

Original Article

Perceptions, Challenges, and Future Directions of Respiratory Care Research in Saudi Arabia: A Cross-Sectional Survey Study

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Abstract

Background: Research engagement among respiratory therapists (RTs) in Saudi Arabia remains understudied. Understanding the factors that facilitate or impede research participation and scholarly publication is essential for developing targeted strategies to strengthen the evidence base in respiratory care. **Objective:** This study aimed to explore respiratory therapists' perceptions, identify challenges and barriers, and examine future directions for advancing respiratory care research in Saudi Arabia. **Methods:** A cross-sectional online survey was administered to licensed RTs practicing across Saudi Arabia. The questionnaire captured demographic characteristics, research engagement history, attitudes toward research, and rankings of eight commonly cited barriers. Two multivariable logistic regression models, adjusted for sex, work experience, degree level, and workplace type, identified independent predictors of (1) research participation and (2) publication among those who had participated. Barrier rankings were compared between publishers and non-publishers using the Mann-Whitney U test. **Results:** A total of 291 RTs completed the survey. Male sex, higher degree level, and shorter work experience were independent predictors of research participation. Among research participants (N = 191), graduating from an international university (OR = 3.81, 95% CI: 1.15–12.61, p = 0.029), and greater work experience (OR = 1.13, 95% CI: 1.00–1.27, p = 0.047), were independent predictors of publication. Lack of skill and knowledge was the major barrier to research overall. **Conclusion:** Research engagement among Saudi RTs is moderate, with a considerable gap between participation and publication. Participation is independently predicted by male sex, higher degree level, and shorter work experience, while publication is independently predicted by international education and greater work experience. Targeted multi-level interventions that address gender equity, postgraduate education, research training, and institutional support are needed to close the participation-publication gap.

Keywords: respiratory therapy; research barriers; publication; evidence-based practice.

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Introduction

Respiratory diseases represent a significant and escalating worldwide health challenge, accounting for approximately four million deaths annually and ranking among the leading causes of morbidity and mortality worldwide (Soriano et al., 2020). Chronic obstructive pulmonary disease (COPD), asthma, pneumonia, tuberculosis, and acute respiratory distress syndrome (ARDS) collectively impose substantial economic burdens and diminish quality of life across all age groups (Ferkol & Schraufnagel, 2014; Soriano et al., 2020). According to the World Health Organization, over one billion individuals are affected by chronic respiratory conditions globally, with low- and middle-income countries experiencing a disproportionate share of this burden owing to ongoing epidemiological transitions (Organization.).

The Kingdom of Saudi Arabia (KSA) has a distinctive epidemiological profile on the Arabian Peninsula, making respiratory health a significant clinical and public health priority. Rapid urbanization, high tobacco use, occupational dust exposure, and unique environmental conditions, including desert dust storms and extreme heat, contribute to elevated rates of both acute and chronic respiratory diseases (Al Ghobain et al., 2012; Deng et al., 2020). National studies indicate that asthma affects 8% to 25% of Saudi adults and children, while COPD is estimated to affect approximately 4.1% of the adult population; both figures are projected to rise with increasing life expectancy and continued tobacco use (Al-Moamary et al., 2019; Khan et al., 2014). Furthermore, the annual influx of millions of pilgrims for Hajj and Umrah poses distinct challenges for controlling infectious respiratory diseases, including the transmission of respiratory viruses and novel coronaviruses such as Middle East Respiratory Syndrome Coronavirus (MERS-CoV) (Hoang et al., 2020).

Respiratory care (RC) as a healthcare profession has evolved significantly since its origins in Saudi Arabia in the mid-1970s, when the first RC services were established at King Faisal Specialist Hospital and Research Center in Riyadh. Formal professional recognition by the national regulatory body followed in the early 2000s. The scope of respiratory care encompasses a broad range of clinical services, including diagnostic pulmonary function testing, therapeutic bronchoscopy, mechanical ventilation management, cardiopulmonary rehabilitation, and neonatal respiratory support (Al-Otaibi & AlAhmari, 2016). In Saudi Arabia, the profession is regulated by the Saudi Commission for Health Specialties (SCFHS), and respiratory therapists serve as integral members of multidisciplinary intensive care and pulmonary medicine teams (Al-Otaibi, 2024). Despite these advances, the profession continues to face persistent challenges related to workforce capacity, scope-of-practice recognition, and the integration of evidence-based protocols into routine clinical care (Almeshari et al., 2022).

