Endarti[2], Titi Indriyati[2], Angky Budianti[3], Linda Mahardhika[1]

[1]Department of Pulmonology and Respiratory Medicine, Faculty of Medicine, Universitas Indonesia, Jakarta, Indonesia
[2]Faculty of Health, Universitas M.H. Thamrin, Jakarta, Indonesia
[3]Department of Clinical Microbiology, Faculty of Medicine, Universitas Indonesia, Jakarta, Indonesia

Abstract

Respiratory Syncytial Virus (RSV) is one of the viruses that cause acute respiratory symptoms. We aimed to determine the level of knowledge about RSV among pulmonary residents in Indonesia. This is a cross-sectional study that employed an online questionnaire and involved all pulmonary residents in Indonesia. Assessment of knowledge encompasses virological aspects, clinical manifestations, disease severity, and prevention. 282 responded to the questionnaire. Most participants reported the number of acute respiratory patients was 1-10 cases per week, has attended at least one RSV scientific event, had an interest in RSV, had no access to RSV detection, no access to a microbiologist and clinical pathologist. Most of the respondents had sufficient knowledge in terms of virological aspects, clinical manifestations, disease severity, and prevention aspects. Respondent in semester 1-4 had a higher Odds of having good knowledge (OR = 1.3; 95% CI = 1–2.85; p = 0.049). Furthermore, respondent who had previous experience of discussion with a clinical pathologist had a 3.1 times higher chance of good knowledge (OR = 3.1; 95% CI = 1.01–9.6; p = 0.047). It is essential to enhance the RSV diagnosis tools and the interaction between pulmonary residents, microbiologists, and clinical pathologists to increase RSV knowledge and awareness.

Keywords: knowledge, Respiratory sycncytial virus, Resident, Pulmonology

.

Introduction

Infections with the Respiratory Syncytial Virus (RSV) can cause severe medical conditions in the elderly and patients with chronic diseases such as Chronic Obstructive Pulmonary Disease (COPD), asthma, bronchiectasis, coronary heart disease, and diabetes mellitus [1]. RSV infection symptoms are non-specific, mimicking various other viral respiratory infections like influenza, adenovirus, rhinovirus, and SARS-CoV-2 [2].

Given the non-specific symptoms and relatively high incidence of RSV, a comprehensive understanding of symptom identification is required for physicians, including pulmonology residents [3]. A pulmonology resident is a trainee specialist in lung and respiratory medicine undergoing supervised training in university-affiliated hospitals [4,10]. Pulmonology residents are intensely involved in managing patients seeking care in hospitals, both in outpatient clinics and emergency departments [5].

To date, no study has assessed the knowledge level of resident physicians regarding RSV. A systematic review evaluating physician knowledge and behaviour towards RSV prevention found limited knowledge and awareness but noted positive behaviour towards prevention strategies [6]. Another study revealed an average RSV knowledge score of 56%; concerning experience, 57% of physicians rarely or never encountered RSV patients, 40% requested RSV testing, and 63% lacked therapeutic guidelines for confirmed RSV cases [7]. Therefore, this study aims to assess the knowledge level of pulmonology residents in Indonesia regarding RSV infection and its prevention.

Methods

This study employs a cross-sectional survey design utilizing an online questionnaire. The inclusion criteria for participation were active pulmonology and respiratory medicine residents in Indonesia who provided informed consent by signing an electronic participation agreement. The study received ethical approval (Number: 0129/KEPK-RSUPP/06/2025) from the Institutional Review Board (IRB) of Persahabatan Hospital.

Correspondence: : Fariz Nurwidya, Department of Pulmonology and Respiratory Medicine, Faculty of Medicine, Universitas Indonesia, Jakarta, Indonesia, **e-mail:** fariz.nurwidya@ui.ac.id , **Received:** December 3, 2025 **Accepted:** January 13, 2026

Subjects were identified from the student lists of Pulmonology and Respiratory Medicine Study Programs across Indonesia, including Universitas Indonesia (UI), Universitas Airlangga (UA), Universitas Sebelas Maret (UNS), Universitas Brawijaya (UB), Universitas Andalas (Unand), Universitas Sumatera Utara (USU), Universitas Syiah Kuala (USK), Universitas Lampung (Unila), Universitas Riau (Unri), Universitas Udayana (Unud), Universitas Hasanuddin (Unhas), Universitas Lambung Mangkurat (ULM), Universitas Mataram (Unram), and Universitas Islam Negeri Syarif Hidayatullah (UIN-SH).

