International Journal of Research in Medical Sciences
Ghafoor S et al. Int J Res Med Sci. 2026 Feb;14(2):427-432
www.msjonline.org
pISSN 2320-6071 | eISSN 2320-6012

DOI: https://dx.doi.org/10.18203/2320-6012.ijrms20260223

Original Research Article

Young paediatricians on the frontline: awareness of neonatal stabilization in congenital diaphragmatic hernia prior to surgical referral

Saima Ghafoor[1], Khowla Rabbani[2], Maryam Ghaffar[1], Shabana Tehreem[1], Waqas Ali[1], Fahad Iqbal[1], Muhammad Zaeem Khalid[2]*

[1]Shalamar Hospital, Lahore, Pakistan
[2]Shaikh Zayed Hospital, Lahore, Pakistan

Received: 02 November 2025
Revised: 11 December 2025
Accepted: 02 January 2026

***Correspondence:**
Dr. Muhammad Zaeem Khalid,
E-mail: m.zaeemkhalid@gmail.com

ABSTRACT

Background: In congenital diaphragmatic hernia (CDH), survival and morbidity hinge on meticulous cardiopulmonary stabilization during the minutes to hours after birth often led by young paediatricians. Core elements include no bag-mask ventilation, early endotracheal intubation, orogastric decompression, titrated oxygen to preductal saturation milestones, gentle ventilation with permissive hypercapnia, hemodynamic optimization for PPHN, transport readiness and deferral of surgical repair until physiologic stability. Objective: To evaluate young paediatricians' knowledge and practices in early CDH stabilization, quantify guideline fidelity, identify gaps (including beliefs about early surgery) and determine educational/system factors associated with high performance.
Methods: Multi-centre cross-sectional survey of junior paediatricians across labour wards, EDs and NICUs. A validated 48-item tool generated a stabilization fidelity score (SFS, 0–20). Multivariable models assessed associations between training exposures and high SFS (≥16/20).
Results: Among 312 respondents (mean age 28.4 years; 62% female, 61% tertiary centres), recent NRP was 68%, NICU ≥6 months 54%, CDH simulation 41%. Mean SFS was 13.8±3.4, 29.5% achieved ≥16/20. Strengths: intubation priority (84%), OG decompression (79%), transport checklists (74%). Gaps: avoidance of bag-mask ventilation (58%), correct preductal SpO_2 targets (46%), permissive hypercapnia (39%), stepwise PPHN management (41%). Notably, 35% believed earlier repair helps even when unstable; 18% were unsure. NRP, NICU time, simulation and unit checklists independently increased odds of high SFS.
Conclusions: Young paediatricians execute procedures well but often miss numeric targets and algorithmic PPHN therapy; misconceptions about early surgery persist. Low-cost levers checklists, simulation that drills the numbers, NRP reinforcement and explicit myth-busting ("stabilize first, repair later") can raise fidelity and pre-operative readiness.

Keywords: Congenital diaphragmatic hernia, Neonatal stabilization, Gentle ventilation, Persistent pulmonary hypertension of the new born (PPHN), Timing of surgery

INTRODUCTION

CDH, affecting roughly 1 in 2,500–3,500 live births, arises from a failure of diaphragmatic formation most commonly a posterolateral (Bochdalek) defect allowing abdominal viscera to herniate into the thorax and impede normal lung growth.[1-4] The cardinal pathophysiology combines pulmonary hypoplasia with maldevelopment and hyperreactivity of the pulmonary vasculature, producing early respiratory insufficiency and right-to-left shunting through the ductus arteriosus and foramen ovale.[2,5-7] In the immediate postnatal transition, even brief periods of excessive airway pressure/volume or gastric insufflation can worsen ventilation–perfusion mismatch, amplify hypoxemia and acidosis and precipitate or aggravate persistent pulmonary hypertension of the newborn (PPHN).[2-8]