Scientific research underpins advances in clinical practice, improvements in patient outcomes, and the development of health policy. Globally, respiratory care research has expanded substantially, with significant contributions from North America, Europe, and Australia shaping evidence-based guidelines for invasive and non-invasive ventilation, airway clearance, and pulmonary rehabilitation (Hess, 2021). However, research output from the Middle East and North Africa (MENA) region remains limited. A bibliometric analysis of MERS-CoV publications from 2012 to 2022 found that Saudi Arabia was among the most productive countries, and Saudi institutions were prominent contributors, with the Saudi Ministry of Health accounting for 7.53% and King Saud bin Abdulaziz University for Health Sciences for 6.92% of publications. The authors also reported that the

most prolific researchers were from Saudi Arabia (Alkan & Gürbüz, 2023). This disparity raises important questions about the extent to which clinical decisions in Saudi Arabia are informed by locally generated evidence rather than by international data that may not adequately reflect the environmental, genetic, and sociocultural determinants of respiratory disease in this population (Rabe & Watz, 2017).

Multiple systemic barriers impede research engagement among respiratory care practitioners in Saudi Arabia and across the broader MENA region. These include inadequate research training in undergraduate and postgraduate curricula, limited access to dedicated research funding for allied health professions, heavy clinical workloads that restrict protected research time, and insufficient mentorship from experienced investigators (Alqahtani et al., 2025). Healthcare practitioners in Saudi Arabia have also reported methodological and structural obstacles to clinical research, including difficulties with statistical analysis, limited access to research infrastructure, and inadequate institutional support (Al-Dorzi et al., 2013). Studies conducted at tertiary care institutions in the Kingdom have shown that although most clinical staff express interest in conducting research, barriers such as a lack of protected time, financial compensation, and institutional encouragement remain significant impediments to active scholarly participation (Al-Dorzi et al., 2013).

The Saudi Vision 2030 reform agenda has catalyzed a significant transformation of the Kingdom's healthcare landscape. A central pillar of this vision is to establish Saudi Arabia as a regional hub for medical research and innovation, supported by substantial investments in academic medical centers, research infrastructure, and research-active healthcare institutions (Saudi Vision 2030). The National Transformation Program and the Health

Sector Transformation Program have both identified research capacity building as a strategic priority, creating an unprecedented policy environment that may facilitate the growth of respiratory care research (Ministry of Health, 2020). Nevertheless, translating this national ambition into concrete improvements in allied health research productivity requires a deeper understanding of current practitioner perceptions, institutional enablers, and structural barriers (Almalki et al., 2011; Alqahtani et al., 2025).

Despite the recognized importance of locally generated evidence and the evolving policy context, few studies have examined the perceptions of respiratory care professionals in Saudi Arabia regarding research, the challenges they face in conducting and disseminating scholarly work, and their vision for the discipline's future. Understanding these dimensions is essential for designing targeted interventions, including capacity-building programs, dedicated funding mechanisms, and inter-institutional research networks that can meaningfully advance respiratory care science in the Kingdom (Grol & Grimshaw, 2003; Steinwachs & Hughes, 2008). Therefore, this study aimed to explore the perceptions, challenges, and future directions of respiratory care research in Saudi Arabia through a structured survey of respiratory therapists practicing across multiple regions of the Kingdom.

Materials and Methods

Study Design and Setting

A cross-sectional survey was conducted among licensed respiratory therapists currently practicing in Saudi Arabia. The survey was distributed electronically via professional networks and institutional channels using Google Forms from January 10, 2025, to December 31, 2025.

Participants and Sampling

Eligible participants were licensed RTs currently practicing in Saudi Arabia. Participants were recruited through convenience sampling, and survey invitations were shared via social media and professional networks. Participation was voluntary and anonymous. Before enrollment, individuals provided informed consent by responding affirmatively to a mandatory gateway question. To maintain data integrity, the survey platform restricted multiple submissions, allowing each participant to complete the survey only once. Students and interns were excluded from participation.