A structured questionnaire on the Google Doc platform was used to collect data on age, gender, semester, education stage, university of origin, number of acute respiratory infection cases managed, interest in specializing in RSV, number of RSV learning events attended, experience handling confirmed RSV patients, access to RSV testing, and experience in discussion/consultation with microbiology and clinical pathology physicians. The questionnaire also assessed subject knowledge on three aspects: virology (6 questions), transmission rate, clinical manifestation, and disease severity (8 questions), and prevention through vaccination (6 questions). A total of 20 questions in this questionnaire underwent a validity test and a reliability test involving 20 subjects. The results from the Corrected Item-Total Correlation analysis (in Appendix Table S.1) indicated that all questions met the validity criteria. For the reliability test, the Cronbach's Alpha analysis demonstrated that the questions met the reliability criteria (Table S.2). Fifteen or fewer correct answers will be classified as insufficient knowledge, and 16 or more correct answers will be classified as good knowledge.

Table 1. Validity test results of RSV knowledge questionnaire

Aspects	Question	Corrected item-total Correlation	Conclusion
Virology	RSV is a member of virus family: - [ ] Adenoviridae - [ ] Paramyxoviridae - [ ] Picornaviridae - [ ] Coronaviridae	0.618**	Valid
	Genetic structure of RSV is a: - [ ] Double stranded DNA - [ ] Single stranded RNA - [ ] Single stranded DNA - [ ] Double stranded RNA	0.662**	Valid
	RSV surface proteins that play role in infection are: - [ ] Hemagglutinin (HA) and Neuraminidase (NA) - [ ] Protein F (Fusion) and Protein G (Attachment) - [ ] Spike protein (S) - [ ] Protein E1 and E2	0.597**	Valid
	RSV infection can induce imunological response in the form of: - [ ] NK specific anti-RSV - [ ] Interferon alpha anti-RSV - [ ] Imunoglobulin G anti-RSV - [ ] Fibroblast growth factor	0.670**	Valid
Mode of transmition	RSV is not spread through: - [ ] Mosquitto vector - [ ] Direct contact with respiretory secretion - [ ] Cough or sneezing droplets - [ ] Airborne	0.651**	Valid

	Incubation period of RSV ussually: - [ ] 1-5 days - [ ] 5-15 days - [ ] 15-30 days - [ ] >30 days	0.634**	Valid
Clinical manifestation	Most common clinical manifestation of RSV is: - [ ] Diarrhea and vomitting - [ ] Bronchiolitis and pneumonia - [ ] Skin rash - [ ] Hepatitis	0.609**	Valid
	In adult patients, the RSV can mimicking: - [ ] Common cold - [ ] Gastroenteritis - [ ] Urinary tract infection - [ ] Arthritis	0.525**	Valid
	RSV can be detected using: - [ ] Antigen test - [ ] PCR - [ ] Serological test - [ ] All true	0.718**	Valid
	Misconception about RSV is: - [ ] RSV is a disease in baby and children - [ ] RSV can easily be self-limiting diseases in elderly - [ ] RSV is that same with other respiratory viruses - [ ] All true	0.558**	Valid
Severity of disease	Disease severity of RSV is classified according to acute respiratory infection severity, which are: - [ ] Upper and lower respiratory tract infection - [ ] Parenchymal and pleural - [ ] Thorax and extra-thorax - [ ] Local and systemic	0.486**	Valid
	Risk factor of severe RSV indection in adults is: - [ ] Conjunctivitis - [ ] COPD - [ ] Scoliosis - [ ] Pheripheral neuropaty	0.654**	Valid
	Most severe RSV complication is: - [ ] Resepiratory failure - [ ] Anemia - [ ] Uveitis - [ ] Psoriasis	0.572**	Valid
	True statement about RSV infection is: - [ ] RSV reinfection can occur - [ ] RSV could results in risk of mortality in elderly - [ ] The need of ICU in elderly patients with RSV could be higher as compared to influenza virus infection - [ ] All true	0.565**	Valid
Prevention	Mr. Andi is 75 year-old stable COPD who is on his routine concultation at the Respiratory Outpatient Clinic. Patient very rare suffer from	0.468**	Valid