Over the past two decades, management has shifted from urgent primary repair toward a stabilize-then-repair paradigm anchored in standardized postnatal care bundles.[1,5,9,10] Contemporary pathways emphasise six early priorities no bag-mask ventilation or CPAP in the delivery room to avoid gastric distension prompt endotracheal intubation with capnography and preductal oximetry, immediate orogastric decompression to low suction, titrated oxygento the minute-by-minute preductal SpO_2 trajectory recommended in neonatal resuscitation guidance, gentle ventilation with low PIP/PEEP and permissive hypercapnia (accepting $PaCO_2$ 50-70 mmHg with pH ≥7.20) to limit ventilator-induced lung injury; and (6) hemodynamic optimisation that prioritises vasoactive support over liberal fluid boluses.[2,3,5,6,11-14] For refractory hypoxemia due to PPHN, stepwise algorithms recommend optimisation of ventilation and circulation, trial of inhaled nitric oxide when indicated and adjunct vasodilators such as sildenafil or inodilators like milrinone, guided by echocardiography and oxygenation indices.[7,11,15-17] Transport readiness thermoregulation, secure airway, continuous OG suction, dual oximetry, labelled infusions and structured handover reduces adverse events and preserves the physiologic gains achieved during initial stabilisation.[12,13]

Equally important is timing of surgery. Contemporary surgical and extracorporeal life support frameworks converge on deferral of repair until physiologic stability adequate oxygenation/ventilation on gentle settings, controlled PPHN and stable hemodynamics while individualising the approach when ECLS is used.[7,9,18-20] Despite this consensus, belief in “the sooner the better” persists in some training environments, risking premature trips to the operating room with labile physiology and a higher likelihood of rescue ventilation or ECLS without demonstrable survival benefit in the absence of stabilisation.[7,18-20]

In many networks particularly outside high-volume neonatal surgical centres the first hour of care is led by young paediatricians and trainees. Resuscitation science suggests that under stress clinicians recall procedural scripts (intubate, decompress) more readily than numeric targets (SpO_2 by minute, $PaCO_2$/pH thresholds) or multi-step algorithms (PPHN sequence), making omission of “the numbers” predictable unless these are trained deliberately and made visible at the bedside.[2,3,16,17] This study therefore evaluates frontline knowledge and beliefs regarding early CDH stabilisation among young paediatricians, quantifies guideline fidelity using a Stabilisation Fidelity Score, maps domain-specific gaps (with special attention to oxygen targeting, permissive hypercapnia and PPHN sequencing), interrogates misconceptions about early surgery and identifies educational/system levers NRP refreshers, NICU exposure, simulation and checklists associated with higher-fidelity practice.[1-3,5,6,11-14,18-23]

METHODS

Study design and setting

We conducted an analytical cross-sectional survey across secondary and tertiary hospitals providing delivery services, neonatal resuscitation and inter-facility transport interfaces at Lahore General Hospital, Services Hospital and Shaikh Zayed Hospital, Lahore from a period of June 2022 to June 2025. Sites were purposely sampled to capture variation in resource profiles (availability of inhaled nitric oxide, high-frequency ventilation, bedside echocardiography) and case-mix (inborn vs outborn neonates). The design focused on assessing frontline awareness and self-reported practices during the first hours of care for neonates with suspected or confirmed congenital diaphragmatic hernia (CDH), aligned with contemporary consensus pathways and neonatal resuscitation guidance Institutional approvals were obtained at all participating centres; participation was voluntary, anonymous and uncompensated.

Participants

Eligible clinicians were junior paediatric medical officers, paediatric residents and early-career registrars with current responsibilities in labour wards, emergency departments receiving outborn neonates and neonatal intensive care units. We excluded consultants beyond five years post-fellowship and clinicians without neonatal responsibilities. To minimise selection bias, site leads invited all eligible clinicians on service rosters during the data-collection window and provided two reminders one week apart.