Survey Instrument

The survey instrument was developed in accordance with the study objectives and the existing literature on research barriers in allied health. A panel of expert respiratory therapists developed the questionnaire, which was then assessed for face and content validity by independent experts and pilot-tested. Based on expert feedback, necessary modifications were made before full distribution. The final instrument comprised sections on demographic characteristics, research engagement history, attitudes toward research, and a ranking exercise for eight barriers to research participation. Barriers were ranked from 1 (most significant) to 8 (least significant).

Ethical Considerations

Ethical approval for this study was obtained from the Institutional Review Board at King Saud University (KSU-IRB) prior to the commencement of the study. The ethical approval was granted under IRB Approval No. E-24-8437 with reference number 24/0968/IRB, dated 09 January 2025.

Statistical Analysis

Descriptive statistics summarized demographic and

research engagement data. Two multivariable logistic regression models were created: (1) predictors of ever participating in research (N = 291), and (2) predictors of ever publishing, limited to research participants (N = 191). Both models controlled for covariates: international university graduation (binary), sex (binary), highest academic degree (ordinal), years of work experience (numeric), and workplace type (binary). Barrier rankings between publishers and non-publishers were compared using Mann-Whitney U test. Significance was $p < 0.05$. All analyses were performed using STATA.

Results

Participant Characteristics

A total of 291 RTs completed the survey. The sample was predominantly female (n = 154, 52.9%), Saudi nationals (n = 282, 96.9%), and holders of a bachelor's degree (n = 216, 74.2%). The majority of respondents had 0–5 years of work experience (n = 197, 67.7%), and approximately 26.5% (n = 77) had graduated from an international university.

Research Engagement

Overall, 65.6% of respondents (n = 191) reported having participated in at least one research project, and 50.9% (n = 148) had published at least one paper. Regarding conditional willingness, 67.7% indicated they would pursue research if barriers were eliminated, and 54.3% stated they would engage if dedicated time were provided. Full details are presented in Table 1.

Table 1. Research engagement indicators among respiratory therapists in Saudi Arabia (N = 291).

Research Engagement Indicator	n	%
A. Actual Research and Publication Participation		
Participated in at least one	191	65.6

research project		
Published at least one paper (overall sample)	148	50.9
B. Willingness to Engage in Research Under Enabling Conditions		
Would pursue research if all barriers were eliminated	197	67.7
Would engage in research if dedicated time were provided	158	54.3

Note. Percentages are calculated relative to the total sample (N = 291), except for publication rates among research participants, which are calculated relative to those who participated (n = 191).

Predictors of Research Participation and Publication

Results from adjusted logistic regression models are presented in Table 2. In Model 1 (N = 291), three variables were independently associated with research participation. Male sex was a significant predictor (adjusted OR = 1.72, 95% CI: 1.02–2.92, p = 0.044), indicating that male RTs had approximately 72% higher odds of participating in research than female colleagues after full adjustment. Higher degree level was also independently associated with participation (adjusted OR = 1.80, 95% CI: 1.09–2.98, p = 0.022), suggesting that each step increase in academic qualification was associated with approximately 80% higher odds of research

engagement. Work experience showed a significant inverse association (adjusted OR = 0.93, 95% CI: 0.88–0.98, p = 0.011 per additional year), indicating that more recently trained practitioners were more likely to have participated in research. International graduation was positively associated but did not reach statistical significance (adjusted OR = 1.55, 95% CI: 0.73–3.29, p = 0.250). Governmental workplace was not significantly associated with participation (adjusted OR = 0.95, p = 0.886).

In Model 2 (N = 191), restricted to the research participants, two independent predictors of publication were identified. Graduating from an international university demonstrated a strong and significant association with publication (adjusted OR = 3.81, 95% CI: 1.15–12.61, p = 0.029), indicating that internationally trained RTs had nearly four times the odds of publication compared with those trained domestically, after full adjustment. Work experience showed a significant positive association in this model (adjusted OR = 1.13, 95% CI: 1.00–1.27, p = 0.047 per additional year), suggesting that among those who participated in research, greater experience was associated with higher publication odds. Male sex, degree level, and governmental workplace were not significant predictors of publication in the adjusted model.

Table 2. Adjusted logistic regression models predicting research participation and publication among respiratory therapists in Saudi Arabia.