	acute exacerbation within the last 5 minutes and experiencing breathlessness during heavy activities. Patient had been vaccinated with influenza and pneumococcus and asking how he can be protected from RSV infection. The specific prevention that should be offered to Mr. Andi is: - [ ] RSV vaccination. - [ ] Treatment with monoclonal antibody palivizumab - [ ] Profilaxis antibiotic - [ ] Ribavirin inhalation		
	The true statement about RSV vaccination is: - [ ] Could be administered in 50 year-old patient or above. - [ ] It is sufficient to be given only one time without booster. - [ ] Coadministration with influenza vaccine is possible - [ ] All true	0.628**	Valid
	The type of RSV vaccine available in Indonesia currrently is: - [ ] Live-attenuated virus vaccine - [ ] Inactivaed virus vaccine - [ ] mRNA vaccine - [ ] Protein sub-unit vaccine	0.551**	Valid
	One of the reason for eldery should be vaccinated with RSV vaccine is: - [ ] Imunosenence phenomena - [ ] Risk of lymphocytopenia - [ ] Risk of hypersensitivity due to RSV infection - [ ] Risk of having severe disease due to RSV infection	0.579**	Valid
	RSV vaccination should be suggested to the following population: - [ ] First semester of pregnant women - [ ] Teenager - [ ] 60 year-old individuals - [ ] Immunocompetent individuals	0.387**	Valid
	The step to prevent RSV infection in hospital is: - [ ] Washing hand - [ ] Isolation of RSV patient - [ ] Masker usage - [ ] All true	0.550**	Valid

*Significant r < 0.05; ** Significant r < 0.01

Table 2. Reliability Test of RSV knowledge questionnaire

Item number	Cronbanch's Alpha	Conclusion
20	0.924	Reliable

Non-parametric testing will include the bivariate Chi-square test, with Fisher's exact test used for data that do not meet the Chi-square assumption. The difference in means between two groups will be analysed using the t-test for normally distributed data and the Mann-Whitney test for non-normally distributed data. Logistic regression analysis will be employed to identify variables influencing pulmonology residents' knowledge about RSV.

Results

There are 818 pulmonary residents in Indonesia, and 282 completed the questionnaire, resulting in a 35% response rate. Based on the data in Table 1, the majority of the respondents in this study were female, accounting for 55.1%, with male respondents comprising the remainder. The distribution of respondents by education level showed that 45.6% were in semesters 1 to 4, generally categorized as the junior level. By educational stage, the questionnaire was predominantly completed by the senior group, followed by the junior group, and then the chief group, which was relatively smaller. Regarding clinical experience, the average respondent had managed 1–10 cases of acute respiratory tract infection (ARTI) per week. Most respondents had participated in at least one scientific activity concerning RSV. Senior and chief-level respondents tended to have a higher frequency of participation compared to the junior group. Generally, nearly all respondents, both junior and senior, expressed a strong interest in deepening their knowledge of RSV in the future.

Table 3. Subject characteristics

Subject characteristics	Mean/Median	Proportion n (%)
Age (Years)	32(26-40)	
Gender		
- Male		127 (44.9)
- Female		155 (55.1)
Training level		
- Junior		104 (36.8)
- Senior		109 (38.5)
- Chief		69 (24.7)
Semester		
- Semester 1-4		129 (45.6)
- Semester 5-6		83 (29.7)
- Semester 7-8		61 (21.5)
- Semester 9-10		9 (3.2)
Number of cases of acute respiratory infection	10 (0-130)	
- 0 case / week		13 (4.6)
- 1-10 cases / week		130 (46.1)
- 11-20 cases /week		83 (29.4)
- >20 cases / week		56 (19.9)
Number 0f attendance of RSV-related scientific event	1 (0-11)	
Interest of deepening RSV topics		
- Interest		270 (95.8)
- No interest		12 (4.2)
Access to RSV detection tools		
- Yes		64 (22.7)
- No access		218 (77.3)
Experience of treating RSV-confirmed patient		
- Yes		33 (11.7)
- No experience		249 (88.3)
Experience of discussion or consultation with clinical microbiologist		
- Yes		32 (11.3)
- No experience		250 (88.7)
Experience of discussion or consultation with clinical pathologist		
- Yes		21 (7.4)
- No experience		261 (92.6)