Instrument development and validation

A 48-item questionnaire was developed from the CDH EURO Consortium consensus update, APSA peri-operative guidelines, neonatal resuscitation (NRP/AHA) oxygen targeting and delivery-room guidance, ELSO recommendations for neonatal respiratory failure including CDH and exemplar institutional care pathways (CHOC, UC Davis). Content validity was established by a panel of ten experts (neonatology, paediatric surgery, transport medicine) who iteratively reviewed item relevance, clarity and mapping to guideline constructs. Cognitive interviewing with six trainees refined wording and flow. Pilot testing in 26 trainees demonstrated internal consistency (Cronbach’s α 0.83) and two-week test–retest reliability (intraclass correlation coefficient 0.88). The final instrument comprised domains on delivery-room priorities (airway sequence, avoidance of bag-mask ventilation, preductal oximetry, oxygen titration), ventilation strategy and blood-gas targets (PIP/PEEP bounds, permissive hypercapnia), gastric decompression (timing, tube size, suction), hemodynamic support and PPHN therapy (vasoactives, iNO, sildenafil/milrinone, echocardiography triggers), transport readiness (thermoregulation, monitoring, documentation, handover), timing of surgery and self-efficacy and system supports.

Outcomes and score construction

The primary outcome was the Stabilisation Fidelity Score (SFS; range 0–20), an additive composite indexing alignment with guideline-concordant early management. Items and weights were prespecified consistent avoidance of bag-mask ventilation in the delivery room (0–2), early endotracheal intubation with capnography and preductal probe placement (0–2), prompt orogastric tube ≥10–12 Fr to low continuous suction (0–2), correct mapping of minute-by-minute preductal SpO_2 milestones in the first 10 minutes of life (0–3), (5) gentle ventilation boundaries (PIP ≤25 cm H_2O, PEEP 3–5 cmH_2O) (0–2), acceptance of permissive hypercapnia ($PaCO_2$ 50–70 mmHg with pH ≥7.20) (0–2), stepwise PPHN management (optimise ventilation/hemodynamics→iNO when indicated→ adjuncts such as sildenafil/milrinone) (0–3), transport checklist elements (≥5 of 6: airway secure, OG suction, thermoregulation, dual oximetry, infusion labels, structured handover) (0–2), continuous analgesia/sedation to minimise ventilator dyssynchrony (0–1) and correct belief that surgical repair should be deferred until physiologic stability (0–1).[12-14,18-23] High fidelity was defined a priori as SFS≥16. Secondary outcomes included domain-level correctness rates, self-efficacy (4-point Likert), availability of key resources (iNO, HFOV/HFJV, echocardiography, unit checklist) and beliefs regarding operative timing.

Exposures and covariates

Prespecified exposures were: completion of NRP within the prior 24 months, cumulative NICU rotation≥6 months, participation in a CDH-specific simulation within two years, access to a unit-level CDH checklist/guideline and involvement in≥3 CDH stabilisations since graduation. Covariates included postgraduate year, hospital level (tertiary vs secondary) and average monthly deliveries.

Sample size

Assuming a 25% prevalence of high SFS with ±5% absolute precision and a design effect of 1.2 to account for clustering within hospitals, the minimum required sample was 276 respondents. Anticipating partial non-response, we targeted ≥300 participants to preserve power for multivariable modelling.

Data collection and quality assurance

Surveys were administered electronically with one response per participant enforced by tokenisation. Mandatory fields, logic checks (e.g., mutually exclusive options, range limits for ventilator settings) and soft validations (prompting for missing oxygen targets) reduced entry errors. Site investigators monitored completion dashboards and addressed technical queries. De-identified data were exported to a secure repository for analysis.

Statistical analysis

Continuous variables were summarised as mean±SD or median (IQR) and categorical variables as counts (percentages). Bivariable comparisons used t-tests/ANOVA or χ^2 tests as appropriate. The SFS was analysed as both continuous and binary (≥16 vs <16). Multivariable linear regression (SFS, continuous) and logistic regression (high SFS) evaluated associations with prespecified exposures, adjusting for postgraduate year, hospital level and monthly deliveries; hospital-level clustering was addressed using robust standard errors. Multicollinearity was assessed via variance inflation factors (threshold <2). Model diagnostics included linearity in the logit for continuous predictors, Hosmer–Lemeshow goodness-of-fit for logistic models and residual inspection for linear models. Two-sided α was set at 0.05. Analyses were performed using standard statistical software.