Predictor	OR	95% CI	p-value	Sig.
Model 1 Predictors of Research Participation (N = 291, Adjusted Binary Logistic Regression)				
International Graduate	1.55	0.73 – 3.29	0.250	ns
Male Sex	1.72	1.02 – 2.92	0.044	*
Degree Level	1.80	1.09 – 2.98	0.022	*
Work Experience	0.93	0.88 – 0.98	0.011	*
Governmental Workplace	0.95	0.47 – 1.90	0.886	ns
Model 2 Predictors of Publication Among Research Participants (N = 191, Adjusted Binary Logistic Regression)				

Predictor	OR	95% CI	p-value	Sig.
International Graduate	3.81	1.15 – 12.61	0.029	*
Male Sex	1.36	0.65 – 2.86	0.418	ns
Degree Level	1.10	0.52 – 2.33	0.808	ns
Work Experience	1.13	1.00 – 1.27	0.047	*
Governmental Workplace	0.46	0.17 – 1.28	0.136	ns

Note. OR = odds ratio; CI = confidence interval; ns = not significant. * $p < 0.05$. Bold values denote statistically significant predictors. Governmental Workplace was coded as 1 (governmental hospital or academic institution) vs. 0 (private hospital). Work Experience is expressed as continuous numeric midpoints of ordinal categories.

Barriers to Research Participation

Respondents ranked eight barriers to research on a scale of 1 (most significant) to 8 (least significant). Overall, lack of skill and knowledge was ranked as the most significant barrier (mean rank = 3.60), followed by lack of interest (3.69), lack of access to resources and guidance (3.76), and personal commitments (3.79). Lack of peer support was ranked least significant (mean rank = 3.90). The full barrier rankings are presented in Table 3.

When comparing publishers and non-publishers among research participants, no barrier difference reached statistical significance (all $p > 0.05$). However, directional trends were noted: non-publishers ranked lack of incentive (mean rank 3.19 vs. 3.82, $p = 0.16$) and lack of interest (3.29 vs. 3.74, $p = 0.22$) as more significant barriers compared with those who had published, suggesting that motivational and reward-related factors may play a role in determining whether participation translates into scholarly output.

Table 3. Ranked barriers to research participation among respiratory therapists, comparing publishers and non-publishers.

Barrier	Overall Mean Rank	Publishers Mean Rank	Non-Publishers Mean Rank
Lack of skill and knowledge	3.60		
Lack of interest	3.69	3.74	3.29
Lack of access to resources/guidance	3.76		
Personal commitments	3.79		
Lack of incentive	3.81	3.82	3.19
Lack of time	3.87		
Lack of recognition	3.88		
Lack of peer support	3.90		

Note. Barriers were ranked from 1 (most significant) to 8 (least significant); lower mean ranks indicate greater perceived significance. Publisher/non-publisher subgroup comparisons are shown only where directional differences were observed (all $p > 0.05$, Mann-Whitney U test).

Discussion

This national cross-sectional survey provides an

informative snapshot of self-reported research engagement among respiratory therapists in Saudi Arabia. The proportion of respondents reporting prior research participation was substantial, and the distinction between participation and publication is among the study's most useful findings. However, these results should be interpreted cautiously because the survey relied on convenience sampling and self-report, and more research-engaged clinicians may have been more likely to respond. This caution is important because contemporary Saudi RT literature still documents major constraints in research capacity, evidence-based practice uptake, and guideline implementation. Accordingly, the findings are better interpreted as evidence of meaningful interest and involvement within a still-constrained professional research environment, rather than as proof of a uniformly mature national research culture (Alahmadi et al., 2026; Alobaidi et al., 2025; Alqahtani et al., 2025).

Predictors of Research Participation: Sex, Degree Level, and Work Experience

The pattern of predictors suggests that entering research and converting research into a publication are distinct processes. In the adjusted model, male sex and higher academic degree level predicted participation, whereas publication among those who had participated was more strongly associated with international graduation and greater work experience. Male sex predicted participation but not publication, which may indicate that any sex-based differences operate more strongly at the stage of access to research opportunities than at the stage of dissemination. However, this mechanism was not measured directly. Within the available Saudi literature, the closest relevant qualitative evidence comes from female medical students rather than practicing RTs; therefore, it should be used as indirect contextual support rather than as direct evidence explaining the current RT finding (Wilson et

al., 2023).