The majority of respondents reported having no access to RSV diagnostic facilities at their learning centers. This access varied across universities, with respondents from Universitas Indonesia, Universitas Sumatera Utara, Universitas Andalas, and Universitas Riau generally having access. Only 11.3% of respondents had direct experience managing patients with confirmed RSV. Most respondents reported no experience discussing RSV with either microbiology or clinical pathology physicians.

Overall, the respondents' knowledge level regarding RSV was categorized as good, including aspects of virology and transmission mode (Table 4). However, knowledge about the immune response to RSV infection needs improvement, as 44.3% of respondents did not understand this aspect correctly. In the sub-aspect of transmission, 78% of respondents understood the RSV transmission mechanism, but 27.3% were unaware of the infection's incubation period. Despite these shortcomings, the majority of respondents still possessed adequate understanding of the viral transmission mechanism. A total of 64.9% of respondents had good knowledge regarding clinical symptoms and disease severity. Almost all respondents (97.2%) were aware of the clinical manifestations of RSV infection, and 99.3% could identify symptoms in adult patients. Nevertheless, 28.7% did not understand the examination modalities available for early RSV detection, and 20.2% answered incorrectly on questions intended to identify misconceptions regarding the disease concept. Respondent knowledge concerning RSV prevention was very good, with the majority recognizing that RSV vaccination is an effective preventive method.

Table 4. Respondent level of knowledge

Subject characteristics	Mean/Median	Proportion n (%)
Level of knowledge in the aspect of virology and mode of transmission		
- Good		252 (89.4)
- Insufficient		80 (10.6)
Level of knowledge in the aspect of clinical manifestation and degree of disease		
- Good		183 (64.9)
- Insufficient		99 (35.1)
Level of knowledge in the aspect of prevention		
- Good		272 (96.5)
- Insufficient		10 (3.5)
Level of knowledge of RSV	16 (5-20)	
- Good		175 (62.1)
- Insufficient		107 (37.9)

Of all analyzed characteristics, although none showed a statistically significant association with the RSV knowledge level at an alpha of 0.05, an interesting trend was observed for the variables of female gender, semesters 1-4, and experience discussing with a clinical pathology physician, providing insight for further multivariate analysis (Table 5).

Table 5. The relationship between the level of knowledge about RSV and each respondent's characteristics

Subject characteristics	Mean/Median	RSV knowledge level		Total	p Value	OR
		Good	Insufficient			(95% CI)
Age	32(26-40)[mw]				0.782	
Sex						
- Male		103(66.5)	52(33.5)	155	0.093	1.5 (0.93-1)
- Female		72(56.7)	55(43.3)	127		

Level of Education						
- Chief		45(65.3)	24(34.7)	69		ref
- Senior		69(63.4)	40(36.6)	109	0.795	1(0.57-2.04)
- Junior		61(58.7)	43(41.3)	104	0.386	1.3(0.70-2.48)
Semester level						
- Semesters 7-10		49(71.5)	21(28.5)	70		ref
- Semesters 5-6		53(63.9)	30(36.1)	83	0.422	1.3(0.66-2.61)
- Semesters 1-4		73(56.6)	56(43.4)	129	0.065	1.7(0.96-3.3)
Number of ARI cases per week						
- >20 cases		33(59)	23 (41)	56		ref
- 11-20 cases		54(65.1)	29(34.9)	83	0.464	0.7(0.38-1.54)
- 1-10 cases		80(61.5)	50(38.5)	130	0.738	0.8(0.47-1.78)
- 0 cases		8 (61.6)	5 (38.4)	13	0.863	0.8(0.26-3.11)
Number of attendances at scientific events related to RSV.	1 (0-11)				0.151	
Interest to study more about RSV						
- Interested		168 -62.3	102(37.7)	270	0.786	1.1(0.36-3.8)
- Not interested		7(58.4)	5 (41.6)	12		
Access to RSV testing						
- Had access		38(60)	26(40)	64	0.615	0.8(0.48-1.52)
- Had no access		137(62.9)	81(37.1)	218		