Ethics and reporting

The study adhered to institutional policies for minimal-risk survey research. Participation implied consent; no identifiable patient data were collected. Reporting followed STROBE recommendations for cross-sectional studies and all score definitions and model specifications were prespecified and retained for transparency with respect to guideline sources and transport frameworks.

RESULTS

Of 338 eligible clinicians, 312 completed the survey (92%). Mean age was 28.4±2.6 years, 62% were female. Roles included medical officers 43.6% (136/312), residents 41.0% (128/312) and registrars 15.4% (48/312), 61% worked in tertiary centres. Training exposure was substantial: 68% had completed NRP within 24 months, 54% had ≥6-month NICU rotations, 41% had CDH simulation exposure and 49% had been involved in ≥3 CDH stabilisations post-graduation. Median cumulative neonatal experience was 14 months (IQR 8–26) (Table 1).

Overall alignment with guidance was moderate. The SFS averaged 13.8±3.4 (range 4–20), with 92/312 (29.5%) achieving high fidelity (≥16/20). Performance was strongest for procedural domains prioritising endotracheal intubation (84%), prompt orogastric decompression (79%) and structured transport checklists (74%). Numeric/algorithmic targets were weaker: only 58% consistently avoided bag-mask ventilation (BMV) in the delivery room, 46% correctly mapped preductal SpO_2 milestones for minutes 1–10, 39% accepted permissive hypercapnia ($PaCO_2$ 50–70 mmHg, pH ≥7.20) and 41%

selected a stepwise PPHN sequence. Continuous analgesia/sedation for ventilator synchrony was endorsed by 45% (Table 2). A notable cognitive gap concerned timing of surgery. Despite contemporary pathways that defer repair until physiologic stability, 35% believed earlier surgery improves outcomes even when unstable and 18% were unsure; only 47% endorsed continued medical optimisation when significant PPHN/instability persisted (Figure 1).

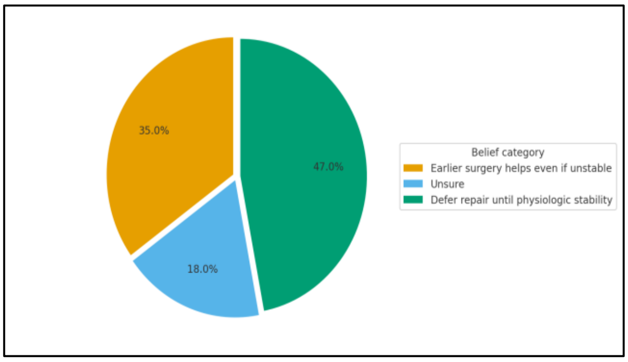

Figure 1: Categories for belief.

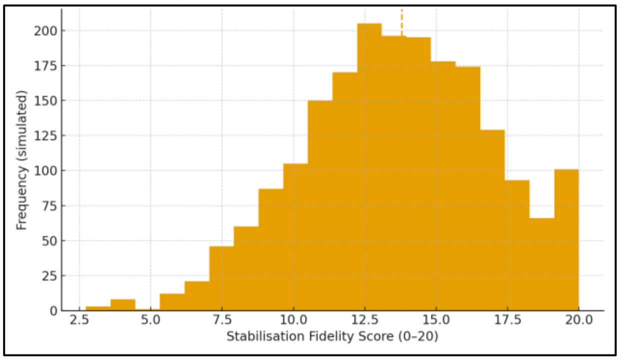

Figure 2: Stabilisation fidelity score.