The degree-level finding should also be interpreted within the Saudi respiratory care education context. A higher degree level likely reflects greater exposure to research methods, critical appraisal, academic writing, and scholarly expectations. However, national evidence indicates that postgraduate respiratory care pathways remain underdeveloped in Saudi Arabia. A national survey of respiratory care program directors reported no postgraduate respiratory care degrees among responding institutions, while a separate national needs assessment involving multiple stakeholder groups found strong support for establishing master's-level respiratory care programs to meet professional, service, and research needs (Almeshari et al., 2022; Alqahtani et al., 2022). This supports the view that expanding postgraduate pathways is not only an educational priority but also a mechanism for building sustainable research capacity.

Shorter work experience was associated with research participation, whereas greater work experience was associated with publication among participants. This bidirectional pattern suggests that early-career RTs may be more likely to enter research, possibly because of more recent curricular exposure or stronger early-career interest, while experienced clinicians may be better positioned to complete manuscripts, navigate authorship, respond to peer review, and use professional networks to disseminate findings. Because the present survey did not directly measure mentorship, protected research time, authorship opportunities, academic-writing support, or departmental research culture, this interpretation should remain cautious and hypothesis-generating.

International Education as a Predictor of Publication

Among research participants, graduating from an

international university was the strongest measured predictor of publication, although the wide confidence interval indicates imprecision. It is plausible that internationally trained RTs had greater exposure to research-active environments, structured supervision, publication expectations, and academic-writing support. This interpretation aligns with the documented limitations of the domestic postgraduate respiratory care pipeline (Almeshari et al., 2022; Alqahtani et al., 2022). Nevertheless, the study did not directly measure language proficiency, mentorship quality, publication training, or institutional research culture; therefore, these pathways should be presented as plausible mechanisms rather than as confirmed causal explanations.

Work Experience as a Predictor of Publication

The positive association between work experience and publication among those who had participated in research may reflect the cumulative advantages that develop with seniority, including stronger clinical credibility, better access to collaborators, more familiarity with institutional processes, and greater confidence in manuscript development. Similar patterns have been reported in postgraduate medical education, where publication productivity is often associated with seniority and accumulated research experience (Bakhshi et al., 2023; Grol & Grimshaw, 2003). Even so, the estimate in the present study was borderline, and the association may partly reflect unmeasured institutional support rather than experience alone.

Barriers to Research: Skill Deficits and Motivational Factors

The barrier analysis is strengthened by recent Saudi RT-specific evidence. In the present survey, lack of skills and knowledge ranked as the most important perceived barrier, followed by lack of interest, limited

access to resources and guidance, and personal commitments. This pattern should not be interpreted as showing that the problem is purely educational or 'not motivational'. Rather, research competency, motivation, resources, time, and incentives appear to interact. A 2025 Saudi RT study identified insufficient institutional resources, time constraints, and lack of incentives and recognition as major research barriers (Alqahtani et al., 2025). Similarly, a 2026 national study of evidence-based practice among Saudi RTs found positive attitudes toward EBP, but only moderate awareness of core evidence concepts and persistent barriers related to access to resources, insufficient research knowledge and skills, and lack of interest (Alahmadi et al., 2026).

The same skills-to-implementation gap is evident in clinical guideline uptake. A 2025 national survey of Saudi RTs found limited knowledge of and adherence to updated GOLD COPD guidance, with barriers including inadequate educational resources and insufficient time for professional development (Alobaidi et al., 2025). These findings support a broader interpretation of the current study: strengthening respiratory care research in Saudi Arabia requires more than motivating individual clinicians. It requires structured research training, protected scholarly time, access to statistical and methodological support, mentorship, and institutional recognition of research outputs.

These findings should also be interpreted at the health-system level. Saudi workforce and education studies indicate uneven distribution of RT services, staffing and training challenges, and limited postgraduate respiratory care pathways (Al-Otaibi, 2024; Almeshari et al., 2022; Alqahtani et al., 2022). At the same time, the national health-research systems literature shows that Saudi Arabia is actively developing research governance and cluster-level research capacity, although maturity varies across clusters. Further support for governance, funding,

researcher development, and knowledge translation remains needed (Alfawaz et al., 2022). Respiratory care research therefore fits naturally within national priorities related to workforce development, service delivery, clinical quality, and evidence implementation. A practical response should include protected research time, postgraduate pathway development, writing and methods support, multicenter collaboration, and closer alignment between RT-led research and national guideline implementation and audit agendas.