[b]Bivariate Analysis, mw Mann-Whitney,[f] Fischer

Table 5. The relationship between the level of knowledge regarding RSV and each respondent characteristic (continued)[b]

Subject characteristics	Mean/Median	RSV knowledge level	Total		p Value	OR
		Good	Insufficient			(95% CI)
Experience with confirmed RSV patients						
- Had experience		22(66.4)	11(33.3)	33	0.562	1.2(0.58-2.7)
- Had no experience		153(61.5)	96(38.5)	249		
Experience engaging in discussions or consultations with a microbiologist						
- Had experience		22(68.8)	10(31.2)	32	0.408	1.3(0.63-3.11)
- Had no experience		153(61.2)	97(38.8)	250		
Experience engaging in discussions or consultations with a clinical pathologist						
- Had experience		17 (81)	4(19)	21	0.073	2.7(0.96-

						8.4)
- Had no experience		158 (60.6)	103 -39.4	261		
University of origin categorized by regional divisions of Indonesia						
- Western Indonesia		144 (61.1)	92 (38.9)	236		ref
- Central Indonesia		24 (68.6)	11 (31.4)	35	0.391	0.7(0.33-1.53)
- Eastern Indonesia		7(63.7)	4 (36.3)	11	0.861	0.8(0.25-3.14)

Subsequently, a multiple logistic regression analysis was performed on the variables of gender, semester, and previous experience of discussion with a clinical pathology physician (Table 6). The results of the multiple logistic regression analysis, while not crossing the threshold for statistical significance (p = 0.094), showed a trend where females had 1.5 times higher odds of having good knowledge compared to males, with an adjusted OR (CI 95%} = 0.93-2.45). A significant finding was observed for the semester variable. Respondents in semesters 1 to 4 were found to have 1.36 times greater odds of having good knowledge compared to those in higher semesters (aOR = 1.364; 95% CI = 1.001–1.859; p = 0.049). Analysis of the other variable indicated that respondents who had discussed with a clinical pathology physician had 3.1 times greater odds of being knowledgeable about RSV (OR = 3.1; 95% CI = 1.01–9.6; p = 0.047).

Table 6. Multivariate analysis

Subject characteristics	Bivariat			Multivariat		
	OR	95% CI	p Value	aOR	(95% CI)	p Value
Sex						
- Female	1.5	0.93-2.4	0.093	1.5	0.93-2.45	0.094
Semesters						
- Semesters 1-4	1.7	0.96-3.3	0.065	1.3	1-1.85	0.049*
Experience engaging in discussions or consultations with a clinical pathologist						
- Had experience	2.7	0.96-8.4	0.073	3.1	1.01-9.6	0.047*

Discussion

This is the first study in Indonesia to assess the knowledge level of pulmonology and respiratory medicine residents regarding RSV. The recruited subjects are representative of various pulmonology and medicine education centres in Indonesia, and the sample size meets the minimal subject requirement.

We first analysed the influencing factors of RSV knowledge among pulmonary residents in Indonesia. Bivariate analysis showed that female gender, semesters 1-4, and experience discussing with clinical pathology physicians exhibited a trend towards better knowledge, although this did not reach statistical significance. This aligns with international studies; for example, a study in Italy found that knowledge of RSV vaccination in the elderly was associated with age, education, and previous vaccination experience [8], while a Croatian study showed that regional factors, gender, and prior experience using anti-RSV monoclonal antibodies influenced usage behaviour [9].

We then identified the modifiable factors for intervention to improve knowledge. Only semesters 1-4 and experience discussing with clinical pathology physicians were found to be significant modifiable factors; others were not. Potential contributors to these findings include response bias (residents possibly studying literature before filling out the questionnaire) and uneven distribution bias (high participation in some study programs and very low participation in others), both of which could affect the

results.