In adjusted models (cluster-robust by hospital), four exposures independently predicted high SFS (≥16): NRP within 24 months (aOR 2.7, 95%CI 1.6–4.7), NICU rotation ≥6 months (aOR 2.1, 1.2–3.6), CDH simulation (aOR 1.9, 1.1–3.2) and access to a unit CDH checklist/guideline (aOR 2.2, 1.3–3.9). Tertiary setting also favoured higher fidelity (aOR 1.8, 1.0–3.1). A histogram of SFS illustrates a unimodal distribution with a right-shoulder towards higher scores.

Table 1: Participant characteristics.

Characteristic	Value
Total respondents, N	312
Age, years (mean±SD)	28.4±2.6
Female sex, N (%)	193 (62%)
Tertiary centres, N (%)	190 (61%)
NRP within 24 months, N (%)	212 (68%)
NICU rotation ≥6 months, N (%)	169 (54%)
CDH simulation exposure, N (%)	128 (41%)
≥3 prior CDH stabilisations, N (%)	153 (49%)
Neonatal experience, months (median, IQR)	14 (8–26)

Table 2: Domain wise knowledge and adherence.

Domain	N correct	Percent correct (%)
Prioritise ETT at birth	262	84
OG tube to low suction	246	79
Transport checklist use	231	74
Avoid BMV in delivery room	181	58
Correct preductal SpO_2 milestones	144	46
Permissive hypercapnia ($PaCO_2$ 50–70, pH≥7.20)	122	39
Stepwise PPHN management	128	41
Analgesia/sedation infusion	140	45

Table 3: Predictors of high SFS (≥16/20), multivariable models.

Predictor	Adjusted odds ratio (aOR)	95% CI
NRP within 24 months	**2.7**	1.6–4.7
NICU rotation ≥6 months	**2.1**	1.2–3.6
CDH simulation exposure	**1.9**	1.1–3.2
Unit CDH checklist/guideline	**2.2**	1.3–3.9
Tertiary vs secondary hospital	**1.8**	1.0–3.1

DISCUSSION

This multi-centre evaluation reveals a consistent pattern: young paediatricians execute procedural elements of early CDH care reliably endotracheal intubation, prompt orogastric decompression and structured transport checklists yet frequently miss numeric targets and algorithmic steps that determine cardiopulmonary trajectory in the first hours of life.[1,5,9,12,18] Specifically, less than half accurately applied minute-by-minute preductal SpO_2 trajectories and accepted permissive hypercapnia within lung-protective bounds ($PaCO_2$ 50–70 mmHg, pH ≥7.20) and fewer than half selected a stepwise PPHN sequence (optimize ventilation and hemodynamics→trial inhaled nitric oxide when indicated→adjunct vasodilators guided by echocardiography).[2,3,6,11,15-17,20] These gaps matter: over-ventilation, hyperoxia or untimely escalation can aggravate V/Q mismatch, amplify vasoreactivity and increase the likelihood of refractory hypoxemia or need for rescue strategies.[1,5-7,12,18-20]

Our data support a cognitive explanation for these deficits. Under time pressure, clinicians preferentially recall action scripts ("intubate, decompress, transfer") over thresholds and multi-step algorithms, unless the numbers are repeatedly rehearsed and made visible at the bedside.[2,3,16,17] The finding that recent NRP, ≥6 month NICU rotation, CDH-specific simulation and unit checklists each independently increased the odds of high SFS suggests that deliberate practice and externalized cognitive aids translate guidelines into executable behaviour at the point of care.[2,3,12-14,18-23] These levers align with implementation literature from neonatal resuscitation and transport medicine, where standardized pathways and checklists have reduced omission errors and improved handover fidelity.[12-14]

A second, clinically important insight is the persistence of the "earlier surgery is better" misconception. Over half either believed or were unsure that operating within hours benefits unstable infants. Contemporary consensus rejects this premise: outcomes hinge predominantly on pre-operative physiology, not the clock.[1,7-9,12,18,22,23] Stabilization adequate oxygenation/ventilation on gentle settings, controlled PPHN and hemodynamic stability should precede repair, when extracorporeal life support is required, ELSO frameworks guide timing and technique to balance cardiopulmonary support and operative risk.[7,8,23]