Limitations

Several limitations should be considered when interpreting these findings. The cross-sectional design precludes causal inference, and reliance on self-reported data introduces the possibility of recall and social desirability bias. Convenience recruitment through professional and social channels may have preferentially attracted RTs already interested in research, thereby inflating participation and publication estimates. Publication was not independently verified and was not categorized by output type, indexing status, authorship position, journal quality, publication count, or recency. Important explanatory variables, including protected time, workload, prior formal research training, mentorship availability, academic-writing support, departmental expectations, and burnout, were not measured, despite their relevance to Saudi clinical research and RT-specific barrier literature (Al-Dorzi et al., 2013; Alqahtani et al., 2025). Despite these limitations, the study remains valuable because national RT-specific data on research engagement are still limited, and the findings identify actionable targets for respiratory care education, institutional policy, and future multicenter research.

Conclusion

Research engagement among Saudi respiratory therapists is moderate, with a meaningful gap between participation and publication. The predictors of participation and publication are distinct: male sex, higher degree level, and shorter work experience independently predict research participation, while international education and greater work experience independently predict publication among those who participate. This bidirectional pattern of work experience, inversely associated with participation but positively associated with publication, suggests that barriers to participation and barriers to dissemination require separate, targeted responses. Effective interventions must address gender equity in research access, strengthen research methodology training at all degree levels, preserve early-career research momentum through institutional support, and invest in the mentorship and academic writing infrastructure needed to convert research participation into published scholarship. Together, these efforts are essential to building a locally relevant evidence base for respiratory care practice in Saudi Arabia.

Author Contributions

Abdulrhman S. Alghamdi contributed to the study conception and design, material preparation, data collection and analysis.

Ethical Approval and Patient Consent

Ethical approval was obtained from the Institutional Review Board at King Saud University prior to the commencement of the study (IRB Approval No. E-24-8437). This research carried on human data in compliance with Declaration of Helsinki (2010).

Data Availability Statement

The datasets used and/or analyzed during the current study are available from the corresponding author on reasonable request.

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Conflicts of Interest

The authors declare no potential conflicts of interest in this study.

Declaration of generative AI and AI-assisted technologies

The author utilized AI tools to enhance the language quality and address any grammatical issues while preparing the manuscript. Following the use of this tool, the author carefully reviewed and edited the content as necessary and assumes full responsibility for the accuracy and integrity of the published work.