Ultimately, the findings suggest that the knowledge level of pulmonology residents regarding RSV may be influenced by other factors not included in the study variables, or it may reflect that knowledge is more determined by general learning experience and clinical exposure rather than the individual factors analysed. This highlights the need for more in-depth future studies to pinpoint the true determinant factors shaping resident knowledge related to RSV.

Conclusion

Based on the findings of this study, it can be concluded that the knowledge level regarding virological aspects, clinical features, disease severity, and prevention aspects of RSV is classified as good among pulmonology residents in Indonesia. Factors associated with RSV knowledge level in pulmonology residents include semesters 1-4 and experience discussing with clinical pathology physicians. There is still a need to enhance RSV detection modalities and increase residents' experience in managing confirmed RSV cases to improve both knowledge and vigilance towards RSV among pulmonology residents in Indonesia.

Acknowledgement of authorship

FN designing the study, collecting the data, analyzing the data, writing the manuscript and confirming the accuracy of the data and the analyses. ATE, TI, and AB designing the study, analyzing the data, and confirming the accuracy of the data. LM collecting the data, analyzing the data, and writing the manuscript.

Conflict of interest: None

References

1.Callahan DG, Osman NY, Klig JE, Farrell SE, Stuart JC, Coll MD, et al. Facilitating the transition to residency: A resident-as-coach pilot program. Med Teach 2024;46:849-851. DOI: 10.1080/0142159X.2024.2326115.

2.Shi T, Vennard S, Jasiewicz F, Brogden R, Nair H; RESCEU Investigators. Disease Burden Estimates of Respiratory Syncytial Virus related Acute Respiratory Infections in Adults With Comorbidity: A Systematic Review and Meta-Analysis. J Infect Dis 2022;226:S17-S21. DOI: 10.1093/infdis/jiab040.

3.Puggina A, Marijam A, Cailloux O, Vicentini M, Turriani E, Verelst F, et al. Physician knowledge, attitudes, and perceptions of respiratory syncytial virus in older adults: A cross-sectional survey in Germany and Italy. PLoS One 2025;20:e0330763. DOI: 10.1371/journal.pone.0330763.

4.Zafar MA, Diers T, Schauer DP, Warm EJ. Connecting resident education to patient outcomes: the evolution of a quality improvement curriculum in an internal medicine residency. Acad Med 2014; 89:1341-7. DOI: 10.1097/ACM.0000000000000424.

5.Clements DS, Miser WF. Understanding and Using the ACGME Resident Surveys to Improve Your Residency Program. Ann Fam Med 2021;19:280-281. DOI: 10.1370/afm.2704.

6.Gavaruzzi T, Ceccarelli A, Nanni C, Vignali C, Colonnello V, Caserotti M, et al. Knowledge and Attitudes Regarding Respiratory Syncytial Virus (RSV) Prevention: A Systematic Review. Vaccines (Basel) 2025; 13:159. DOI: 10.3390/vaccines13020159.

7.Ciemins EL, Gillen A, Tallam M. RSV: A vaccine is coming, time to educate providers. Vaccine 2023; 41:4636-4638. DOI: 10.1016/j.vaccine.2023.06.033.

8.Ponticelli D, Losa L, Antonazzo IC, Zampella A, Marino FD, Mottola G, et al. Respiratory Syncytial Virus (RSV) and Intention to Recommend RSV Vaccination: A Cross-Sectional Survey of Cardiologists and Cardiac Nurses in Southern Italy. Infectious Disease Reports 2024; 16:128-141. DOI: 10.3390/idr16010010.

9.Mrcela D, Deng S, Li Y, Jukic I, Markic J. Knowledge, attitudes, and practices of Croatian pediatricians and pediatrics residents about RSV infection. Scientific Reports 2025;15: 15838. DOI: 10.1038/s41598-025-01021-2.

10. Fatima, T., Bilal, A. R., Imran, M. K., & Jam, F. A. (2025). Developing Entrepreneurial Orientation: Comprehensive Skill Development Guide for Software Industry in South Asia. In Entrepreneurship in the Creative Industries (pp. 132-157). Routledge.