Proceeding to the OR with labile shunt physiology risks deterioration and unplanned reliance on rescue modalities without demonstrable survival advantage in the absence of stability.[1,7-9,18,23] Addressing this belief demands myth-busting woven into teaching, checklists and simulation (e.g., "stabilize first, repair later"), with measurable readiness criteria (preductal SpO_2 85–95% on modest FiO_2, $PaCO_2$ 50–70 mmHg with pH ≥7.20, improving lactate, stable vasoactive requirements).[1] Resource context also shapes fidelity. Nearly half of respondents reported lack of iNO and one-third lacked HFOV/HFJV, underscoring the necessity of mastering gentle conventional ventilation, precise oxygen titration and transport readiness in many networks.[6] Where iNO is unavailable or ineffective, echo-guided use of sildenafil or milrinone is reasonable, but only after ventilation and circulatory goals are optimized.[11,15-17] Embedding clear escalation pathways linked to oxygenation index thresholds, hemodynamic targets and echo findings can reduce ad-hoc FiO_2 escalation and promote physiologic problem-solving.[11,15-17,20] Implications for education and policy. Authors propose a four-part implementation bundle curricular overlay that merges NRP minute-by-minute SpO_2 targets with CDH-specific ventilation and PPHN thresholds visible cognitive aids at resuscitaires and ventilators (laminated SpO_2 curves, $PaCO_2$/pH acceptance, PIP/PEEP bounds, PPHN sequence and transport checklist) low-cost simulation with mandatory verbalization of numeric targets, timed prompts and role cards and structured debriefing after every CDH resuscitation to close the loop on missed targets and refine logistics.[18-23] These steps are inexpensive, scalable and congruent with evidence linking standardization to improved neonatal processes of care.[12-14]

Strengths and limitations. Strengths include multi-site sampling, a validated instrument anchored in widely adopted guidance and prespecified multivariable analyses accounting for clustering. Limitations include reliance on self-report, which may overestimate adherence, modest over-representation of tertiary centres and absence of linkage to patient-level outcomes. We also did not directly audit bedside performance or gas targets; future studies should incorporate prospective observational audits, waveform/exported monitor data and time-stamped process measures (e.g., time to OG suction, SpO_2 attainment by minute, $PaCO_2$ within target by 2 hours). Pragmatic trials testing a bundle (simulation + checklists + debrief + NRP refreshers) should assess impacts on transport physiology, ventilator days, ECMO utilization and survival.[1,23]

CONCLUSION

Early CDH care is a numbers game as much as it is a sequence of tasks. Young paediatricians generally "get the big moves right," but improvement depends on hitting the targets preductal SpO_2 by minute, lung-protective $PaCO_2$/pH and sequenced PPHN therapy while resisting the impulse toward premature surgery. Because recent NRP, NICU exposure, CDH simulation and unit checklists each substantially increase high-fidelity practice, neonatal networks can raise the floor quickly by embedding targets into visible aids, rehearsing them in simulation and institutionalizing transport doctrine operationalizing the principle to stabilize first, repair later.

Funding: No funding sources
Conflict of interest: None declared
Ethical approval: The study was approved by the Institutional Ethics Committee