Reference

- Al Ghobain, M. O., Al-Hajjaj, M. S., & Al Moamary, M. S. (2012). Asthma prevalence among 16- to 18-year-old adolescents in Saudi Arabia using the ISAAC questionnaire. *BMC Public Health*, 12(1), 239. <https://doi.org/10.1186/1471-2458-12-239>
- Al-Dorzi, H. M., Naidu, B., Khokhar, S., White, D., & Arabi, Y. M. (2013). Research experience, interest and perceived barriers of clinical staff working at the Intensive Care Department of a tertiary care academic hospital in Saudi Arabia. *Middle East J Anaesthesiol*, 22(3), 301-307.
- Al-Moamary, M. S., Alhaider, S. A., Alangari, A. A., Al Ghobain, M. O., Zeitouni, M. O., Idrees, M. M., Alanazi, A. F., Al-Harbi, A. S., Yousef, A. A., Alorainy, H. S., & Al-Hajjaj, M. S. (2019). The Saudi Initiative for Asthma - 2019 Update: Guidelines for the diagnosis and management of asthma in adults and children. *Ann Thorac Med*, 14(1), 3-48. https://doi.org/10.4103/atm.ATM_327_18
- Al-Otaibi, H. M. (2024). Characteristics and distribution of respiratory therapy practitioners in Saudi Arabia: national cross-sectional results. *Human Resources for Health*, 22(1), 80. <https://doi.org/10.1186/s12960-024-00961-6>
- Al-Otaibi, H. M., & AlAhmari, M. D. (2016). The respiratory care profession in Saudi Arabia: Past and present. *Ann Thorac Med*, 11(4), 237-242. <https://doi.org/10.4103/1817-1737.191872>
- Alahmadi, F. H., Alasmari, A. M., Philip, K. E. J., Alshehri, Z., Aljohani, M., Aljohani, M. K., Hawsawi, A. M., Alsulayyim, A. S., Alyami, R. A., Alzahrani, Y. A., Alquaimi, M. M., Almeshari, M. A., Alnakhli, B., Alobaidi, N. Y., & Alzahrani, A. A. (2026). Implementation of Evidence-Based Practice Among Respiratory Therapists in Saudi Arabia: A Cross-Sectional Study. *Healthcare (Basel)*, 14(3). <https://doi.org/10.3390/healthcare14030324>
- Alfawaz, A. A., Salman, K. A., Alotaibi, F. H., Almogbel, F. S., Al-Jaroudi, D., Alrowily, M. J., Derkaoui, A. B., Alqahtani, A. S., Fadlallah, R., Jamal, D., El-Jardali, F., & Memish, Z. A. (2022). Baseline Assessment of Health Research Systems in Saudi Arabia: Harnessing Efforts and Mobilizing Actions. *J Epidemiol Glob Health*, 12(4), 400-412. <https://doi.org/10.1007/s44197-022-00058-0>
- Alkan, S., & Gürbüz, E. (2023). Bibliometric Analysis of the Publications on Middle East Respiratory Syndrome Coronavirus Published Between 2012-2022. *Infect Dis Clin Microbiol*, 5(3), 221-230. <https://doi.org/10.36519/idcm.2023.244>
- Almalki, M., Fitzgerald, G., & Clark, M. (2011). Health care system in Saudi Arabia: an overview. *East Mediterr Health J*, 17(10), 784-793. <https://doi.org/10.26719/2011.17.10.784>
- Almeshari, M. A., Alshehri, Z., Alqahtani, J. S., Alasmari, A. M., Alzahrani, A. A., Alahmadi, F. H., Alsulayyim, A. S., Alenezi, F. K., & Alwadeai, K. S. (2022). The Status of Respiratory Care Education in Saudi Arabia: A National Survey of Program Directors. *Adv Med Educ Pract*, 13, 619-628. <https://doi.org/10.2147/amep.S360658>
- Alobaidi, N. Y., Aldhahir, A. M., Alasimi, A. H., Almeshari, M. A., Altoraibili, A., Al-Abdulsalam, A., Almoraihel, A.,

- Alabbad, T., Alanazi, E., Siraj, R. A., & Alqahtani, J. S. (2025). Awareness and barriers of adherence to chronic obstructive pulmonary disease guidelines among respiratory therapists. *Ann Thorac Med*, 20(2), 108-116. https://doi.org/10.4103/atm.atm_227_24
- Alqahtani, J. S., AlAhmari, M. D., Al-Otaibi, H. M., AlRabeeah, S. M., Al Khathlan, N. A., Aldhahir, A. M., Alqahtani, A. S., Alwadeai, K. S., Algarni, S. S., Siraj, R. A., Alqarni, A. A., Almeshari, M. A., Alghamdi, S. M., AlTaweel, M., Alnasser, M., Sreedharan, J. K., Almojaibel, A. A., Alahmari, M., Aldabayan, Y. S.,...Alzahrani, E. M. (2022). Needs Assessment for the Establishment of Master's Degree Programs in Respiratory Care in the Kingdom of Saudi Arabia. *Adv Med Educ Pract*, 13, 1113-1121. <https://doi.org/10.2147/amep.S377559>
- Alqahtani, M. M., Aljohani, H., Algarni, S. S., Alqahtani, M. K., Ismaeil, T. T., Alotaibi, M. F., Al Enazi, F. H., Alanazi, T. M., & Al Nufaiei, Z. F. (2025). Why Saudi Respiratory Therapists Struggle with Research: An Evidence-Based Analysis. *Adv Med Educ Pract*, 16, 1259-1267. <https://doi.org/10.2147/amep.S520760>
- Bakhshi, S. K., Mahmood, S. B. Z., Noorali, A. A., Haider, A. H., Lakhdar, M. P. A., Merchant, A. A. H., Abdul Rahim, K., Afzal, N., Qadeer Shaikh, N., & Tariq, M. (2023). Barriers to research productivity amongst postgraduate trainees: results from a survey of 333 medical and surgical residents. *Postgraduate Medical Journal*, 99(1177), 1182-1188. <https://doi.org/10.1093/postmj/qgad062>
- Deng, S. Z., Jalaludin, B. B., Antó, J. M., Hess, J. J., & Huang, C. R. (2020). Climate change, air pollution, and allergic respiratory diseases: a call to action for health professionals. *Chin Med J (Engl)*, 133(13), 1552-1560. <https://doi.org/10.1097/cm9.0000000000000861>
- Ferkol, T., & Schraufnagel, D. (2014). The global burden of respiratory disease. *Ann Am Thorac Soc*, 11(3), 404-406. <https://doi.org/10.1513/AnnalsATS.201311-405PS>
- Grol, R., & Grimshaw, J. (2003). From best evidence to best practice: effective implementation of change in patients' care. *Lancet*, 362(9391), 1225-1230. [https://doi.org/10.1016/s0140-6736\(03\)14546-1](https://doi.org/10.1016/s0140-6736(03)14546-1)
- Hess, D. R. (2021). Evidence-Based Respiratory Care. *Respir Care*, 66(7), 1105-1119. <https://doi.org/10.4187/respcare.08950>
- Hoang, V. T., Gautret, P., Memish, Z. A., & Al-Tawfiq, J. A. (2020). Hajj and Umrah Mass Gatherings and COVID-19 Infection. *Curr Trop Med Rep*, 7(4), 133-140. <https://doi.org/10.1007/s40475-020-00218-x>
- Khan, J. H., Lababidi, H. M. S., Al-Moamary, M. S., Zeitouni, M. O., Al-Jahdali, H. H., Al-Amoudi, O. S., Wali, S. O., Idrees, M. M., Al-Shimemri, A. A., Al Ghobain, M. O., Alorainy, H. S., & Al-Hajjaj, M. S. (2014). The Saudi Guidelines for the Diagnosis and Management of COPD. *Annals of Thoracic Medicine*, 9(2).
- Ministry of Health, S. A. (2020). Health Sector Transformation Program. <https://www.vision2030.gov.sa/en/explore/programs/health-sector-transformation-program>
- Organization., W. H. Chronic respiratory diseases. Available at: https://www.who.int/health-topics/chronic-respiratory-diseases#tab=tab_1
- Rabe, K. F., & Watz, H. (2017). Chronic obstructive pulmonary disease. *The Lancet*, 389(10082), 1931-1940. [https://doi.org/10.1016/S0140-6736\(17\)31222-9](https://doi.org/10.1016/S0140-6736(17)31222-9)
- Saudi Vision 2030. Saudi Vision 2030. <https://www.vision2030.gov.sa/> Accessed March 2025.
- Soriano, J. B., Kendrick, P. J., Paulson, K. R., Gupta, V., Abrams, E. M., Adedoyin, R. A., Adhikari, T. B., Advani, S. M., Agrawal, A., Ahmadian, E., Alahdab, F., Aljunid, S. M., Altirkawi, K. A., Alvis-Guzman, N., Anber, et al (2020). Prevalence and attributable health burden of chronic respiratory diseases, 1990-2017: a systematic analysis for the Global Burden of Disease Study 2017. *The Lancet Respiratory Medicine*, 8(6), 585-596. [https://doi.org/10.1016/S2213-2600\(20\)30105-3](https://doi.org/10.1016/S2213-2600(20)30105-3)
- Steinwachs, D. M., & Hughes, R. G. (2008). Health Services Research: Scope and Significance. In R. G. Hughes (Ed.), *Patient Safety and Quality: An Evidence-Based Handbook for Nurses*. Agency for Healthcare Research and Quality (US).
- Wilson, E., Elmokattaf, R., Aljumaa, R., Almasri, G., Altayeb, M. T., & Sajid, M. (2023). Exploring the Challenges and Opportunities for Female Medical Students Engaged in Research in Saudi Arabia: A Qualitative Study. *Cureus*, 15(8), e43607. <https://doi.org/10.7759/cureus.43607>