REFERENCES

1. Snoek KG, Reiss IKM, Greenough A, Capolupo I, Urlesberger B, Wessel L, et al. CDH EURO Consortium. Standardized postnatal management of infants with congenital diaphragmatic hernia in Europe: 2015 update. Neonatology. 2016;110(1):66–74.
2. Weiner GM, Zaichkin J, Kattwinkel J. Textbook of Neonatal Resuscitation (NRP). 8th ed. Itasca (IL): American Academy of Pediatrics. 2021.
3. Wyckoff MH, Wyllie J, Aziz K, de Almeida MF, Fabres J, Fawke J, et al. Neonatal life support: 2020 International Consensus on CPR and ECC with treatment recommendations. Circulation. 2020;142(1):185–221.
4. Gallot D, Boda C, Ughetto S, Robert-Gnansia E, Francannet C, Laurichesse-Delmas H, et al. Prenatal management of congenital diaphragmatic hernia. Semin Fetal Neonatal Med. 2014;19(6):357–65.
5. Reiss IKM, Schaible T, van den Hout L, Capolupo I, Allegaert K, van Heijst A, et al. Standardized postnatal management as a cornerstone of improving outcome in CDH. Eur J Pediatr Surg. 2012;22(5):364–9.
6. Keijzer R, Puri P. Delivery room and early ventilation strategies in congenital diaphragmatic hernia. NeoReviews. 2011;12(8):439–52.
7. Extracorporeal Life Support Organization (ELSO). ELSO Guidelines for Neonatal Respiratory Failure (including CDH) on ECMO. Ann Arbor (MI): ELSO; updated. 2021.
8. Choi W, Halligan N, Zaniletti I. ECMO and timing of repair in congenital diaphragmatic hernia: a contemporary review. Children (Basel). 2021;8(11):1000.
9. Putnam LR, Tsao K, Lally KP. Perioperative pathways and outcomes in congenital diaphragmatic hernia. J Pediatr Surg. 2016;51(1):74–7.
10. Snoek KG, Capolupo I, Rosmalen J. The CDH EURO Consortium registry: epidemiology, management and outcomes. Pediatr Surg Int. 2016;32(5):473–83.
11. Harting MT, Lally KP. The congenital diaphragmatic hernia patient: pathophysiology and perioperative care. Semin Pediatr Surg. 2014;23(5):298–306.
12. American Pediatric Surgical Association (APSA). CDH Clinical Practice Guidelines (perioperative pathway); 2023.
13. Children's Hospital of Orange County (CHOC). CDH Care Guideline (Delivery Room & NICU). 2024.
14. UC Davis Health. Congenital Diaphragmatic Hernia Clinical Management Guideline. 2024.
15. Kinsella JP, Steinhorn RH. Pathobiology and therapy of persistent pulmonary hypertension of the newborn. J Pediatr. 2022;245:30–41.
16. Kamlin COF, O'Donnell CPF, Davis PG, Morley CJ. Oxygen saturation in healthy infants immediately after birth. J Pediatr. 2006;148(5):585–9.
17. Oei JL, Dawson JA, Moss TJ, Morley CJ, Davis PG. Targeted oxygen supplementation and monitoring during neonatal transition. Semin Fetal Neonatal Med. 2013;18(4):176–80.
18. Downard CD, Jancelewicz T, St Peter SD. Perioperative management of the neonate with congenital diaphragmatic hernia. Semin Pediatr Surg. 2017;26(3):144–8.
19. Migliazza L, Bellan C, Alberti D, Auriemma A, Burgio C, di Castri A, et al. Retrospective study of high-frequency oscillatory ventilation in congenital diaphragmatic hernia. J Pediatr Surg. 2007;42(1):98–104.
20. Snoek KG, Greenough A, Capolupo I, Schaible T, Allegaert K, van Heijst A, et al. Gentle ventilation and permissive hypercapnia in CDH: institutional experiences. J Pediatr Surg. 2012;47(3):522–7.
21. Lakshminrusimha S, Keszler M. Persistent pulmonary hypertension of the newborn. NeoReviews. 2015;16(12):680–92.
22. Keijzer R, Puri P. Maximizing survival in congenital diaphragmatic hernia: gentle ventilation and cardiovascular support. NeoReviews. 2016;17(12):705–17.
23. Extracorporeal Life Support Organization (ELSO). ELSO Registry and guidance documents for neonatal ECLS/CDH. Ann Arbor (MI): ELSO. 2021–2024.

Cite this article as: Ghafoor S, Rabbani K, Ghaffar M, Tehreem S, Ali W, Iqbal F, et al. Young paediatricians on the frontline: awareness of neonatal stabilization in congenital diaphragmatic hernia prior to surgical referral. Int J Res Med Sci 2026;14:427-32.